The *mnp* Model

An Architecture for the Fine Grained Structure of Everything

- or -

Three Entities, Three Effects, One Universe

An Attempt to Create a Radically Reduced Instruction Set for the Universe

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Abstract

The *mnp* Model is offered as a conceptual structure for understanding the universe. The *mnp* Model has one main principle, two minor principals, two assumptions, three new and tiny entities, and three new and short range interactions between those entities.

The principles, entities, and effects are explained. The effect directions and ranges and how those effects work and lead to the basic structures of matter and fields are shown. The many failures considered in the development of the *mnp* Model are also documented, both to support the effectiveness of the current conceptual structure and in hopes that others can critique and avoid the dead ends encountered.

Some of physics' givens, such as mass, movement and the Lorentz transformations involved, inertia, conversion of mass and energy, fields from moving masses and moving charges, relativistic mass, quark charge, nucleon structure, weak and strong interactions, have (mostly) simple geometric explanations in the *mnp* Model. Many of physics' givens are seen as emergent from the *mnp* Model rather than intrinsic to particles or fields. MUCH work remains.

The Model avoids the use of familiar terms for new concepts, hence terms "entities" and "figments" for the tiny constituents of particles and fields. "Effects" or "interactions" replace forces.

The structure of fields and of particles, gravity, electro-static, magnetic, electro-magnetic, weak, and (both) strong forces are described. The Model is considered by the author to be capable of explaining the range of physics experimental results with its minimal set of concepts. It lacks any "proof of concept" in the form of calculation and modeling. The Models and documents are currently undergoing remodeling.

Abstract - long form

The *mnp* Model is new and not new. "No one is thinking like this," yet preon models were considered in the 1980's. String theory and quantum loop gravity have been seeking simplicity and descriptive power for some time. Poincaré's "New Mechanics" of 1905, often referred to as LET or Lorentz Ether Theory, is considered experimentally indistinguishable from Special Relativity though SR is currently preferred.

The *mnp* Model contains interesting suggestions for many current puzzles but also challenges orthodoxy in many ways.

The conceptual structure is used to describe photons, charge, magnetism, electrons, and Dirac spin. A structure is proposed for muons and small and large quarks. A reordering of generations of quarks is suggested. The Higgs is described as a meson.

The *mnp* Model suggests gravity results in a non-intuitive way from the tendency of the entities to align their orientation of Travel. Densities never become infinite. Light is seen as "slowing" passing a mass by taking a longer route. Particles in deep space may accelerate significantly if already traveling toward the mass, black holes are porous but destroy "elementary" particles, and extra dimensions do not seem to be needed to explain current experiment.

Dark matter and energy are pictured as unorganized accumulations of the basic entities.

The photon paarticle is seen as having structure as a clump of mediators with Axis aligned, constantly creating magnetic and electric fields which then spread and attenuate themselves. Those fields help organize the entities into a complete photon when it is first created. The electric and magnetic fields also influence (mostly subsequent) photons. Photons continue to create new fields as they travel.

Fields have no net translation or spin but do have structure, so do not affect or take energy from the particles that create them until a disturbance or measurement is made. Due to the stochastic nature of interactions in the *mnp* Model, the

probabilistic nature of the fields and the location of the photon as described in QED are not supplanted. The *mnp* Model does provide descriptions of charge and electromagnetism that should eventually become visible and accessible to the merely gifted student.

Time dilation is a function of the structure of matter and movement at all speeds. Length compression must occur if the basic entities and their coiled organization is preserved. The basic entities have a constant speed, so particles can be "stationary" only because in matter the basic entities move in (closed) coiled loops. Mass derives from the influence of the entities and the tendency of the "charge" entities to pick up "mediators" to the small degree the "charge" entities are not just coiling, but are moving or interacting with fields and other particles. Motion and kinetic energy arise from redirecting those entities in a direction. This differs, to the author's dismay, from modern descriptions of energy, momentum and mass. The Model's description of time dilation and length contraction are consistent with the Michelson-Morley experiments and the very precise successors, but suggest a non-relativistic interpretation. One way speed of light experiments, considered impossible by many, are not accurate enough to measure the tiny differences in the measured speed of light due to the earth's rotation and orbit expected by the Model.

The Model suggests that the basic structural unit of particles is a loop of charge material 1/6 of an elementary charge which combine as six loops into a strand with hexagonal stranding to form the structure of electrons, positrons, and the small quarks through strange.

The electron is described as a strand of six coiled filaments made up of negative charge entities, capable of expanding in a shell, twisting into higher energy shells, responding to spin measurements, reverting quickly to a tiny sphere when free, and maintaining its unity at relativistic speeds.

The Model describes the weak force as exchange of charge material loops, stable quantum triplets as the same process but with incomplete realignment and separation due to the presence of a compatible third quark, and the spontaneous appearance of positron-electron pairs as similar to neutron decay in the requirement for the presence of "charge" entity loops. The Model suggests why nucleons tend to be left handed in our region of the universe. Why up, down, and electrons predominate over anti-up, anti-down, and positrons is explained as (and accident of) recruitment of the conserved charge loop material once some early quark triples became stable. The Model suggests a structural nature of muons, W and Z bosons as being similar to the quarks, though it has no need for elusive mediators. Some of the newest material is in Appendix C, "Current Blog Articles." 93

Appendix F 238 addresses many of the "unsolved problems in physics" of 2012 with comments of varying quality, from interesting to wild guessing.

The *mnp* Model does not yet include relative magnitudes of the influence or distances over which the three effects operate. The "size" or "mass" or "count" of figments need not be determined until the Model is complete and ready to be scaled to the real universe. The *mnp* Model insists that ALL distances of interaction will be small and ALL influences will act locally.

Determining the details and magnitudes of the Computational *mnp* Model will take some time.

Other models and theories of unification may benefit from the *mnp* Model's investigation of relevant phenomena and its structural explanations of perceived distance effects and spacial distortions.

The Standard Model might even benefit from an approach based on sixths of an elementary charge "mixed in a way we cannot see." This could make current particle theory and QCD interesting. If quark triplets arise due to incomplete exchange of quantized sixths and the weak force from complete exchange, bringing calculation to a simplified Quantum Chromo-Dynamics might be possible, though this requires seeing the weak and strong forces as contact rather than mediated interactions.

Thanks to the Giants

The author thanks the giants who have done so much careful experimentation and the giants who have worked to explain the experimental results and who have provided the vocabulary, grammar, and mathematics to describe those results. If the *mnp* Model cannot eventually confirm those experimental results and predict others, its conceptual beauty will be for naught.

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Forward

The main document on the *mnp* Model has not yet been re-written to incorporate all the developments in the Model of the last nine years. This Foreword (mostly from 2015-10-26) represents a the start on a new *mnp* Manual.

In keeping with modern comedy, humor may be limited but everyone will find something at which to take offense.

"No one is thinking like that" has been an accurate description of the *mnp* Model for years.

Why "think like that?" The author suggests a simple Model that

- makes the Planck constant understandable
- has a small number of building blocks and interactions
- seems to cover the range of existing forces and particles
- leaves few conceptual gaps for mysteries or new forces or particles or universes

might well be attractive. On the other hand, the author is aware everyone will find offense somewhere in the list of what the simple *mnp* Model purports to explain:

- Planck constant h is the result of the coiled nature of matter
- Spin is the result of the coiled nature of matter, with the quantized loops of fixed length and fixed speed c requiring 720 degrees for complete revolution
- The basic charge loop structure of quarks, electrons, and positrons comes from 6 loops in a strand, allowing +1 to -1 charge in steps of 1/3
- Length contraction and time dilation are essential to movement, not accidents that happen. ALL motion is "relativistic" though a universal frame of reference is required
- Left-handed preference is not universal but a function of the Earth's rotation
- Gravity is an interaction over a very small scale between entities moving at c
- Galactic dynamics results from the recruitment and attraction of gravitons which act over very short distances
- Gravity beyond some limit a_0 is weak and chaotic unless a distant mass has been "captured" in which case the gravitational attraction is higher than Newtonian physics suggests
- Gravitational (and electric and magnetic) fields are recruited and have mass since they are made up of the same 3 basic entities that make up matter
- The acceleration of gravity is very complicated and dependent on the coiled nature of matter. Light and neutrinos behave fundamentally differently than matter in a gravitational field
- Photons and neutrinos are the same except that photons are polarized and the constituents of neutrinos have random polarization, with net 0 magnetic effect
- Neutrinos recruit and change mass. They are not quantized. A moving or rotating or oscillating neutrino detector might be more effective at measuring a range of neutrino masses.
- Wavelengths of photons and all other moving particles are the result of the particles' momentum and not the cause of the energy of the photon. *Though how electro-magnetic radiation recruits photons is not yet explained*
- Black holes are seen as made up of basic entities and constituents moving at c and do NOT have a singularity at the center
- Dark matter and dark energy are not sinister unexplained forces but do not have any magical gravitational effects either. Disorganized matter may collect around galaxies and other masses, but will have normal gravitational effects.
- Quantum chromodynamics becomes a much simpler geometric explanation of 6 stranded coiled quarks tearing at each other, based on the constituent's speed c and their structure. Calculations may be just as complicated as QCD's
- The space in which the constituents of the Model move is flat as is the basic "time" in which the constituents move at c

- Time and distance result from measurement by particles including photons and neutrinos
- Down and Strange are seen as in the same family, with perhaps a third shorter lived -1/3 charge particle in the family.
- The Higgs is a real particle, but is seen has being a meson of quarks in the same family as bottom and should usually present in its most durable form as having spin 1. It is seen as having nothing to do with gravity.
- If a -1/3 charge particle can be found corresponding to top, it will be even more massive/energetic and will come in two or three variants.
- Electro-magnetic fields caused by photons are somewhat persistent and are reinforced by coherent photons. *single photon interference is not adequately explained, but the requirement that photons be coherent is seen as crucial to the explanation*
- Worm holes will not exist
- Time travel is impossible

Lest any readers remain unoffended, the author suggests that

- Acceleration does not produce time dilation
- The satellites making up the GPS system see Earth clocks as fast
- The twin-paradox explanations are on shaky ground
- The time dilation effects of gravity are a function not of acceleration which depends on the presence and differential direction of gravitons but on just the presence of gravitons due to strength of the gravitational field which depends on the presence and proximity of mass. Time dilation at Lagrange Points is not zero.

Hence the author suggests the theory of special relativity is on shaky ground, and the theory of general relativity is also ripe for reinterpretation.

History of the *mnp* Model

The *mnp* Model grows out of a thought experiment, started 45 years ago, based on two questions.

- "What is the simplest explanation for gravitational forces?" and
- "What is the simplest model for matter and energy?"

Starting with basics:

- the speed of light is constant
- some small angular momentum seems to be fundamental
- our universe exists
- certainty contains and even requires uncertainty

Adding a few concepts:

- the simpler the explanations the better
- the simpler the interactions the better. Even better if interaction is only with near neighbors
- the universe exists, but that certainty contains uncertainty

The result of that thought experiment is the *mnp* Model. The *mnp* Model needs no long distance magic, no extra dimensions, and no implausible singularities except the first.

The *mnp* Model has developed over time, starting with a meditation in early August 2011 positing that every "point" in the universe is moving at c. The first writings were a compendium of emails from September 22, 2011.

Drafts of this "treatise" stopped in December 2012, though piecewise developments have been presented in the blog into 2015 and sporadically since.

Understandings of the three basic entities in the *mnp* Model, their two interactions and one "non-interaction" have developed in that time. Understanding the Planck constant has improved. Gaps in the *mnp* Model's understanding of movement and the formation of photons from electro-magnetic radiation have also been recognized.

Language and Vocabulary

This document (starts) an attempt to bring the central draft document on the *mnp* Model into the second seventh of the 21st century.

The draft has not yet been translated into the language of physics. Some of the concepts are foreign or rare to physics. The author speaks more the language of architecture and architectural engineering and comes from a background of intellectual and computer tool development. So readers who attempt that translation in their own minds have the author's admiration and gratitude.

Author's Motivations

The author has always been irritated with models in which space needed to know what was going on across the universe and had very large numbers of magic quantities. He also has not forgotten the teaching assistant who proposed sending information faster than light at the intersection of two rotating beams of light.

The author has always been awed by the care and genius required by experimentation.

In spite of decades of relative stable life and the awe in which he holds theorists and experimenters, the author finds the unsettled state of physics knowledge and the suggestions of the *mnp* Model leading to the conclusion that life will be interesting and unsettled for all branches of physics for many years.

The author believes that an integration of various branches of physical experimentation and knowledge is possible. To the author's dismay, it appears that gradual, evolutionary development of theory and mental models will not be sufficient to achieve an integrated theory of much of anything, let alone everything.

Author's Intentions

The *mnp* Model is proposed in the spirit of understanding and development. Whatever Theory of Everything emerges to unify the various incompatible branches of physics, that unification might be able learn from the attitudes and approaches of the *mnp* Model and may even require a re-examination of theory and proof similar to that presented here...

Contents

Chapter 1

Criteria for Model Acceptance

A new "Theory of Everything" needs to meet many criteria.

Both the Constituent and the *mnp* Model Must Arrive Fully Formed - As A Quantum

An integrated model or a Theory of Everything may need to arrive as a quantum. Stresses may show up in the field/fabric of physics before then, but a new particle(physics) must be stable on its own so it doesn't oscillate back out of the real plane. When the Model will reach that quantum state is not clear. The response from physicists so far is that it has not reached that first quantum necessary for attention.

When Does a Model Deserve Attention?

The "Hauser Criteria" have been suggested as a basis for attention:

- Does F=ma come out of your theory in some limit?
- Can you get Coulomb's law?
- Can you calculate the cross-section for electron-electron scattering?

At present, movement is well understood. Movement has time dilation as an integral aspect of movement of mass! The separation of optic's photons from the electric and magnetic fields they cause and which then affect (mostly) other photons is solid but not modeled. The coil based nature of matter is proposed with confidence. The rest of physics is sketched but not calculated. The Constituent Model's and the *mnp* Model's positing of structure to all elementary particles (and forces) is at odds with current experimental inability to find structure in quarks and other "elementary particles," though anyons and fractional charges seem to be occurring.

Inertial reference frames, where there are no net forces, are very hard to find in the universe. The Constituent Model and the *mnp* Model (and presumably quantum field theory when it includes gravity) therefore find changing viewpoint does not work when examining the fine grained structure of matter and energy and time.

Neils Bohr could fill his notebooks with words and diagrams but never numbers. That approach will not work today.

When Does a Model Deserve Serious Attention? - The Big Five

Five Problems in Theoretical Physics were posed in 2006 by Lee Smolin ISBN-13 978-0-618-55015-7 The Trouble with Physics pages 5-17

The Constituent Model and the *mnp* Model fall short:

- Combine general relativity and quantum theory into a single theory that can claim to be the complete theory of nature. Also known as the "problem of quantum gravity"

- Resolve the problems in the foundations of quantum mechanics, either by making sense of the theory as it stands or by inventing a new theory that does make sense.
- Determine whether or not the various particles and forces can be unified in a theory that explains them all as manifestations of a single, fundamental entity.
- Explain how the values of the free constants in the standard model of particle physics are chosen in nature.
- Explain dark matter and dark energy. Or, if they don't exist, determine how and why gravity is modified on large scales. More generally, explain why the constants in the standard model of cosmology, including the dark energy, have the values they do.

Though six years old, this list does not seem wildly out of date. The three volumes of the Feynman lectures suggest quantum understanding of everything will take time.

When Does a Model Deserve Acceptance?

To any Model hoping to supplant existing orthodoxy in Physics, Malament's challenge is useful.

From "Classical Relativity Theory" (`http://arXiv.org/abs/gr-qc/0506065v2` 18Aug2005, to appear in Handbook of the Philosophy of Physics) page 39 which discusses the one way speed of light and the criteria for an electromagnetic theory that hopes to supplant Einstein's reasonable assumption. Quoting Howard Stein 1991

> we know that within this theory, there is only one "reasonable" concept of simultaneity (and in terms of that concept, the velocity of light is indeed as Einstein supposed); therefore an alternative will only present itself if someone succeeds in constructing, not simply a different empirical criterion of simultaneity, but an essentially different (and yet viable) theory of electrodynamics of systems in motion. No serious alternative theory is in fact known. (H. Stein. On relativity theory and the openness of the future. Philosophy of Science, 58:147–167, 1991.)

When Does a Model Deserve Publication in the Popular Press?

Word from the publishing industry is that any publisher or agent will want to know if the theory has been peer reviewed and holds water. Clearly, the error bars need to be narrower than a 300 mesh sieve or about 50 microns.

When Does a Model Start to Look Viable?

The "E Criterion" is simple. "Well, do you have any numbers?" At least at that point the Model starts to look like physics. Emphasis on starts.

What's a Model to Do?

So the challenge has been issued, and the Constituent Model and *my nutty persistent* Model of the imagination has some work to do. The author has a great deal of work to do in understanding the results of recent and not so recent experiments. Given the range and contradiction in physics writings in the last thirty years, he may not be alone.

The Internet Answer - Never

Noted 2014-04-01:1027, a comment in a sci.chem forum lost to followup: "maybe I'll be interested when your theory computes the instability of nuclei from first principles."

Gotta love the internet, the repository of much of the world's knowledge. And most all of its foolishness.

Chapter 2

Two Models, Many Possible Expositions

More than two approaches are available for introducing the author's Architecture of the Universe. The dilemma was described in Post 43, A Tale of Two Models, in 2022 from a draft created early January, 2019.

A Tale of Two Models - Post 43 (2022-01-10)

The *mnp* Model may be presented either as a specific structural model with three entities and three effects that combine and operate as the universe or as a general conceptual model comprised of constituents moving at c. The Constituent Model, with constituent entities moving at c can be used to describe many phenomena in physics. The author considers the *mnp* Model a more specific development of the Constituent Model. Both may be viewed as gauge models. Someday.

So instead of a single linear exposition, the author is faced with two (nay, more) choices. This dilemma has been faced before. Based on Dickens' model, here is one draft of a start with the original included for reference. On first reading, choose a column.

mnp /Constituent Models Adaptation: A Tale of Two Models I. The Epoch	Dickens Original: A Tale of Two Cities I. The Period
It was the best of times, it was the worst of times, it was the age of wisdom, it was the age of foolishness, it was the epoch of belief, it was the epoch of incredulity, it was the season of Understanding, it was the season of Dark Energy, it was the spring of hope, it was the winter of despair, we had everything before us, we had nothing before us, we were all going direct to Understanding, we were all going direct to Confusion — in short, the period was so far like the present period, that some of its noisiest authorities insisted on the Models being rejected, for good or for evil, as the height of folly, vanity, and foolishness with a priori no chance of success. There were established journals and authorities on the thrones of science.	It was the best of times, it was the worst of times, it was the age of wisdom, it was the age of foolishness, it was the epoch of belief, it was the epoch of incredulity, it was the season of Light, it was the season of Darkness, it was the spring of hope, it was the winter of despair, we had everything before us, we had nothing before us, we were all going direct to Heaven, we were all going direct the other way — in short, the period was so far like the present period, that some of its noisiest authorities insisted on its being received, for good or for evil, in the superlative degree of comparison only. There were a king with a large jaw and a queen with a plain face, on the throne of England; there were a king with a large jaw and a queen with a fair face, on the throne of France.

In all Disciplines it was clearer than crystal to the lords of the Discipline preserves of wisdom and knowledge, that things in general were settled for ever.

In both countries it was clearer than crystal to the lords of the State preserves of loaves and fishes, that things in general were settled for ever.

Or not.

Thank you, Charles Dickens. Original here: `http://www.gutenberg.org/ebooks/98`

In many ways, the present period is not so different from the year of the Current Era one thousand seven hundred and seventy-five. Or it is. Different.

So the *mnp* /Constituent Model exposition will be a Tale of shuttling back and forth between Two Models with a common origin but separated by a channel of specificity. This Tale is offered in quest of understanding and of an alternate to the current and Standard Models.

The current models have been preserved one hundred eighty, one hundred fifty four, one hundred forty five, one hundred thirty four, one hundred sixteen, one hundred thirteen, one hundred two, ninety three, ninety two, ninety one, and fifty one years, depending on which Current Model one chooses, by diligent experiment and explosive development of useful product. Preserved also by acceptance of the contradictions and unknowns with the promise one makes in science to revisit mysteries and other rough edges. (2)

The two new Models ARE based on the exposed bedrock of physics. The speed of light, c, is a constant. Experiments and the universe Exist ($\exists$). The general Model can be considered the Continental Model, since it has some mathematical connection to the rest of physics. It has been christened the Constituent Model. The more specific Model may be considered the island Model, since it appears untethered to any existing theory. It has been christened the *mnp* Model, for the three basic entities *m*ediators, *n*egatives and *p*ositives seen as making up matter, energy, and fields. The *mnp* Model adds an understanding of the third foundation/leg of modern physics, the Planck constant h.

The quest for novel understanding will be interesting. The tale unfolds...

Local Addendum - Current Model Dates

Pick your metric:

Area	Topic/Scientist	Year
Statistical Mechanics	Bernoulli	1738
	Maxwell	1859
	Boltzman	1864
	Statistical Mechanics proper	1870's
	Statistical Mechanics as a term by American mathematical physicist J Willard Gibbs	1884
	Boltzmann's collected Lectures on Gas Theory	1896
	Gibbs *Elementary Principles of Statistical Mechanics*, which formalized the basis of statistical mechanics and which was found to be very general	1902
Electro Magnetism	Maxwell's equations	1864
	Maxwell's Treatise on Electricity and Magnetism	1873
Relativity	Special Relativity	1905
	General Relativity	1916
Quantum Mechanics	in matrix form by Heisenberg Born and Jordan	1925
	in wave form by Heisenberg Pauli and Dirac	1926
	as the Heisenberg Uncertainty Principle and the Copenhagen Interpretation (Schrödinger)	1927
The Standard Model		1967

Chapter 3

The Constituent Model

The first, shorter, and less developed exposition will be the Constituent Model, a more general and somewhat more mathematical description of (some portion of) physics in two posts, Post 36 from 2017 is an introduction to the scope of the Constituent Model. The followup Post 41 from 2019 is shorter, offering further developments. This chapter addresses mostly movement, gravity, and similar issues. The *mnp* Model includes much more insight into charge, electromagnetic, and weak force.

Constituent Models - Useful Supersets of the *mnp* Model - Post 36 (2017-06-24)

Abstract

The term Constituent Model is explained as an attempt to model fermions and fields as made up of constituent(s) moving at c. Interpreting momentum, movement, and mass in a Constituent Model with constituent(s) moving at c is seen as leading directly to the familiar concepts of rest mass, gamma, and relativistic mass. Added: 2017-06-24

The author believes Constituent Model is a new term, though great minds may be working in the same direction.

The author recognizes a potential naming conflict; the term constituent is also used for constituent quarks, which are current quarks along with (some of) their associated virtual quarks and gluons. Constituent quarks are NOT directly related to Constituent Models, though the *mnp* Model sees quarks as intrinsically recruiting and keeping what QCD calls gluons.

The term Constituent Model is chosen intentionally, since particles are seen as more or less cohesive collections of participants in a given region. Net movement is the net of each contribution. Fields are seen not as specific motions but the result of imbalances in the random potential offered by constituent(s) moving at c. Field-particle interactions may be as dependent on the particle constituent(s) as on the field constituent(s). The word Constituent is specifically intended as an analogue to politics. Particle and field behavior is seen as rather like voting; individuals have their own paths but the net or average of a vote determines an issue. The plural of constituent is shown here as constituent(s) to indicate that constituent(s) may be either discrete tiny entities as posited by the *mnp* Model, in which case the "plural" would be constituents or may be continuous, in which case the "plural" would be constituent.

Interpreting the Ψ function of a particle as the particle is not far removed from a Constituent Model. If influences on the electron are seen as influences on the Ψ function itself, this picture is even closer to being a Constituent Model. Add an expectation that influences on a Ψ function and changes in the Ψ function travel at most at the speed of light, and the interpretation has become a Constituent Model. This necessitates seeing the Ψ function as representing both the particle, our incomplete knowledge of the location and movement of that particle, and accumulated inaccuracies due to the mathematical formulation. The author suggests the Ψ function has infinite tails only as a way to make the mathematics tractable. So "finding" an electron at a location does not require infinite time in a Constituent Model based on the speed of light.

The *mnp* Model is an example to a Constituent Model.

Introduction

Seeing fermions as made up of charge structure and mediators traveling at c is, the author suggests, useful in particle dynamics. Remaining stationary requires that the constituent(s) be rotating internally in a mostly symmetric fashion. Movement involves a net direction to that internal movement. Slight asymmetries may lead to spin and chirality.

Seeing quarks, electrons, and positrons as having charge structure in six parts, is useful for understanding nucleons, weak interactions, high energy collisions, and Quantum Chromo Dynamics. This is one level of greater specificity in the *mnp* Model.

Seeing the charge structure of leptons as consisting of coiled loops, may be useful in explaining spin, strong nuclear force, van der Waals forces and Casimir effects, Abraham-Lorentz forces, and the quantization of charge. This is another level of even greater specificity in the *mnp* Model.

Seeing fields made up of mediators and, in the case of electrostatic fields, charged mediators, will be useful for dealing with fields and offers hope of integration with gravity.

Seeing photons and neutrinos as bundles of energy may be useful for handling a puzzle of how constituent(s) traveling at c, traditionally seen as perpendicular, could possibly yield entities traveling at c again in a perpendicular direction. This is a different level of specificity in the *mnp* Model.

Seeing gravitational fields as made up of gravitons or diffuse field effects moving at c allows gravity to be integrated into a Constituent Model. Seeing gravity as resulting from gravity fields/gravitons recruited and acting both approaching and leaving the mass allows conservation of mass. If the recruitment is in proportion to the directionality of a mass, then the field varies with the mass's movement and rotation. Seeing gravitons as moving at c and having a span of effect allows small scale effects and short term effect limits without concern for singularities. This is yet a different level of specificity in the *mnp* Model.

Seeing gravitational fields as made up of gravitons which are the same as the mediators that make up neutrinos, photons, and "gluons" traveling both directions toward and from the mass allows simplification of a model and perhaps more confidence that recruiting for all fields will be possible. This is a greater level of specificity in the *mnp* Model view of gravity which has led to a great deal of integration with matter and the other fields in the *mnp* Model.

Constituent Models are physical. Resorting to extra dimensions can be useful during model and mathematical development and useful as an investigation of limits, but the author would prefer to minimize hiding wherever possible.

The *mnp* Model sees the constituent(s) as discrete and equal effect and range of influence and therefore the same "size" and "mass." None of the Constituent Models need to adopt this view. In fact, the author could see a useful Constituent Model CM_p just addressing particles, energy, mass, and particle interactions.

The *mnp* Model makes a number of interesting but unsubstantiated claims and speculations that a Constituent Model might well eschew. An example is the explanation of galactic dynamics and the Pioneer gravitational anomaly as gravitons recruiting each other when spaced far apart between masses that have been closer at a previous time in their history. The explanation of particle spin as resulting from coiled loop dynamics and chirality from the stranding of 6 coiled loops could be ignored even by a coiled loop Constituent Model CM_{cl}.

So for now, the author has seven categories for specialization and is looking for further differentiation between the *mnp* Model and generic Constituent Models. The criteria for separation are fault lines in understanding and acceptance. If some physicists find A easier to accept than B, then separating the two concepts into separate categories or sub-categories of the Constituent Model is appropriate.

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Edit history: 2017-06-24 minor changes to Abstract and Conclusion, major rewrite of Momentum in Constituent Models and addition of Minor Comments.

Constituent Models - Specialization for Branches of Physics

Model Type	Model Name
Particles have constituent(s) traveling at c	CM_p
Fermion charge comes in 6 parts, resulting in charges -1 -2/3 -1/3 0 1/3 2/3 and 1	CM_6
Fermion charge structure is 6 coiled loops of quantized length and "mass"	CM_{cl}
Fields have constituent(s) traveling at c	CM_f
Photons and neutrinos are particles	CM_{pp}
Gravitational fields have constituent(s) traveling at c	CM_g
Gravitational fields share constituent types with other fields	CM_{g1}

Table 3.1: Constituent Model Types

Should Constituent Models and CM types ever warrant verbal discussion in public, the pronunciation "c Model" would also be reasonable.

Beyond Constituent Models

The *mnp* Model has been developed assuming discrete basic entities and makes a number of claims consistent with discrete basic entities, but a useful Constituent Model need not follow that path. Some of the claims made by the *mnp* Model include:

Issue(s)	Model
Gravitons attract oncoming gravitons, leading to greater coherence of gravitational fields in galactic arms at extremes of low gravity and greater attraction of between the sun and spacecraft leaving the solar system	*mnp* Model
Photons do not carry spin, but affect particle constituent(s) in ways that measure as spin	*mnp* Model
A very small number of constituent(s) could explain all phenomena	*mnp* Model
Space is not expanding	*mnp* Model at its most extreme

Table 3.2: Beyond Constituent Models

Constituent Model - Particles

The constituent(s) of a particle at rest would be moving at c within the particle, logically moving perpendicular to any axis through the particle. If the particle could be destroyed, the momentum of the constituent(s) would total mc, the momentum squared m^2 c^2 and the energy mc^2. The constituent(s) of a particle in motion would have net forward velocity $\boldsymbol{v}$, with the rest of the motion logically perpendicular to $\boldsymbol{v}$. If all constituent(s) of particle are moving at c and a constituent of a particle is moving at the average velocity $\boldsymbol{v}$ of that particle, then a component c*sqrt(1-v^2/c^2) of that constituent's movement must be moving within the particle logically perpendicular to the particle motion or at least in

some circular fashion. In the limit, as the particle dimension goes to 0, constituent(s) must all be making progress at the same speed in the direction of the velocity. The larger the region in which the particle exists, the greater variation in the constituent(s)' vector at a given time and the greater the variation in forward component. Momentum of the bundle is the (only) way to talk about movement of the bundle. See Momentum in Constituent Models - Proof #1 and #2 ... 21. In 3 space, if the constituent(s) in a cohesive region (called here a bundle) have a mass m and a net momentum m$\boldsymbol{v}$-> then the bundle velocity is $\boldsymbol{v}$-> Therefore the square of the total internal momentum not involved in bundle movement is $m^2(c^2\text{-}v^2)$ and the total internal momentum perpendicular to the direction of travel is m sqrt(c^2-v^2) and the net momentum perpendicular to the direction of travel is 0.

CM_p sees the energy involved in movement as part of the particle, so acceleration can be seen as adding or subtracting energy to change the net velocity, applied to the totality of the particle at that particular velocity. That change in energy/mass must be applied to the entire particle.

Relativistic expressions become the only expressions for the m in F=ma. A Constituent Model for particles seems to fit well with the use of relativistic momentum in high energy particle physics.

Constituent(s) do not act like particles, they just move at c. Addition and averaging of constituent(s) do not require relativistic corrections, just as photons and neutrinos do not require velocity or mass corrections. Gravity to be treated later.

The author admits that seeing particles as made up of constituent(s) is probably the easiest concept to understand or accept. The going gets harder from here on.

Constituent Model - Charges Quantized at 1/6 Electron Charge

Experiment shows quite clearly that quarks have +-1/3 or +-2/3 of a full charge, electrons -1 and positrons +1, with no other possible values. The author proposes that the (only) uniform way to get this result is to have all possible combinations of 6 charges which can be positive or negative. This does result in the possibility of a 0 charge "small" lepton of 3 negative and 3 positive charges. The *mnp* Model calls this a z and suggests that z are involved in naked proton and nucleon decay and (paired) in spontaneous creation of electrons and positrons. The *mnp* Model has made no progress in suggesting the z's mass or masses.

Quantized charge can lead to understanding of nucleons, weak interactions (trading of charge material), high energy collisions (trading, rearranging, recruiting charge material), and Quantum Chromo Dynamics. Quarks are seen as attempting to trade charge material but unable to complete the interaction. For example, in a proton, two up quarks attempt to take the same positive charge material portion from a down quark and continue to do so as long as the charge material is quantized and moving at c.

Constituent Model - Coiled Loops as the Basis of Particles

Coiled loops are seen as useful in explaining

- h/2 is the angular momentum in the one loop that must be present for the loops to complete and exist in real space
- h is the angular momentum in two loops that must be removed if the electron is to expand into the simplest shells
- spin results from coiled loops that can proceed either clockwise or counter clockwise in the direction of progress

At least in the *mnp* Model, if coils attract one another by the direction of their travel both in the direction and in the opposite direction as gravitons do, then explanations become possible for:

- strong nuclear force
- van der Waals forces and Casimir effects, Abraham-Lorentz forces
- positrons and electrons interact if their spin is appropriate

Constituent Model - Fields

Electrostatic and gravitational fields have, classically, a logical point source and are linear in spread and effect. Magnetic fields have a logical linear source and are planar in spread and effect; they only redirect and do not change speeds in classical formulations.

Note that the words instigate and instigation (2022-01-30: NOT "propagate" and "propagation") are used as intransitive verb and noun form of movement respectively to describe the movement of constituent(s) at c in spreading and maintaining the field. This clearly contrasts with the way quantum mechanics uses the different term "propagator" for the function or matrix that represents the probability amplitude of particle travel or travel with a particular energy and momentum.

Magnetic fields may be the easiest of the fields to be seen as made up of constituent(s). While charge is conserved, energy is used to create the field and affects the current. But first: Magnetic fields traditional description uses "Magnetic Lines of Force," which the author finds to be a terrible misnomer. "Magnetic Lines of Zero Force" seem much more appropriate. If the constituent(s) of the magnetic field are spreading from the line of current in all planes containing that line of current, the constituent(s) are able to affect moving charges in directions within that plane but not perpendicular to that plane. The author suggests that the difference between stationary charges and moving charges is that the constituent(s) of the moving charge have a net direction forward and that the magnetic field affects only this net direction, not the component of constituent movement rotating with the charge at c but net perpendicularly to the direction, and are unable to add energy to the particle.

Electrostatic fields do not diminish or increase charge over time, therefore the constituent(s) of the charge cannot provide the constituent(s) of the electrostatic field. The author suggests that potential for electrostatic fields must exist around the charge. The charge then recruits constituent(s) to form the field, in proportion to the magnitude of the charge. Since electrostatic fields have two directions, the field organized by a negative charge must point the opposite direction from that organized by a positive charge. The author also suggests that point charges are useful mathematical fictions and that recruitment may well require that charge has dimension.

Gravitational fields, which appear simple and uni-directional in concept and become complicated when interacting with matter, are treated separately below as CM_g. The author suggests that mass concentrated at a point is a useful mathematical fiction, that recruitment requires dimension and surface area.

Electromagnetism is not easily treated as part of a Constituent Model without accepting photons and perhaps neutrinos as particles of energy, treated below as CM_{pp}. The author admits he has not integrated the planar nature of magnetic fields back into his views of traditional electromagnetic radiation. He holds some small hope of headway in that direction.

Constituent Model - Photons and Neutrinos as Particles

The author suggests that if the constituent(s) act at c, that electrical and magnetic fields do not interact fast enough to create electromagnetic radiation spreading at c. The author suggests that as bundles of energy, they affect the field potential through which they travel to create attenuating oscillating fields. Non polarized particles such as neutrinos create deBroglie waves. In the case of photons which are polarized, this will lead to electrical and magnetic fields. Photons must be created by electron or positron shells and cannot be recruited by changing electrical fields, if the constituent(s) are traveling at c and not already formed. Diffraction and interference remains to be explained, but the current thought is that it occurs as electrons influenced by the coherent electromagnetic field redirect or absorb the photons.

Constituent Model - Gravitational Fields

If c is the maximum speed for everything, then models of gravitational fields fall into three categories: pure information, affective, and magic.

If gravity is pure information, then matter and electromagnetism "know what to do" when presented with gravitational information, as in General Relativity. If the model insists that matter does not have any part in responding to that information, then the author suggests the interpretation fits in the third realm, magic. Which is OK, magic is just that which we don't really understand yet. "It just works" is a powerful argument for any theory, and postponing investigation and decision is an effective and often appropriate strategy in science and in politics. If gravitational fields cause change in matter's clock, mass or apparent mass, and movement, then those gravitational fields have energy.

Pure information field models must offer some means for matter to affect the information, for information to affect matter, and either for information emanating from one mass to interact with that from other masses or for that information to spread at c and superimpose perfectly without influence from other information and without its travel being influenced by gravity, which is in contrast to current theory that electromagnetic radiation and neutrinos are affected by gravity. Pure information models have the advantage of mass and energy conservation.

Affective models of gravity (for want of a better term and a better word than affective) see matter as creating gravitational fields to which matter then responds. These fields are seen as having energy that is provided to matter when affected by the field. Since conservation of mass and energy are experimental facts, four explanations can be enumerated.

- Mass and time are "running out" at a universally coordinated rate so that the experience of mass and time remains constant.
- Mass absorbs as much as it sends.
- Mass sends only what it can recruit.
- Mass recruits and responds to potential that exists independently. The recruited potentials influence each other.

All possibilities other than the first see two way exchange, so that gravitational fields travel away from mass and toward mass so that masses are not reduced by emitting gravitons. The simplest explanation is that gravitons have the same effect whether they are moving toward or away from the nearest mass. An alternate, rejected by the *mnp* Model, is that gravitons are always assumed to be "pointing to where they came from." The difficulty with this directional model is that incoming gravitons must equal outgoing gravitons over a relatively short time since the masses are not emitting. The author suggests that gravitational fields are not recruited by static mass but by the directionality of that mass; if constituent(s) are moving more in one direction, that the gravitational field is skewed forward and backward based on the balance of constituent movement.

This constituent sub-model CM_g is a different area of specificity in the *mnp* Model which sees gravitational fields as requiring recruitment rather than emission and as spreading at c. If that field is made up of basic entities, as suggested by the *mnp* Model, some string theories, and perhaps quantum loop gravity, those gravitons could be tiny, non polarized, and distinct from the basic entities that act as mediators of the other forces. The entities that constitute relativistic mass could be mediators, which could become photons when released by electron shells. Or relativistic mass could conceivably be the non polarized gravitons. The *mnp* Model posits a unification of gravitons and mediators, as follows.

Constituent Model - Gravitational Fields Unified with Other Mediators and Other Fields

Seeing gravitational fields as gravitons being mediators that have random orientation of polarity would seem to allow unification of mediators and gravitons. Simplicity, reduction in the need for the mass of two separate fields, and personal preference are the author's only reasons for preferring the reduction in mediator type count.

A challenge posed by this unification is that gravity works the same for all masses, where charges have sign electrostatic fields attract or repel. Therefore, the constituent(s) of a gravitational field are bi-directional while the constituent(s) of an electrostatic field are directional.

The *mnp* Model

The *mnp* Model can be seen as an extreme version of the seven (and counting) Constituent Models. The *mnp* Model attempts to radically simplify basic explanations. In doing so, it more than occasionally creates complicated three dimensional geometry. The *mnp* Model is NOT complete and NOT numerically satisfying at this time.

The *mnp* Model suggests that there are three basic entities, with two basic effects and one non-effect on overlap, that result in all particles and fields, that the basic entities that lead to charge bind tightly into stranded coils that provide the hidden structure for electrons, positrons, and quarks.

The *mnp* Model could be consistent with expanding space, but since the speed limit c is built into the foundation of the Model, nothing will be seen as exceeding c in a local region. The author claims the Model has higher ambitions for explanation, so is not conceding the expansion of space. Yet.

The *mnp* Model's approach to providing directional information in electrostatic fields using a single mediator is complicated. The *mnp* Model posits that electrostatic fields spread slower than c. The mediators spread perpendicular to the line toward the charge, with their polarity information pointing toward the negative charge and away from a positive charge. The basic entities that form charge are oriented and travel in the field in the direction toward the opposite charge and then are sent off from the charged particle at more oblique angles. (2020's): the Axis information that makes up electric fields is seen as spreading at c in all directions, independent of the direction of the random field potential, as long as random field potential exists in the region. True electrostatic fields may then depend on some of that field potential redirecting to Travel perpendicular to the Axis information.

Constituent Models - Roadblocks to Acceptance

Constituent Models, even the most general particle only model CM_p, all suffer a powerful roadblock to acceptance. They do offer hope of integration between small scale effects at a quantum level and large scale effects up to galactic dynamics.

But they offer no hope of going back to special or general relativity as "virtual" or "apparent" theories. They offer no hope of relying on frames of reference, in the author's estimation, though reconciliation and explanation of why existing theories work well in appropriate conditions will necessarily follow development and will probably precede acceptance for Constituent Models - edited 2017-06-24. Particles are not seen as the same when they are moving as when they are in the never seen state called stationary.

Constituent Models must offer alternate explanations for experiment:

- inertia
- the two-way speed of light
- time dilation
- length contraction
- gravitational time dilation
- lack of time dilation due to rotational acceleration

and of course the currently unexplained

- diffraction and interference
- galactic dynamics

The author has every faith in physicists' ability to consider the impossible. Examples include "the only possible other explanation is sub-structure," those Theories of Everything that depend on an absolute frame of reference, "God does not play dice with the universe," the multiple universe models initially rejected and later seen as saving some theories, dark matter. Scientists' and theoreticians' ability to be honest is impressive though not quite universal. Still, the author has every expectation that the *mnp* Model will benefit for now from further obscurity. With a readership now into the low two digits...

The author is preparing to revise the now ancient 2012 "treatise" on the *mnp* Model and plans to codify the level of Constituent Model involved in the various discussions. So far, Constituent Models enumerates 7 sub-scripts: p, f, 6, cl, pp, g and g1. The author seeks a complete list. He would eventually like the Model to resemble a menu; to get an explanation for (fill in the issue), certain levels of a Constituent Model must be posited... Some explanations or ideas may remain idiosyncratic to the *mnp* Model, and would be labeled as such. For example, the *mnp* Model is looking for alternate explanations of the Cosmic Microwave Background Radiation and for the apparent expansion of space, but expect the Constituent Model to yield explanatory success in those areas.

Earth's Frame of Reference - For Reference

- The Earth's gravity gives rise to the greatest component of the gravitational field experienced on earth.
- The Earth is rotating on its axis, giving rise to the greatest component of angular momentum of large scale objects on earth.
- The solar system is orbiting the galactic core, giving rise to 220 km/sec movement.
- The solar system (not galaxy?) has a speed of 371 km/s in a co-moving reference frame toward Leo, somewhat near the plane of the ecliptic of the galaxy. This frame appears to be useful in studies of the Cosmic Microwave Background.

So, in models and theories that depend on an absolute frame of reference, Earth's labs have NEVER been stationary.

Singularities and Constituent Models

If a Constituent Model accepts that fermions and fields are made of constituent(s) traveling at c, the author suggests that no singularities can exist beyond perhaps the instant of initial creation of the universe. Any other local singularities have exceeding low probabilities and evaporate at, well, the speed of light.

The *mnp* Model and Natural Philosophy

This discussion of Constituent Models is part of an on-going attempt by the author to understand our understanding of natural phenomena, to examine the approaches to understanding, to understand where radical simplifications can take place and what the effects of those simplifications would be, and to provide ways to translate the experimental results and theoretical language of modern physics into a different Model.

It that translation is even moderately successful, explanations of why current theory works so well should prove interesting and even fruitful. Failure at that translation may still aid the understanding of physics and the universe.

Movement in Constituent Models - Proofs #1 and #2 - 2017-06-24

This development of a toy Constituent Model will address only movement of a "bundle" and the constituent(s) comprising said "bundle." It will not address charge or mechanisms for acceleration and will (usually) avoid the term particle for bundle.

The Constituent Model's need to model action within a bundle/particle is different from the mathematical needs of basic physics (though the momentum term will be familiar), high energy particle physics (though the momentum squared term may be familiar), quantum mechanics (Ψ^2), and mechanics and statistical mechanics. The use of a momentum term to apply to constituent(s) is as non-standard as the concept of constituent(s).

The following development of constituent and bundle velocity and velocity squared may (nay should) be reminiscent of other developments in physics, but will attempt to refer for validation or permission to experience and experiment rather than to other branches of physics.

The first question of interest in a Constituent Model is "where are the constituent(s) going within the particle." Such a model sees even those particles considered to be points as merely having dimension too small to be seen by current experiments. Mass is seen as merely an ability to influence and to resist being influenced. No assumptions are made about mass, except that it does not change for a given tiny constituent or a differential volume of constituent(s) at a given time.

Three concepts are useful:

- Where and how fast are the constituent(s) and the aggregate bundle going?
- How much motion are the constituent(s) exhibiting?
- How much of that constituent motion is in the axis of bundle travel?

Momentum, mv, is a good measurement for the where and how fast question. Aggregate motion is a volume integral of differential mass times velocity. Absolute value of constituent(s) motion times mass is a good measure for the how much questions, but the square root of dot products is computationally inconvenient so the expedient of squaring the integral will be used.

Givens and Nomenclature:

- an inertial frame with no fields
- constituent(s) in a cohesive region (reminiscent of a particle), called here bundle b
- total mass of constituent(s) in the region, called here m
- constituent(s) differential of mass, called here dm
- velocity of the constituent(s) in dm, called here prog
- all constituent(s) move at the speed of light, c
- direction of travel of the cohesive region, called here the x axis with no loss of generality

Since Constituent Models look directly at the constituent(s), no complex numbers are required. Complex numbers are required when processes and progress within a particle are occurring but are not measured outside the particle. (The triple intregrals should all be written as triple volume integrals,but that symbol is not easily available in latex.)

- The total mass of the bundle is a volume integral: $_{\mathrm{b}}\iiint dm = m$
- The total momentum of the bundle is a volume integral: $_{\mathrm{b}}\iiint prog_{\mathrm{dm}} dm = m\boldsymbol{v}$

- The velocity of the bundle is the momentum volume integral divided by mass: $_{\mathrm{b}}\iiint prog_{\mathrm{dm}} dm/m = \boldsymbol{v}$
- When the bundle is at rest in the inertial frame, velocity and momentum are 0.
- When the bundle is at rest in the inertial frame, the author suggests the absolute quantity (integrated over the volume of the bundle) of constituent(s) progress (sometimes called here absolute progress or absolute momentum) is $_{\mathrm{b}}\iiint abs(prog_{\mathrm{dm}}) dm$ -or-
- $_{\mathrm{b}}\iiint \sqrt{prog_{\mathrm{dm}}} dm$ -or- Shown using the components of prog:
- $_{\mathrm{b}}\iiint \sqrt{prog^2_{\mathrm{dm_x}} + prog^2_{\mathrm{dm_y}} + prog^2_{\mathrm{dm_z}}} dm$
- Working with square roots is a pain, so we will use the crude expedient of squaring the whole mess.
- $_{\mathrm{b}}\iiint \sqrt{prog^2_{\mathrm{dm_x}} + prog^2_{\mathrm{dm_y}} + prog^2_{\mathrm{dm_z}}} dm \; _{\mathrm{b}}\iiint \sqrt{prog^2_{\mathrm{dm_x}} + prog^2_{\mathrm{dm_y}} + prog^2_{\mathrm{dm_z}}} dm$
- Experimental results indicate moving particles such as electrons have no parts that are distinguishable. So recognize that m is independent of progress and progress does not depend on m so that the square roots can be gathered within one integral, leading to
- $_{\mathrm{b}}\iiint (prog^2_{\mathrm{dm_x}} + prog^2_{\mathrm{dm_y}} + prog^2_{\mathrm{dm_z}}) dm$ or $_{\mathrm{b}}\iiint dm$

The result should be mc^2m or m^2c^2 since the constituent(s) are moving at c. Note that for continuous rather than discrete constituent(s), the integral also implies integrating over all directions present in the differential of volume, treating the constituent(s)' directions rather as a tensor. Constituent(s) absolute momentum would be the square root of the result, or mc. Note that we cannot add the squared results directly to represent a particle.

What happens if constituent(s) are added to the bundle at rest, moving at c along the x axis? Call the amount of constituent(s) added $\mathrm{m_d}$. If this is added to the bundle (and integrated in somehow so that it does not just escape the other side), m for the total bundle (called $\mathrm{b_t}$ here) would become $\mathrm{m_0}$ + $\mathrm{m_d}$ (called $\mathrm{m_t}$ here). One might think that the momentum added would be $\mathrm{m_d}$ c and the resulting velocity of the bundle $\mathrm{m_d}$ c/$\mathrm{m_t}$, but to integrate the added constituent(s) into the bundle, the total movement of all the constituent(s) at c must be taken into account.

Experimental results indicate moving particles such as electrons have no parts that are distinguishable. So movement within the moving bundle that does not result in net bundle movement is represented by

- $\sqrt{_{\mathrm{b_t}}\iiint ((prog_{\mathrm{dm_x}} - v)^2 + prog^2_{\mathrm{dm_y}} + prog^2_{\mathrm{dm_z}}) dm \; _{\mathrm{b_t}}\iiint dm}$ or
- $\sqrt{_{\mathrm{b_t}}\iiint ((prog^2_{\mathrm{dm_x}} - 2prog_{\mathrm{dm_x}} v + v^2) + prog^2_{\mathrm{dm_y}} + prog^2_{\mathrm{dm_z}}) \, dm \; _{\mathrm{b_t}}\iiint dm}$
- Note that since $_{\mathrm{b_t}}\iiint prog_{\mathrm{dm_x}} dm is m_t v$ -and-
- $_{\mathrm{b_t}}\iiint -2prog_{\mathrm{dm_x}} \, v \, dm$ is $(-2m_{\mathrm{t}}v^2)$ -and-
- the integral of v^2dm is $(m_{\mathrm{t}}v^2)$ -then-
- the integral of what the constituent(s) are doing in the moving frame of reference is
- $\sqrt{(_{\mathrm{b_t}}\iiint (prog^2_{\mathrm{dm_x}} + prog^2_{\mathrm{dm_y}} + prog^2_{\mathrm{dm_z}}) dm - _{\mathrm{b_t}}\iiint v^2 dm) _{\mathrm{b_t}}\iiint dm}$
- The first integral is $m_{\mathrm{t}}c^2$.
- The second integral is $m_{\mathrm{t}}v^2$.
- So the resulting momentum is $\sqrt{m^2_{\mathrm{t}}(c^2 - v^2)}$ -or-
- $m_{\mathrm{t}}\sqrt{c^2 - v^2}$

To express $\mathrm{m_t}$ as a function of v and $\mathrm{m_0}$ requires some algebra and some physics (proto-physics? pseudo-physics?). The total (absolute) momentum of constituent(s) in the moving bundle is $\mathrm{m_t}$ c, so the momentum seen outside the bundle is

- $m_{\mathrm{t}}(c - \sqrt{c^2 - v^2})$
- The momentum imparted by $\mathrm{m_d}$ is $\mathrm{m_d}$c

- which since $m_d = m_t$ - m_0
- can be written as (m_t - m_0)c.

The before and after momenta are equal. The results are very interesting:

- $m_t(c - \sqrt{c^2 - v^2})) = (m_t - m_0c$
- $m0c = m_t\sqrt{c^2 - v^2}$
- $m_t = m0c/\sqrt{c^2 - v^2}$
- $m_t = m0/\sqrt{1 - v^2/c^2}$

Surprise! Er, QED, though the author did not fess up to that intention to start. A Constituent Model where particles and energy are made up of constituent(s) moving at c yields the familiar gamma and familiar mass of a moving particle.

Let us look back at the (square of the) absolute momentum of the bundle in the moving frame:

- $\sqrt{(b_t \iiint (prog^2_{dm_x} + prog^2_{dm_y} + prog^2_{dm_z})dm - b_t \iiint v^2 dm)b_t \iiint dm}$ -or-
- $m_t\sqrt{c^2 - v^2}$ -or- written in terms of m_0
- $m_0/\sqrt{1 - v^2/c^2\sqrt{c^2 - v^2}}$ -or-
- $m_0c\sqrt{1 - v^2/c^2}/\sqrt{1 - v^2/c^2}$ -or-
- m_0c

So the absolute momentum of the constituent(s) of a moving particle within that moving frame is identical to the absolute momentum of the constituent(s) of a stationary particle within that stationary frame. Again, surprise. Er, QED.

The author humbly suggests that Constituent Models with all of the stationary or moving particle's constituent(s) moving at c is in fact viable and interesting.

Minor Comments After Momentous Conclusion - 2017-06-24

Apologies for the pun.

The author suggests that adding constituent(s) askew to the direction of travel might contribute to a new direction of travel, but only that portion aligned with the new direction of travel will be incorporated into the bundle with its new momentum.

If constituent(s)/energy could be directly "added" opposite the direction of the bundle's movement, the momentum will go down and the mass that can stay with the bundle goes down so the "added" energy plus that much again will be released probably in random directions unless the bundle is an electron shell. If the energy stayed with the bundle, experiment would show that bundles aka particles constantly gained mass. Experiment shows particles seem to be themselves and to be identical when traveling at the same speed in a frame of reference.

In like manner, if energy is added at an angle to the bundle's movement, the momentum will change in magnitude and direction and the total mass/energy of the bundle's constituent(s) will adjust for the magnitude of the new velocity.

Note that this discussion of bundles and internal momentum applies to particles and not to fields. Fields are seen as (except for electro-static fields) spreading at c, with none of the effectively circular motions required by particles to exist at sub-luminal velocities. So field constituent(s) interact only by affecting angles rather than conserving quantities in Cartesian components.

Conclusion - edited 2017-06-24

The author has submitted Constituent Model as a term for a set of generic approaches to modeling particles and fields and forces in physics, with a few specific sub-models.

With all constituent(s) moving at c, the concepts of rest mass and the gamma correction for moving mass are seen as growing organically out of the Model.

The author's *mnp* Model is an example of a specific Constituent Model using discrete tiny constituent(s) of three types interacting in three ways over very short distances. Whether "anyone else is thinking like this" remains to be determined, developed, and perhaps recruited. The author concedes Constituent Models are probably more interesting to many potential contributors.

The Constituent Model Generalizes the *mnp* Model - Post 41 (2019-12-27)

Further Development of (or Musings on) the Constituent Model

The Constituent Model, in which the constituents of particles, light, neutrinos, and fields are seen as traveling at c, is being developed as a generalization of the specific constituent model, *mnp* . This blog is a short attempt to describe the relation of Constituent Models and the *mnp* Model a little more closely.

Certain explanations and proofs work better in the general Constituent Model, for example the movement of particles and the energy/|mass that must be added to effect movement. Certain details and explanations currently work better in the *mnp* Model, such as the origin of h and $\hbar$. Herein, a sketch of the state of that generalization. Most of this sketch was written at the end of 2018.

Frames

Most theorists in Special and General Relativity see no way the reference frame or the lab can change, no way a rotating frame itself can change, so all relativity must be apparent.

The Constituent and *mnp* Models indicate that the lab DOES change, that particles DO change when they move, that time DOES dilate on movement. Ponder that while the author considers the verb in that sentence. The Models do posit, do not yet show or prove, and are far too dependent on the reality of Lorentz transformation to merely hint. The Constituent Model depends on the Lorentz transformations being real, and is an absolute frame system, as is the *mnp* Model. While not apologizing, the author IS a bit bashful and sometimes quiet about that necessity.

Natural Philosophy

The author thinks primarily in terms of the specific Constituent Model, the *mnp* Model. The advantages of the Constituent Model is that some proofs and developments are easier, for example, the validation of relativistic mass and momentum. These developments apply directly to the *mnp* Model as a specific type of Constituent Model. At other times, ideas such as the meaning/|explanation for h and $\hbar$, seem to emerge more easily from the *mnp* Model. Applying specific thoughts to the general Constituent Model is at times much more challenging. So in the traditions of math and physics, the easier course will be chosen. Comment regarding mathematics: things are usually hard. When mathematicians find something dropping out, making things easier, they get really excited.

Constituent Model Principles

A Constituent Model posits that everything that makes up everything travels at c. The author suggests that the constituent(s) have ways of interacting with constituent(s) that are not classical or expected in any sense. For example, constituents probably do not occupy space, do not bounce off each other, and may not even repel each other. That seems to work well in the specific Constituent Model *mnp* .

The *mnp* Model posits that two basic entities at about the same point and traveling in about the same direction, only one will receive influence from nearby entities. If instead the limitation is seen as a maximum interaction over an area or volume (in addition to maximum influence given and influence received), the limitation works in a Constituent Model as well. Or one could posit that constituents have a maximum density.

A maximum density or maximum influence over volume runs the risk of seeming like an ether based model, which the author would like to avoid for now in favor of a more pure entity or constituent based model.

Speculations Further Afield

If the effect that leads to gravity, called Travel in the *mnp* Model, is also passed transverse to the direction of travel of all basic entities, then gravity can remain consistent to it's a sub 0 limit. This might also be a benefit in picturing electrostatic fields and in picturing the surface of nucleons, with their smaller quarks inside actively trying to pull each

other apart. But for the discussion of measuring time in the the previous post on Time Dilation, those hints of future developments are not needed.

There may well be successful Constituent Models more general than the author's current theorizing, which is based on experience with a specific developing and changing Model, the *mnp* Model. (or is the gerund properly modeling when the creation is still light-years from a Theory.) At present, the author's effort is show the success of a Constituent Model. This effort may or may not be closely tied to the *mnp* Model. Later, further generalization may be possible. At present, picturing why an electrostatic field attracts opposites is explained in the *mnp* Model, based on the coiled structure of charge, but is NOT explained in a generalized Constituent Model.

A "success" can be claimed, for example, in gravitational fields which reasonably generalize from *mnp* 's picture of basic entities streaming away and toward masses, with the attraction being to move parallel or anti-parallel. If the constituent gravitons or gravitational fields travel at c and attract each other to be more parallel and the gravitons attract transverse to their motion (also at c) to travel in their direction and have a limit on how far their attraction can extend based on how "much" constituent there is in a volume or an expanding plane, then the Constituent Model has a similar property to the *mnp* Model of having a limit beyond which gravity becomes non-uniform, preferring to be attracted to gravitational fields and masses already present or already "known." So for gravity, *mnp* 's Travel attraction and distance might become a parallel or anti-parallel attraction of constituents based on an amount of constituent in a volume and distance to possibly affected constituents.

This success is actually bi-directional - suggesting that *mnp* 's Travel direction attraction is transmitted laterally in a cone expanding at c was partially motivated by interest in improving the Constituent Model as well as by recognition of the benefits of seeing gravitation as (up to its limits) approaching radial uniformity.

Apparently, fields may be trying to reach a steady state, to reach equilibrium, but are being perturbed by particles, neutrinos, and fhotons. A fhoton as seen as being a polarized bundle of energy that creates electromagnetic waves, while a neutrino creates analogous "gravity" waves without polarization.

The generalization of the *mnp* Model to a Constituent Model is a work in progress, as is the *mnp* Model itself.

Chapter 4

mnp Model - Introduction (2014-08-04)

Following is the description of the *mnp* Model.

The blog post from 2014 needs to be refactored since it has good introductory material but goes into movement and energy too early for a good exposition and goes into little detail on all the ramifications of charge.

Momentum Energy and h - Post 27 (2014-08-04)

Abstract

The *mnp* Model now offers an understanding of energy and the Planck constant h in a Model based on a limited set of first principles.

The ability to redirect other entities has the units mc^2. So energy is seen as an ability to turn other entities. Mass emerges from the number of basic entities and their equal effects. The Planck constant arises from the behavior of electron shells and the basic ability to turn. The new understanding of the Planck constant allows the dimensions of the basic entities and a limit on the influence distance to be calculated, and suggestions for electron size and density to be offered.

Apparent energy of light and neutrinos in a moving frame is explained.

Transfer of energy into motion is discussed.

Momentum might be conserved by matter, but not by fields. This is the weakest part of the post, since an explanation and understanding of the useful four-momentum is not yet written out.

These developments grew from investigating the fields created by moving neutrinos, to be covered in a subsequent post.

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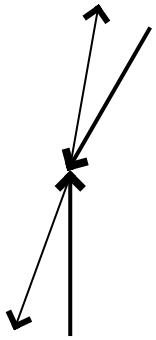

Figure 4.1: Oncoming Interaction

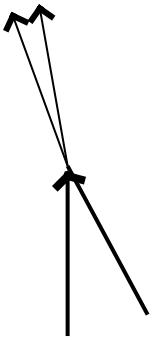

Figure 4.2: Near Parallel Interaction

- Humor 35
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Background

The *mnp* Model sees all fields, matter, and potential in the universe as being formed by three types of basic entities with two ways to interact and few other attributes. These entities interact in a flat, unstructured region of three spatial dimensions. Since those entities all change locations at the same rate, the potential for time or change or entropy exists. The entities all have the same unchanging ability to influence other entities to align with the line of Travel (parallel or anti-parallel). The unchanging but limited amount that entities can influence and be influenced allows change to occur as entities cover distance. All entities have an Axis. For type n, Axis is (2020) opposite Travel. For type p, Axis is (2020) aligned with Travel. For type m, Axis is perpendicular to Travel. All entities have the same ability to influence other entities to align parallel with Axis, though this ability is not as strong as the alignment with Travel. The abilities to affect are limited to short distances. Over a much shorter distance, effects will be experienced by only one entity if overlapped. This is called Separation.

Entities can have two influences to align by Travel direction and to align by Axis. Axis (which leads to charge / magnetism /electrical effects) will be ignored in this post. Over any short length of movement, an entity will attempt to change the Travel direction of any entity within the influence radius to be more aligned (parallel or anti-parallel) with its own direction. Both entities will change by an equal but opposite angle. The effect is symmetrical in the spherical coordinate system around any entity's line of Travel. All entities have the same ability to influence to align by Travel direction. Over any given length of movement when an entity changes the Travel direction of another entity by some angle, its Travel direction is changed by an equal angle in the opposite direction. If one entity affects two entities, its angle changes by the negative sum of the affect. So angle changes are additive and conserved.

Basic entities interact only when separated from other entities by a tiny distance. If an entity is hidden by another within the Separation distance, it does not influence or receive influence until the covering entity has moved to no longer "shield" the "shielded" entity. Events occur because the basic effects are limited in how much effect can be transmitted or received over a distance of movement.

Matter exists because basic entities can form filaments that form loops that twist into coils that can remain in one place or move slowly. Time is measured by matter oscillations.

The letter m was chosen as mediators, magnetic, messenger. The letter n was chosen for negative, the basic entities with an Axis parallel to the direction of Travel that make up electrons and the negatively charged filaments in quarks. The letter p was chosen for positive, the basic entities with Axis anti parallel to the direction of Travel that make up positrons and the positively charged loops that combine as six to provide the charge and structure force quarks.

The basic entities and the coils they form to provide the structure for fermions are tiny in scale, somewhat smaller than the author had imagined.

Conserved Quantities

The speed of light, the number of basic entities, the ability of those entities to influence, the direction of those entities if uninfluenced, the influence distance, and the Separation distance are postulated to be conserved. (1) 35

Mass Emerges

What is mass? The equal ability of all entities to influence and be influenced is mass. Influence is posited as the same for all entities, so the mass of all entities is therefore the same.

Changing Direction

Take the simplest "particle" in the universe, the neutrino. For now consider the neutrino as a bundle of m entities whose Axis orientations are random with vector average of 0. (2) 35

What is involved in changing the direction of the neutrino? Since it cannot be sped up or slowed down, the influence and change must be lateral to the direction of Travel. In *mnp* , every result other than continuing in a straight line at c must be caused. A classical analysis of work does not help since no work is done by orbiting or changing direction. But the classic concept of change perpendicular to Travel, angular acceleration mV^2 /R IS helpful. Pick an arbitrary R, the influence must be exerted perpendicular to Travel and be present over the distance of movement. As a scalar, that amounts to mv^2 over R times R times the angle of direction change. The R drops out. So to turn the neutrino 90 degrees takes mc^2 times pi /2. The same units as energy, classical and modern.

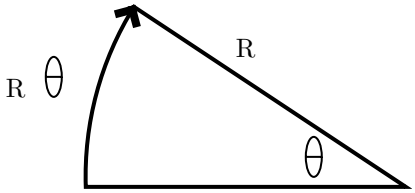


Figure 4.3: Pure redirection - effort proportional to angle

Figure 4.4: Straight Travel

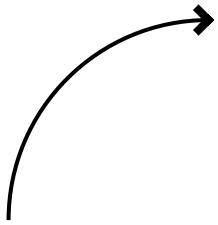


Figure 4.5: 90 Degree Turn

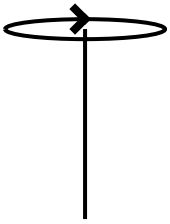


Figure 4.6: Straight to Capture

What happens in the hypothetical case of neutrino capture? If the neutrino could be caught by a particle and the result then brought to rest, the neutrino would add m entities to the mass of the particle.

Capture and release of travelers is not a matter of changing just the direction of the traveler. The traveler will participate in the joining process and become part of the coiling of the particle. Release is the opposite - during the transition from particle to free traveler, the lateral portion of the change to traveler direction is provided by the coils. Let's try a restatement. The traveler, while part of a particle, is moving at c in circular coils with the rest of the particle. While a part of the particle, it contributes to the mass of the particle. During capture, as it is redirected into the particle, the lateral effort influence on the traveler as it turns is supplied by the coils. Only the longitudinal effort to turn the traveler 90 degrees is seen by particle. The effort required to absorb the traveler is mc^2, based on the integral of the longitudinal component of the centripetal acceleration.

If the particle were at rest before, after the mc^2 of the neutrino has been applied, the particle will have its entities, on average, moving at a slightly different angle. The angle of difference will be m /M (actually m /(m+M)) since the neutrino had to be influenced by mc^2 which came from changing the angles of the particle's entities. If seen as a ring,

So the capturing particle has more entities and has a net angle of m /(M+m). If the particle had been at rest, the new velocity is now moving at mc /(M+m), hinting at classical conservation of momentum for particles at very low speeds absorbing small travelers.

If the particle were moving at .707c when it captured the neutrino, the entities in the particle are rotating .707c lateral to the velocity, and .707c in the direction of particle movement. The author thinks of 45 degrees as the attack angle. So only .5 of the mc^2 influence would be needed to capture that neutrino (the neutrino goes through a change of 45 degrees, but the lateral influence will be provided by the coils), since the other component of the neutrino's initial Travel becomes

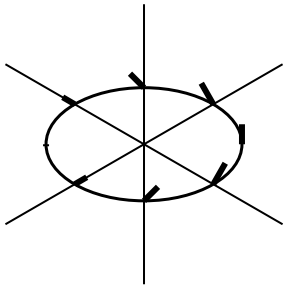


Figure 4.7: Logical Ring with Skewed Entities

part of the particle's net Travel. Note that the particle would see the neutrino as having lower influence hence lower energy.

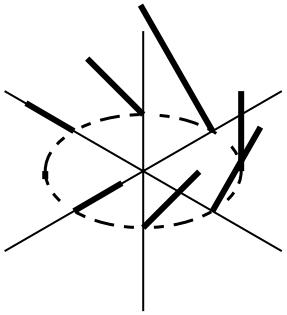


Figure 4.8: Logical Ring with Entities Moving at 45 Degrees

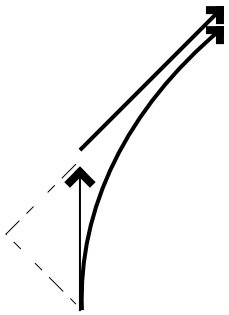


Figure 4.9: Cross Section of Capture When Traveling the Same Direction

So the units of direction change and energy are the same. The concepts may well be equivalent. Notice that the energy of the neutrino as seen by the moving, in Minkowski space, particle is less if moving the same direction. (3) 35

In this Minkowski space of angle change and capture by coil, some of the Lorentz transformations are already appearing.

Motion and Effort

For a particle to travel along a line at a velocity v, the entities must be redirected so that they will travel at an angle from a perpendicular to the line of travel equal to the arcsin of the desired velocity v over c. Since the author is interested in understanding what travel at velocity v requires in terms of turning the basic entities in the particle, a full development with limited hand waving is warranted. The entities in the particle must be bent from their average 0 degrees to move at angle A. A is the arcsin of v /c. The diagram shows a conceptual cross section of the entities rotating in a stationary particle reduced to a ring of rotating entities. Hand wave on averaging entities longitudinal coiling motion noted here.

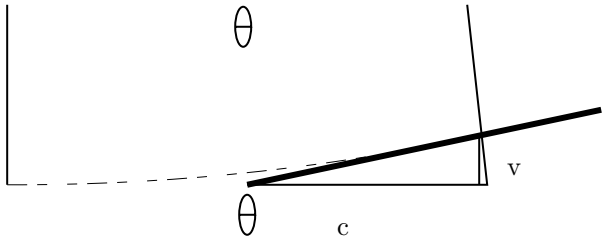


Figure 4.10: Motion and Attack Angle

For redirecting particles and for capture and emission, the differential effort required to move from the resting position is not da times mc^2. but sin a da times mc^2. The indefinite integral of sin a da is -cos a. Integrating from 0 to A gives -cos A + 1 or the negated trailing terms of the Taylor series expansion for cos A, viz. A^2 /2!-A^4 /4!+A^6 /6!-... so the result is mc^2 A^2 /2

At low angles, Ac = v, so apparently the turning effort to reach speed v is mv^2 /2 which equals the classic kinetic energy to reach speed v from rest.

Planck's Constant h

Previous blog postings have attempted to understand why the basic number of quantum mechanics has units of classical angular momentum. Two blog posts have investigated the reason for h's units and tried to make sense of the magnitude of h without notable success. The *mnp* Model's new answer to that question rests on the description of the electron as a coiled strand of 6 quantized filaments of charge material (*n*'s) with Axis aligned with Travel direction, as described in the outdated , *mnp* Treatise. The basis of electron behavior and shape remains the same as described before. Each of the six loops in the strand is a truly fixed length of entities moving at the same speed c. To form a closed shape, a single uncoiling of the strand is necessary. The exactly equal lengths leads to the need for an electron to uncoil and untwist in order to move or adopt the shape of a spherical or complicated shell. Two coils must be removed from the path of the loop for movement or to change orbital angular momentum.

Understanding how much angular change must be applied to the coils to achieve those uncoilings has taken the author some time. The coils, with the balance of Separation against Travel and Axis alignment effects, have a naturally tight coil and a fixed length of loop. That "steady state" or "reference frame" is moving at c and tightly coiled. If we conceptually unravel the coil and break it so we can draw a straight line of reference, we get

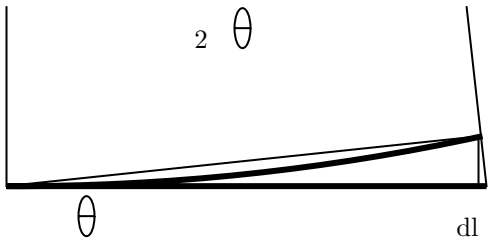


Figure 4.11: Cross Section of Coil Change in Coiling "Reference frame"

where the curvature to be applied is enough to shorten the horizontal side. Since to take out two coils requires changing the strand curvature enough that its effective length is 2 coil circumferences less.

The change to the loop will be a curve of very large radius and small angle. The angle is so small the secant essentially = the arc length 2 theta.

If we use number of coils as the independent variable,

coil circumference = loop length /ncoils theta must be chosen so that 1-cos theta = 2 coil circumference /loop length = 2 /ncoils since theta is small, so 1-cos theta = theta^2 /2 so substituting, theta^2 /2 = 2 /ncoils or theta = 2 /$\sqrt{(ncoils)}$
The angle by which the curvature must be changed is twice the angle of "uncoiling" so the effort to redirect M_e by 2θ is $M_e c^2 2\theta$

Time for one loop completion is only a function of loop length
Time for one loop completion is loop_length /c

Effort sustained through one loop completion is
$M_e c^2 2\theta$ loop_length /c -or-
$M_e c 2\theta$ loop_length -or-
$M_e c 4\theta$ loop_length /$\sqrt{ncoils}$

Integrating the effort to open the two loops over the time taken for an entire loop traverse represents the duration during which the 2 loops must be kept open so the change in the electron shell, whatever it is, can complete. A sudden change in one area needs to spread (2022-01-30: the *mnp* Model is no longer using "propagate" for in-Model phenomena) and, to reach a measurable steady state, even out over the entire electron. The electron may then be held in that configuration by *m*'s trapped by its new larger surface or by the additional field of the new proton in the nucleus or by a magnetic field or, if moving, by the field created by its movement. More on fields created by moving particles in a subsequent blog posting.

The length of the loops that provide structure for the fermions is chosen to be 3 meters, since that is the distance the entities can travel at c in 10^{-8} seconds. Weak interactions take 10^{-8} seconds to completely change the structure of

fermions or, in *mnp* terms, completely unravel the strand that makes up the fermion structure while perhaps forming a new structure. A table of values for angular effort times the time for changes in the loop to occur over its entire length gives:

[Number of Coils and J*s to Keep Entire Loop Open]

Number of coils	1e10	1e20	1e24	1e28	1e40
Coil diameter	9.6e-11	9.6e-21	9.6e-25	9.6e-29	9.6e-41
Angle change	2e-5	2e-10	2e-12	2e-14	2e-20
J*s - one loop	3.28e-26	3.28e-31	3.28e-33	3.28e-35	3.28e-41

Since this range includes h, we might have enough confidence to calculate number of coils directly. In closed form:

$J * s = M_e c^2 (4/sqrt(nc)) * (loop\_length/c)$

So in this universe, a direct calculation of number of coils from h is

$(4M_e cloop\_length/h)^2$ -or-
$(4M_e c^2 loop_time/h)^2$

Coil diameter would be $loop\_length/(\pi * number\_of\_coils)$.
Combining the two equations seems like code obfuscation.

So the *mnp* Model prediction for number of coils is 2.45e25 and coil diameter 3.9e-26 m which is far more plausible than numbers from the previous blog postings. The coil diameter is the upper limit on influence distance. Two possible origins for the quantized loops are investigated in the this section page 32, giving Separation distance, entity sizes and masses within a factor of 1.6, and electron size and density ranges.

This is a back of the envelope calculation, but with the structural explanation of the *mnp* Model, suggests a reason for the magnitude and units of the Planck constant h.

Coils, Momentum, and Matter Waves

Matter waves in modern physics are seen as having a real and an imaginary part. The analogue in the *mnp* Model is the coils of charge loop structure plus m's as gluons, surfaces, and fields plus the electron shell coils with their m's as trapped shell energy, all individually moving at c. So in a translation between the *mnp* Model and the matter wave model, the real part of the matter wave is the forward component of all the basic entities in the particle, the imaginary part is the component of the entity movement at c that is transverse to the wave /particle movement. The square of those magnitudes should be conserved since it represents the real coiling entities.

If the charge portion(s) are significant and different from the distribution of mass of the particle, the real part of charge matter wave is the longitudinal component of the coils of n's and p's while the imaginary part of the charge travel is the transverse component coiling of the n loops and p loops. Again, the square should be constant for an unchanging particle.

If *mnp* were reduced to a mathematical formulation, there would be three spatial dimensions for components of the wave, one time, three direction dimensions for the actual components of the field unless this is the "imaginary" part of the spatial dimensions, and three different types of entities (m's, n's, p's) on perhaps one or perhaps three dimensions, plus perhaps three dimensions for the net Axis direction at each point. Since Axis evolves in the opposite direction from Travel for p's and in the direction of Travel for n's, mathematical separation along an "entity" dimension or dimensions would be needed. So one could seek 10 mathematical dimensions (or 8).

For early development, the author believes discrete simulation will offer faster understanding and development, even though its falutin index (technical term credited to DDL, personal communication) is lower.

Separation - Was the Third Basic Effect in the *mnp* Model

Recent work with the waves created in the random field potential that surrounds matter in a galaxy, to be documented in a forthcoming blog posting, leads to a major re-factoring of the *mnp* Model and profound re-examination of the Separation Effect.

The Separation effect does not cause any movement or change itself. So it is not an active effect If two entities coincide then one ceases to be influenced, so that when the first is influenced to move in some other direction, the second continues uninfluenced until it is separate enough to be influenced. One could take a quantum /statistical mechanics attitude and

suggest that the two are indistinguishable. If the basic entities have conceptual parts or dFigments, those parts are indistinguishable and it is not possible to tell what went in from what came out, just that two basic entities came out.

Whether Separation is limited to situations when entities also have essentially the same direction or not is to be decided in simulation. In most cases other than in the coils that provide structure to matter and at the initial and only singularity at the origin of the universe, the time of overlap will be tiny, so the effect will be small. The strongest argument for similar direction being important may be the apparent durability of the coils, which have lifetimes at least as long as protons.

Separation could be seen as a quantum effect in that only so much influence can occur in a tiny region over a time or a distance. If more than one entity occupies the same tiny region, it is as if it isn't there in any fashion whatsoever. So in a sense, the mass of the universe was not apparent until the entities became separated enough. Or one can say the mass of the universe did not exist until the initial separation occurred.

The new understanding of Separation allows for the formation of quantum loops in a region too dense for normal behavior, due to a lack of competition and fields. (4) 36 The elegance and simplicity of this new description of Separation makes it an attractive addition to the *mnp* Model.

Conclusion

The yet unpublished exploration of field effects from moving neutrinos and moving polarized bundles of energy called fhotons in the *mnp* Model has led to understanding of interaction leading only to redirection. This leads to understanding of energy, motion and energy, apparent energy in a moving frame, and the Planck constant. It led to an incomplete but better understanding of momentum and particles and matter waves, and to an ongoing refactoring of the *mnp* Model.

Appendix

The author prefers to use the term figments in place of the phrase basic entities and indulges in that preference in the Appendix, though not in the endnotes.

Suggestions for Quantized Loop Formation

For an electron, if loop_length is known, coil diameter is d, and the Separation distance is Sep, then

number of figments per electron is 6 loop_length /Sep, number of coils per electron is loop_length /pi d.

Two images of quantized loop formation seem reasonable.

Figure 4.12: Quark Forming as Initial Cylinder

Figure 4.13: Quark Forming as Initial Torus

Cylinder Model - Torus Model of Quantized Loop Formation

If coils formed into a torus with figments packed as closely as possible in the coil and coils packed as closely as possible on the inner circumference of the "hole in the doughnut", the diameter of the inner portion of the torus is equal to the coil diameter.

Number of coils around the center = Pi d /sep = loop_length /pi d
Sep (loop_length /π^2) = d^2 -or-
Since the Planck constant investigation has a coil diameter d,

Sep = $\pi^2 d^2$/ loop_length

If the compact cylinder with a same curvature S shaped connector is the origin of quantized loops, then

Number of coils = 2 d /Sep (ignore any +1) = loop_length /pi d
nfig = 2pi 2d 6 loop_length over sep squared

Sep = $2\pi d^2$/ loop_length

Can coils emerge quantized from the dense soup because there is no competition? In a steady state, long cylinders would be the norm. In a "pressurized" state, the torus model might be more likely. In any case, we have an approximate number for Separation distance and hence for the number of figments in an electron.

	Torus	Cylinder	Units
Separation distance	3.2e-51	to 5.0e-51	m
Number of figments in an electron	5.7e51	to 3.6e51	
Figment mass	1.61e-81	to 2.53e-82	m
Maximum density at separation distance (hexagonal packing)	2.3389e69	to 5.77e69	kg/m^3
Compact electron size	12x12x4*10-26	or 4x4x8*10-26	m
Compact electron density	2.2e45	7.7e45	kg/m^3

The electron is close enough to a point to be considered such in modern physics. Compare density to the Planck density 5.2e96 kg /m^3

Momentum

Momentum is easy to picture, as net movement of the entire combination. The actual difficulties are discussed below.

The author has been blithely claiming absorption and emission of neutrinos and fhotons will conserve momentum, and any viable candidate model must follow experiment. An honest approach to the interaction of pairs of figments, suggests that classical momentum is NOT conserved at the single figment level. Apparently fields will not conserve momentum in and among themselves. Adjusting the simple calculations for time of interaction (oncoming figments have less time to interact than those intersecting at acute angles) may not be sufficient. For example, Travel alignment of two oncoming figments crossing paths will both align more closely and the momentum will shift in that direction and increase along the direction of Travel(?). With Travel alignment, two fellow-moving figments crossing paths tend to average their direction, slightly shifting momentum toward the bisecting angle.

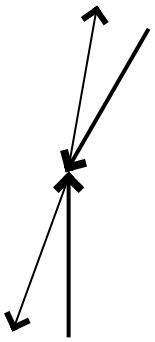


Figure 4.14: Basic Entities in Oncoming Interaction

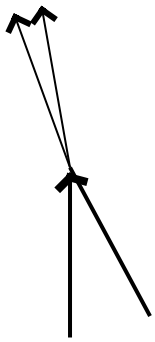


Figure 4.15: Basic Entities in Almost Parallel Interaction

The particle coils averaging and capturing of effects and figments is expected to be the major contributor to momentum "working out." When the math or simulation of particles absorbing figments is worked out, then absorbing neutrinos fhotons and other particles including gluons will easily follow.

Tuning of the transfer functions of Axis and Travel may be needed, but that tuning can only depend on the angle of intersection (and issues of offset within the radius of influence). Individual interactions might be Figment Dynamics (there will be no Figment Statics, as any waking audience members already guessed). Aggregate behavior may be called Figment Mechanics. In my dreams.

Axis only shows more transverse and more longitudinal variation compared to classical momentum. A mix of Travel and Axis alignment, with Travel twice as strong as Axis, shows intermediate variation.

The author hopes to avoid adjusting the transfer function in line with the time of interaction to tune for momentum. Hopefully an old fourth effect, Transverse will not be required to make momentum work directly.

The unevenness of momentum and the need for particles to react, capture, and release change requires that the coils be active in transferring effects. Matter waves will be useful simplifying concepts in this regard. See Coils, Momentum, and Matter Waves 31 in the body of the post.

Nature of the Effects - Philosophy

Gravity has monopoles precisely because the Travel effect works in both directions (symmetrically over each 90 degree range). There is no toward or away with gravity and Travel alignment, only the divergence of directions and the graviton count or density.

Magnetism does not have monopoles because the Axis alignment is one way, over a 180 degree range. Electric and magnetic effects always have a toward and away.

Catalogue of Influence

The ability to influence direction depends on the nature of the influencer. A short catalog:

A neutrino moving at c, with no polarization and no charge material, can change the angle of the figments in the field potential it passes through toward alignment in both directions along the line of Travel of the neutrino.

A magnetic field has m's with Axis aligned. The m's themselves will be moving perpendicular to the Axis alignment, so magnetic effects do not stay in one place but, to appear in one place, must be refreshed.

So alignment with the Axis will be the net effect. As charge approaches c, transverse magnetic fields are less and less effective since the angle between the Axis of the moving charge and the field are close (to be examined). For a stationary charge, the average Axis of the charge will be perpendicular to the Axis of the field, so no force or acceleration results.

A static charge field has Axis aligned radially with the source, Axis out for a negative charge and in for a positive charge. The m's in the field tend to move more tangentially, with Axis aligned with the charge Axis.

Gravity has gravitons mostly m's moving in and out of the mass along radial paths, attracting figments to align vertically going either in or out by Travel alignment.

Musings on Figment Dynamics later Figment Charge Dynamics

The ansatz used for Travel effect is that it is proportional to the cosine of the angle of intersection or near intersection. This guess allows the interaction to cross 0 at 90 degrees, where the Travel alignment effect is expected to be 0. So that figments in closer alignments affect more. In the distant future, tuning the Travel alignment function may be possible. For now, relative magnitudes and experience with simulation is a higher priority. Using both spreadsheet and python, the author found comparison of both helped shake bugs out of both systems.

With good drawings, computation might not even have been needed. Clearly, the lateral is not preserved when oncoming. Longitudinal is going down in magnitude, since the one seen as skewed in the coordinate system gets more y change that the one initially aligned does. Alternate - both are becoming more opposed, so there is less net difference. Even weighted averages (oncoming figments see each other for a shorter period of time) will not support a blind search for momentum conservation.

Still, since stationary collections and since particles are unified by their loops of charge material, they will not spread too far and at some level must act as a unit.

Philosophically, each figment must know only its own coordinate system and the effects of the nearby figments. They could remember a coordinate system (Axis supplies some of that, the basis for a 3d coordinate system for m's but only an axial coordinate system for n's and p's) but a remembered coordinate system doesn't seem useful in trying to force momentum conservation. A model that depends on a postieri tuning depending on coordinate systems is not viable.

Musings on Figment Mechanics

A first computational step in simulating the effect of a field figment on a coiling particle will be to model an electron at rest, with not fields, so influence can be introduced one at a time. Is the "perfectly elastic" attraction of two figments - looks like it might not preserve momentum in orthogonal coordinate systems? Is so, does having a set of coils "stationary" allow that influence to be balanced out so that momentum is conserved

Classical mechanics conserves energy in non-dissipative systems. The entrapping particle is, in a way, dissipating the sideways (not forward) momentum.

History

The author has had the privilege of working on the *mnp* Model without public interruption or pressure since August of 2011. Early that month, sitting in the woods in southern Sweden, the author imagined "the universe being filled with points so happy to be here that they all moved at a constant speed." Even the author sees this as a rhetorical device, but proceeded to develop the *mnp* Model based on that idea.

Humor

Complement: Doesn't read much but thinks a lot.
Not: Doesn't understand much but thinks a lot.
Neither is a compliment.

Endnotes

1. Conserved Quantities

Since basic entities are no longer created or destroyed, entities are conserved though they form the random field potential as well as the gravitational forces.

This blog posting has already seen energy described as ability of entities to turn and be turned. Energy emerges from a basic principle. Mass has been described as the resistance to influence (and the ability to influence) of the entities. The *mnp* concept of mass seems to be consistent with modern particle physics emphasis on rest mass and E and mc^2. Mass emerges and is conserved as long as the captured "energy" of neutrinos and photons is included.

In like manner to mass, charge is persistent only in particles made of loops of n's and p's which have their Axis aligned with Travel. Free n's and p's are easily redirected and take crucial part in static electric and electromagnetic fields, but do not constitute charge. Current loops are conserved but some free loops may be present in the field potential. Since free loops are formed in the modern universe only when positrons and electrons annihilate, charge is conserved. (The author recognizes this exposition is descriptive, not persuasive.)

The author hopes to derive as much of physics as possible. In that he is not alone - string theory and quantum loop gravity have (had) similar ambitions.

Having had some success explaining concepts energy absorption in different frames, of time dilation and length contraction as being an essential part of movement, at understanding the two way speed of light experiments, at providing images of matter consistent with quantum mechanics, the author is guardedly optimistic. Hopes to derive concepts to "explain from basic principles" gravity, fields, magnetism and electromagnetism. Derive Lorentz transformations though (spoiler alert) at the expense of frame independence.

Measured time will be derived, though time is inherent in the position change of all basic entities and the limit on amount of interaction over movement.

Questioning conservation includes future discussions of whether Travel direction is conserved (not would have made the initial formation of quantized loops simpler). Whether instead of space expanding the basic entities are slowing at a corresponding rate may be an interesting question.

2. Neutrino Structure

The *mnp* Model has two views of the structure of neutrinos. They may be amorphous relatively dense collections of m's with random Axis orientations with resultant 0. Strongly deprecated in 2020: They may be rings with balanced Axis either inward or outward directed. The exact form is not important in the present context of this blog posting. The behavior of neutrinos suggests to the author that there is no charge material (n's or p's) at all in neutrinos.

3. Capture by particles moving toward the traveler

If moving different directions, the traveler's mass /energy will be seen as more by the capturing particle. At .707c toward, the neutrino will be hard to capture, since many of the oncoming entities in the particle will try to align with the neutrino rather than turning it toward the particle's direction. A charged traveler would be easier to capture. But say it is possible with the help of some coils of the moving particle moving, for a short distance, in the necessary direction.

The last 90 degrees of the turn to join the particle will take mc^2 effort, as the section drawing on the right suggests. The first 45 degrees of turn, to perpendicular to the traveling particle's figment movement, is as difficult as the next 90 degrees, since the coils offer no assistance. Both the .5c component perpendicular to the particle and the .5c component anti-parallel to the average figment must be countered by the particle's coils. Mathematically, of course, mc^2 /(tan .5 angle of intersection) behaves properly, but a solid first principles *mnp* explanation is needed.

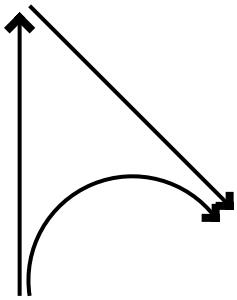


Figure 4.16: Basic Entity Joining Oncoming Particle

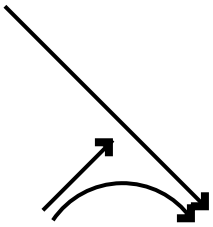


Figure 4.17: Schematic of Traveler Capture While Traveling Toward at .707c

4. Expansion

The *mnp* Model offers an alternate explanation for the big expansion of modern cosmology. If the initial expansion proceeded at c without matter having been formed, there would be no time or history and that would allow gravitons to reach as far as they do so that they could return for the two-way behavior of gravitons to which the modern universe is accustomed, after which the recruitment of modern particles took place followed by the current expansion. Return and Looping will be a future post.

The following (partially edited earlier) material includes a more developed and detailed exposition of the *mnp* Model with more descriptions of gravity, fields, CT symmetry, complicated mesons, and other detailed phenomena. Still in the process of being edited. As auto-didacts have such bad teachers, self publishers have such bad editors.

Chapter 5

mnp Model - Introduction Number Two, from (2012-12-12)

The *mnp* Model grows out of a thought experiment, started 55 years ago, based on two questions. "What is the simplest explanation for gravitational forces?" and "What is the simplest model for matter and energy?" Starting with basics:

- the speed of light is constant
- some small distance seems to be fundamental
- the simplest interactions are with near neighbors

The result of that thought experiment is the *mnp* Model. The *mnp* Model needs no long distance magic, no extra dimensions, and no implausible singularities except the first.

Document Organization

This document will eventually be organized as follows:

- Reduced Instruction Set - summary
- Basic units and interactions
- How "elementary particles" are understood
- How "fields" are understood
- Major theoretical impediments
- How experimental results are explained
- How existing theory helps
- How existing theory hinders/contradicts
- Major thought processes useful to any comprehensive alternate model

The *mnp* Model has developed over time, starting as a compendium of emails from 2011 September 22. This draft still shows many of those formative stresses. The Model has been tested with the Razor of Occam a few times. It seems to have no conceptual need for an entity with no Axis (aka torque neè spin) as a separate basic entity to create gravitational fields and effects, hence no *o* entity to accompany the three basic entities *m n* and *p*.

This draft has not yet been translated into the language of physics. Since some of the concepts are foreign or rare, and since the author speaks more the language of architecture and architectural engineering and comes from a background of intellectual and computer tool development, that translation may be difficult but will be appropriate when communicating with physicists.

A useful narrative form for this document has not been chosen. Choices include:

- Historical, as developed

- Tutorial, as best understood
- Computational, as best justified or verified
- Educational, as physics is taught
- Natural, as a comprehensive Model might be best presented

A style for this document has not been finalized. Choices include:,

- Scientific: how best to get attention from physicists. Obvious short answer: have something that can be calculated and verified or tested.
- Journalistic, how best to get attention
- Sensationalistic, how to get the most attention
- Academic, how best to get the attention of a graduate school
- Personal, how best to express the author's humor and joy at discovering more about the universe and thinking creatively.

Author's Motivations

The author has always been irritated with models in which space needed to know what was going on across the universe and had very large numbers of magic quantities and with the teaching assistant who proposed sending information faster than light at the intersection of two rotating beams of light.

The author has always been awed by the care and genius required by experimentation.

In spite of decades of relative stable life and the awe in which he holds theorists and experimenters, the author finds the unsettled state of physics knowledge and the suggestions of the *mnp* Model leading to the conclusion that life will be interesting and unsettled for all branches of physics for many years.

The *mnp* Model is proposed in the spirit of understanding and development. Whatever Theory of Everything emerges to unify the various incompatible branches of physics, that unification can learn from the attitudes and approaches of the *mnp* Model and will probably require the re-examination of theory and proof started here..

Conventions

This paper uses letters and names for the entities and effects that differ from current models, partly because the effects and entities are different from current models .

Terminology - A Work in Progress

Many of the new concepts deserve effective language. For "effects," "tendencies" and "urges" have been considered. Forces and potentials have been ruled out, since the three effects are completely new? For the "entities" and "figments" and "constituents," "points" and "elementals" are candidates. For specific entities, italicizing the single letter name for those tiny new ideas seemed reasonable. The single letters chosen m, n, and p have been used elsewhere but do not seem to dominate conversations and papers the way e and i do. So m's/m-figments are mediators, n's/n-figments are negatives, p's/p-figments are positives. Prior to August 2012, the model used "Spin" to refer to the orientation or nature of the three "entities." "Axis" has since been chosen for the "charge" information carried by the basic entity, either its charge type or its polarizable axis. Is "nature" "orientation" or "torque" better?

Just so ya know, the author is open to suggestions on nomenclature. So far, the nomenclaturii has not been heard from. Clearly, making suggestions will require effort by the reader to understand some of the explanations offered.

This document is written in indicative (definitive) terms rather than subjunctive (hypothetical). That allows distinction between what "is" in the Model and events that "may" occur under the Model. Or maybe "will" is shorter than "would", maybe "is" is shorter than "would be." *mnp* is just a Model at this point, so anything written about it is hypothesis.

Predecessors to the *mnp* Model

Apparently the *mnp* Model is a successor to the preon models of the 70's and 80's, though the *mnp* Model posits basic entities far smaller than the preon models seemed to imagine. The structural and architectural approach of the *mnp* Model also seems to differ radically from the preon approaches. The quantized loops of charge material that make up

the structure of matter may be similar in scale to preon models, but the loops individual flexibility and grouped rigidity seems new.

The preon model apparently fell out of favor by 1980, since the models could not describe how particles stayed together and stayed small. (Smolin 2006, 73).

In quantum loop theory circa 2006, Bilson-Thompson uses a preon model with ribbons that twist "left, right, or not at all" Braided together, they match the particles of the standard model. (Smolin 2006, 253-254) The three types of actors sound similar to the three entities proposed by the *mnp* Model, the braiding perhaps similar to structural models sought by *mnp*. If the left and right twist are constant, the no twist ribbons have a side and a tendency to align perpendicular to the left and right twist ribbons with an orientation and all cover space at a fixed rate, Bilson-Thompson may have a congruent model. Or perhaps the "no twist" ribbons in a gravity/entity model hint that o's (entities with no Axis (aka torque neè spin)) may be needed in the *mnp* Model. The author hopes to avoid a fourth basic entity that would have no Torque/Spin/Axis.

The *mnp* Model seems to share motivation with Einstein's later exploration, but the author has no direct knowledge of the details of that work. The author is aware of the hit taken by his BCI (Baez Crackpot Index) for the previous sentence, and will not repeat it.

Quantum mechanics is very useful, both for providing concepts to be borrowed and for providing mathematics of shells and potentials to be borrowed. The mathematics of quantum electrodynamics are expected to be very useful in a full development of the *mnp* Model. The mathematics of quantum field theory maybe not so much: semi-classical fields described by the *mnp* Model may suffice. Primary differences are that *mnp* claims to know what is in the underlying field and that those unknowns are moving at c, that gravity is already in that field, that the Separation effect keeps "the field" from becoming too dense for long. A saving grace of the model may well be that gravity and other effects act locally. From quantum mechanics, the mathematics of the continuous Ψ function of the orbiting electron, with its range of orbital numbers, may be used directly, since the "orbiting" electron is seen as approximately a surface in the *mnp* Model. The *mnp* Model might be seen as a "non-local hidden variable" theory similar to David Bohm's "Causal Interpretation" also known as Bohmian mechanics. (`http://en.wikipedia.org/wiki/Hidden_variable_theory` and `http://en.wikipedia.org/wiki/De_Broglie%E2%80%93Bohm_theory`) The latter article even notes that "Most (but not all) variants of this theory that support special relativity require a preferred frame." The *mnp* Model certainly does.

Developmental Approach to the *mnp* Model

The author hopes to limit appeals to uncertainty and magic. Entities that travel at a constant speed and keep a constant Axis (aka torque neè spin) should be enough magic. Given that entities may encounter non-uniformities at a local level, there is enough uncertainty without conjuring particles.

When the *mnp* Model was the only model being described, the criteria for success were here. Now that the Constituent Model is also being developed, the criteria for success have been moved to precede the two expositions. 10

Great Failings (2012-03-27)

The Model depends on a (local, at least) universal reference frame. It supports the experimental data behind the adoption of Special Relativity but unfortunately challenges the frame independence of that theory. The Model poses much less challenge to General Relativity, and further development will rely a great deal on that theory where experiment is lacking. The Equivalence Principle was very useful in creating General Relativity, holding an analogous position to frame independence in Special Relativity, but may not be supported by the *mnp* Model.

Getting Started With *mnp*

The *mnp* Model is conservative only in that

- the counts of each of the basic entities in the universe are constant
- mass and the speed of light are apparently constant
- the amounts of negative and positive charge material including all possible field constituents are constant
- total (mass times velocity) is constant and probably zero
- development and change are constant for any Model that hopes to survive.

So with no more proof than the boundless String Theories, here goes:

Chapter 6

mnp Model Summary

The *mnp* Model architecture makes no reference to a structure or curvature of space, but posits that electromagnetic and gravitational effects are local attractions between entities. The architecture uses discrete entities of uniform size, Travel, and Axis (aka torque neè spin) for didactic purposes but neither insists nor disproves that the entities be discrete.

The Model depends on a (at least local) Universal Reference Frame, an orthogonal, unchanging Minkowski space-time. These orthogonal four dimensions are the only dimensions in the Model. These orthogonal four dimensions provide the basis through which the basic entities move, always at the speed of light.

Lorentz transformations are seem as arising from the structure and movement of matter, light, and fields. They affect matter's experience and measurement of space and time. Gravitational effects are described as interactions between entities in fields and matter. Geodesics result from that interaction. Measured clocks and oscillations result from the structure of matter and from movement and interactions with gravitational fields. Length measurements result from the structure of matter and from movement within the Universal Reference Frame and the distortions to matter due to gravitational fields. Fields are pictured as moving or not, always in the Universal Reference Frame.

The Model can be described as having two concepts of time: Universal or Minkowski time and local time. The Model can be characterized as having two concepts of measurement: Universal or Minkowski distances and local distances. But the Model will deal mostly with the Universal frame, since that is the realm in which the entities themselves operate.

Therefore the Model must examine carefully the experimental proofs of existing, accepted theory. The examination of proofs of Special and General Relativity is ongoing.

Principles and Assumptions

Every entity moves at exactly the speed of light and has a minimum radius of turn and a fixed (small) range of influence. For didactic purposes, the Model assumes all entities are the same ability to influence by Travel and by Axis alignments. Hence the emergent "mass" and "energy" of each entity will be the same.

Entity Properties

In addition to sharing the fixed properties, each entity has a location, Travel direction and Axis (aka Torque neè Spin)direction. The angle between Travel direction and Axis direction determines entity type. Earlier descriptions of the *mnp* Model used Spin instead of Axis (aka Torque neè Spin), but that term conflicted with Quantum Mechanic's spin.

The three "entities" are

- m - Axis perpendicular to direction of travel
- n - Axis opposite the direction of travel
- p - Axis along the direction of travel

m entities can travel very long distances in groups at the speed of light. m entities give rise to magnetic effects, charge effects, gravitational effects. Single m entities can travel long distances, but are more affected by other entities. To be stable, n and p entities must rotate (in a closed loop coil) in a closed surface that, in the case of free electrons and

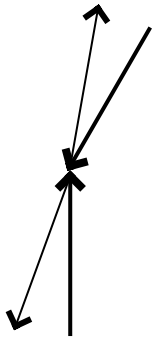


Figure 6.1: Oncoming "Travel" Interaction

Figure 6.2: Near Parallel "Travel" Interaction

positrons, may be very small but non-zero. n and p entities form the basis of "matter" that has a rest mass. m entities are "energy" and "fields" unless trapped by electrons and quarks.

Effects

Entities can pass completely through each other. There is no elasticity at the entity level. Entities interact in three ways:

- Axis Alignment: Entities attempt to align Axis with that of nearby entities. This attraction to align Axis is "signed" in that nearly opposite Axis will average. This gives rise to electrical, magnetic, electromagnetic, and some weak forces.
- Travel Alignment: Entities attempt to align their Travel orientation with that of nearby entities. The effect is bi-directional. Entities traveling in almost opposite directions also try to align their paths, rather than trying to completely change direction as with Axis Alignment. This gives rise to some weak and strong forces, quark formation, Cooper pairing, and gravitational effects.
- Separation: Figments VERY close to being at the same location traveling in essentially the same direction will compete; one will receive and transmit influence, the other will not. This can (2022-01-13) be seen as a limitation on space; only a certain amount of influence can be transmitted in a region. What figments receive and what effect influence may be random. For now, assuming one figment does and one does not seems simpler. The author suspects that an elevation of space in the model is not needed, but appears interesting and even ironic compared to the complete demotion given the dimensions in the *mnp* Model up to now.

Travel Alignment in combination with Axis Alignment leads to the structure of matter. Separation leads to matter not collapsing.

The Three Basic Entities, Known Also As Figments

Figments

- m (Axis (aka torque neè spin) axis perpendicular to direction of travel),
- n figments have Axis (aka torque neè spin) axis opposite to travel.
- p figments with Axis (aka torque neè spin) axis parallel to travel.

The Travel effect can be shown here:

The Axis property is shown here. The long arrow is the direction of Travel, the short wide one the Axis. Note that for m's, the Axis can be any direction in the plane perpendicular to Travel.

Note that Axis influence will change the direction of n's and p's, but that Axis can be changed easily without necessarily changing the direction of m's.

The next chapter will discuss putting the basic entities and effects together into larger structures. At some point, the entirety might be called Figment Mechanics. Just kidding. Or not.

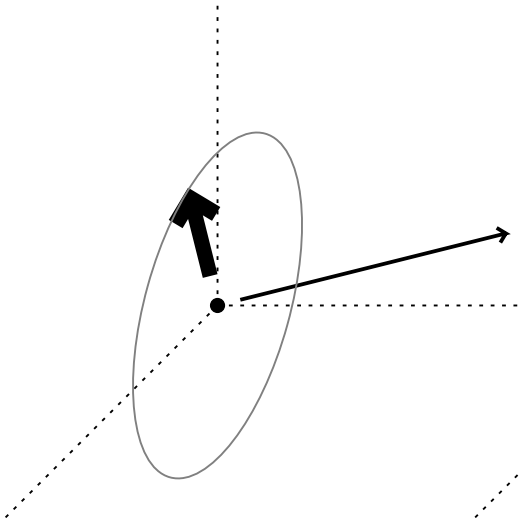


Figure 6.3: Axis perpendicular for m's

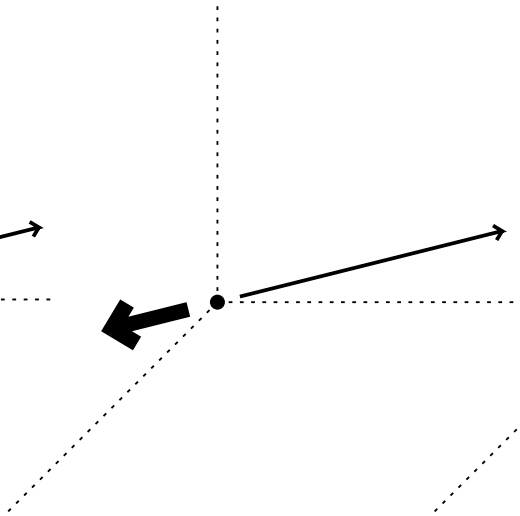


Figure 6.4: Axis anti parallel for n's

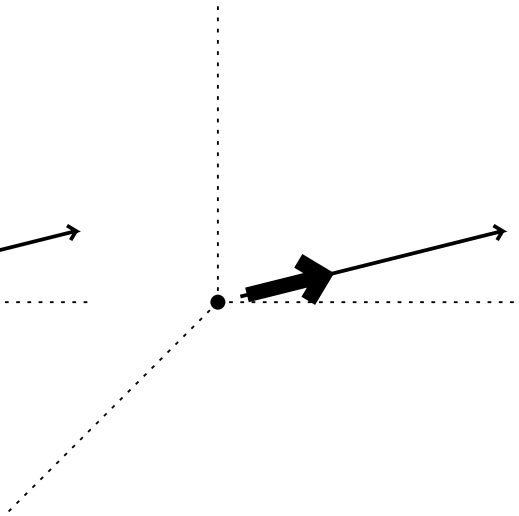


Figure 6.5: Axis parallel for p's

Chapter 7

mnp Building Blocks

Early on in the thought experiments developing the figments (er, basic entities), the author realized that n's and p's were prone to redirection based on Axis influence from both mediators and from other charge figments. If close together in a line, they might stay together in that line. Once starting to curve, they might well reinforce each other in curving, leading to (in early Model thinking) rings that would close and become stable. Since that picture did not allow for movement, filaments have been seized on as the best explanation for the existence of stable particles.

Here, some of the early writing on filaments:

Filaments (2012-12-12)

The effects of Axis Alignment and Travel Alignment will keep figments of the same type and orientation in a line, while Separation will keep them from getting too close to each other. The balance of these three effects will lead to the formation of filaments that are somewhat stable.

Filaments and the necessary behavior of filaments suggest the alignment effects are slightly "forward" looking, so that a figment is slightly more affected by those in front of it. Alternately, the effected center of the figment could be seen as displaced slightly forward in time or space.

Filaments made of n's and p's would then, if bent significantly, coil in on themselves until the Separation effect balanced the coiling effect. The coil radius may become a fundamental dimension in the *mnp* Model.

Filaments could encounter themselves when coiled the maximum, limiting the length to be a loop. Since a single filament is believed to be unstable, the current model of filament loops is that based on the stability of electrons and positrons, which are seen as strands of 6 filaments, coiled with a half twist per coil, until the coil encounters itself. These quantized loops, perhaps though torn from each other during the early era of the universe, are seen as the basis for quantization when combined in sixes to form the charge structure of electrons, positrons, quarks, and other particles including W+- and Z.

Even traveling close to c, loops need to stay intact even though the traveling direction does not match the Axis and so the integrity of the loop may not be as strong. So the effect of Travel Alignment side-side is strong. This suggests that extra coils may be attracted strongly too? For further development.

Electrons and Positrons

Free electrons and positrons are seen as a strand of six equal length filament loops of matching n's and p's respectively. That strand coils, most tightly in free particles, with the coils perpendicular to the outside surface. Experiment does not show any dimension to electrons because the dimension is tiny enough that we have no tools to examine that closely.

Principles

- Figments move at constant speed in their direction of inherent travel (c).
- Figments have a constant Axis (aka torque neè spin).

Some corollaries of the principles:

- Figments cannot be created or destroyed and are ageless since they are "always moving at the speed of light".
- Figments may be influenced to change direction and *m*-figments may be induced to change Axis (aka torque neè spin)axis.
- Figments may or may not influence those that influence them.
- Figments can pass through each other, often with little effect on each other.
- All movement comes from the speed of the figments.
- Velocity results from changing orientation of figments in matter.

The second principle could be rewritten as "Figments have one other constant property that determines how they affect and interact with other figments." The author hopes that by using "Axis (aka torque neè spin)" we are not misled into thinking too narrowly about that second constant property.

Chapter 8

Thinking in the *mnp* Model

This chapter will start with the blog article on mental leaps required in a structural model of the universe. It will then go into more detail on the *mnp* Model itself.

Mental Leaps Required in a Structural Model (2012-10-22)

Much of human development has required mental leaps, sometimes singly and sometimes in groups. Here, I sketch the leaps involved in "thinking in *mnp*." Some of those leaps are common to all science, some to any model that hopes to unify physics, some to a structural model, and some specific to the *mnp* Model. I conclude by listing some of the leaps made by all humans and all physicists, to illustrate that the leaps in *mnp*, if useful, would be a small part of life.

Leaps Required to be a Scientist

- What exists and has been measured is.
- A theory can be measured.

Leaps Required in All Unifications

- Simplicity is the ultimate goal.
- The universe should not need a doctorate, in the author's opinion. Yes, that last sentence is a value judgment and not a fact.

Leaps Required in All Structural Models

Structural Models, as defined by the author, posit or seek explanations using mechanisms and existences smaller than observed fields and elementary particles that interact in ways that cause observed phenomena to emerge. The author includes Preon models, String theories and Quantum Loop theories here, but should practitioners feel their theories are not structural they may opt out.

- All long distance interactions will be mediated by fields created by recruitment rather than by emission. Recruitment is key. Whatever creates gravity is either static or moves both in and out.
- A structural model may seem like a great leap backward, since Special Relativity has been a better explanation than Lorentz-Poincare models have offered the last hundred years. Yet if "hidden variables" are to be explained, gravity to be integrated with everything else, MOND gravity data to be explained, and dark matter-energy to be understood, a great leap in some direction will be needed.
- All structural models require a great leap. The author is convinced a Local Reference Frame will be required. Special Relativity and structural models cannot coexist. While the space-time effects of gravity may make General Relativity useful or even necessary, the author suggests a more fruitful approach is purely structural. The space and time experience we have as matter is different from the space/time experienced by the fundamental constituents of the universe. Matter measures space and time as it is able. So we need to be open to the possibility that geodesics,

measuring time and length, may be properties of matter rather than properties of space. I offer this statement with apologies.

- "Frame independence" has been such a useful concept to physicists and engineers that it will be hard to unlearn with respect to relativity partly because it was so hard TO learn with respect to relativity.
- The mental ability to picture frame independence must not be lost, since it is so useful in statics and non-relativistic dynamics as well as geometry. So, sorry undergrads, it will still be part of the curriculum. But since it will be useful, I'm not too sorry.

Leaps Useful in All Structural Models

- Opposing tendencies will lead to stability.
- Rotation may be transmitted over distance by the units of the model, but Moment and Torque will not. For example, there are no strings leading to centripetal force.
- The tendency of the structural units to separate from each other is not absolute.
- The structural units can pass through each other.
- Interactions will occur by redirection rather than "Force"

Leaps Requested in the *mnp* Model

- Geometry is the key to each type of interaction. There must be some arrangement of the basic units that differentiates static charge from moving charge from magnetism from electro-magnetism. Gravitational acceleration must be different from the magnitude of the gravitational field and its time and length effects.
- Structural units interaction depends on which edge approaches which edge. The time of interaction combined with the direction of interaction will lead to differentiation.
- Minimal tools should suffice. Avoid adding concepts such as marking "I'm ingoing" wherever possible. Rigorous simplicity may lead to deeper understanding. For example, if gravitons go both ways as required by recruitment, only direction and convergence/divergence are available. The latter is the ONLY indicator of which way gravity goes. That may mean an infinite plane would have no acceleration, only time and length effects, in the limit?
- Fields are formed in a random soup of structural units, and are local imbalances in that randomness.
- Fields have conservation properties. There is no net movement of structural units either linear OR spin. Secondary fields may be generated, but they too lead to no net movement as well. The field created by a moving charge may be considered a "two deep" model. For example, by sending some units one way and other units another or by sending those units already upward bound more and the downward bound less, the balance for the instigator means no loss of "energy" or change in direction.
- If the field is affected by something else (measured) that will lead to a change in the instigator. Even then there is not "loss of energy" but just a different configuration or orientation.
- Fields attenuate.
- "Energy" and "mass" emerge from direction, effect, and number and are not independent quantities.

Note that this section used "requested" in the title. Since the Model is not complete, it can do no "requiring." When the Model is ready for prime time, the mental leaps required to understand the *mnp* Model will be smaller than those required by Quantum Mechanics. The leaps are more akin to statistical mechanics, which has been described as "the other life changer for physics students."

Leaps Required to be a Model Developer

Those interested in understanding Structural Models or the *mnp* Model can stop here. Those interested in the context of mental leaps can skip to the next section. Those interested in the leaps required to create or extend the *mnp* Model may continue here.

- Everything must be explained by short distance interactions.
- Everything must, in its essence, be simple even if the accumulation of simplicity leads to complexity.
- The universe does not have a doctorate, though it makes complexity possible.

- Everything is "on the table," so whatever it takes to form the conceptual house of cards, including cannibalizing earlier ideas or admitting I was wrong.
- If a measurement cannot be explained, either I don't understand the measurement, I haven't worked the principles well enough, I don't understand the principles, or the principles are wrong. In developing the *mnp* Model so far, I've experienced all four.

Leaps Required to be a Physicist

Physicists have made many mental leaps already, far outnumbering those requested by the *mnp* Model. The list ends when we give up learning. In roughly reverse chronological order I offer an incomplete list:

- ...
- Manifolds
- Quantum Mechanics
- Shroedinger's equation
- LaPlace transforms
- Fourier transforms - flipping frequency to time or physical domain
- Complex numbers to model "physical Hilbert spaces,"
- Conservation of properties in Feynman diagrams
- Differential Equations
- Tensors
- Frame independence
- Integration by parts
- Integration - chain rule
- Induction
- Symmetry proofs
- Matrix transforms
- Equal and opposite reactions

Leaps Required to be a Human in Large Societies

The first three are currently needed in complex societies. The fourth is made in societies that wear tied shoes. The remainder are universal.

- Reversing point of view
- Algebra (for example, dividing to solve a multiplication problem)
- Negative numbers
- Making the string go back and loop when we want to make a knot that will tighten and tie a shoe
- We are separate individuals
- We can go to something, not everything comes to us. (If we were horses, who walk at birth, we would learn that if we wait some things will come to us)
- Pushing back on our hands and knees will make us go forward

So the *mnp* Model is learning to crawl now. Push back is useful.

Here ends the blog article on mental leaps.

Counter Intuitive Effects of Effects Requires New Thought Patterns

Effects, figments and their method of operation is very different from the "large scale" effects seen in life and experiment. The only way to remain in one place is to rotate at the speed of light. A figment does not have momentum, it only has speed and direction? A figment moving toward another figment or structure attracts that structure and goes on through? (We feel gravity, actually the forces that resist gravity, not the "gravitons") A magnetic field is created by figments traveling perpendicular to the field lines away from the source? Forces are transmitted a distance by mediators not "sent out" but recruited from the other side of the "transmitting" surface and directed by that surface?

Small does not mean high energy. High energy is an inverse proxy for size, a concept needed by human scale and the energies needed to "see" in an experiment, and is still useful as a measure of size. The actual effects at the small scale

of figments are actually small and the concept of "energy" is actually not useful in discussing effects, though the effects must produce the results we expect of energy.

A Few Thoughts about Effects and Figments

Thinking About Travel Alignment

Travel Alignment accounts for the formation of filaments, for a tendency of filaments and figments to travel together in one direction. Or opposite directions. It also accounts for gravity in a non-intuitive way.

Gravity now in the *mnp* Model is the result of masses of figments recruiting figments to act as gravitons by leaving perpendicular to the surface of the mass. In static situations, this "outgoing field" is matched by an equivalent incoming "field" of figments also acting as gravitons recruited by earlier outgoing gravitons. Usually, there will be as many gravitons going out as coming in, so the direction of the gravitons can have no effect in the Model(!).

The gravitational field has magnitude, orientation, and a "rate of dispersion or accumulation." The magnitude (how many gravitons per unit area) affects time dilation and length contraction and, in one picture of gravity's effect on rings and coils, width expansion. The orientation obviously affects direction. The more divergence or rate of dispersion of the gravitons, the higher the acceleration of gravity for a given magnitude of the field.

Note the difference between acceleration and time dilation (which is more related numerically to escape velocity than acceleration) is explained by a single mechanism with differences in geometry. Note too that recruiting both directions will quickly damp gravity waves, other than outbursts of neutrinos, light, and unorganized mediator m's from supernovae.

Thinking About Axis (aka Torque neè Spin)

If all tiny figments have Axis (aka torque neè spin), either perpendicular to the direction of movement (call them m) or parallel to the movement, either in the same direction (call them p for positive) or in the opposite direction (call them n for negative). If two n's or two p's are traveling in the almost the same direction, they will tend to both orient along the "average" direction and stay parallel. Two tiny figments (m's) with Axis perpendicular to direction of travel will, when near each other, attempt to align the Axes. The Travel Alignmenteffect may lead them to travel more the same direction, but the Axis (aka torque neè spin)effect will affect mostly or only? Axisdirection. This alignment operates over 180 degrees, do that Axes almost 180 degrees apart will still attempt to average and if traveling together with no other influences, will (soon enough) have Axes aligned. Note the difference with Travel, which would tend to align at 180 degrees if the travel directions are almost opposite. Of course, the time of interaction will be small.

Thinking About Fields (2012-01-24)

The *mnp* Model needs a phrase or term for the "vacuum potential" that exists in space. That vacuum potential is the randomly oriented m (and perhaps lone or small groups of n and p) figments that exist in space.

Fields in the *mnp* Model are physical entities, formed by "structured" effects but not maintaining their structure the way matter does. That a structure such as a "fhoton" (the *mnp* Model's name for the photon of electromagnetism) can continue to travel at the speed of light in a straight line and continually create the field(s) is a result of the unchanging Axis (aka torque neè spin) and speed of the figments and the random orientation of the "vacuum potential." The fields created will "diffuse" or "evanesce" after the fhoton passes. If the figment in the vacuum through which the fhotons travel is somewhat oriented, that orientation will have an effect on the fhoton. If there are more figments to one side than another, that imbalance will look like a gravitational field. If more figments are moving one way but have a random orientation of Axis (aka torque neè spin) (and n's and p's are equally prevalent), that imbalance will also look like a gravitational field. If the Axis (aka torque neè spin)s are somewhat aligned in a direction, that will look like a magnetic field.

Thinking About Conservation of Charge Loop Material

From (2012-11-11): A number of experiments show that particles are sometimes created and sometimes destroyed. For example, a kaon decays to three pions occasionally, but usually two. Muons rarely decay to two electrons and a positron. The author prefers to see this result as recruitment of charge material loops instead of interpreting the more common results as a loss of charge loops. That is, staying within the *mnp* Model and presuming its validity.

(2012-11-08) The bevatron experiment at LBL collides two protons to produce three protons and an anti-proton at 6 to 7 times mass. This would require recruiting 36 loops, the charge material for 2 nucleons. Tough one, this.

When a decay is truly prohibited, the Model need not concern itself with it. If a decay might be expected to produce a result but truly cannot, the Model has an opportunity to to explain or understand why they do not occur. When "prohibited" decays are actually very rare, the *mnp* Model is interested. Recruitment and/or release are often the best explanations. Side note on "prohibited:" the possible electron shell transitions are interesting and relevant to the *mnp* Model of electron shells.

The *mnp* Model explanations suggest that coiled loops existing in the vicinity of the chaotic reaction are recruited. If no recently released loops are in the vicinity in empty space, recruitment will not occur in the *mnp* Model. No other explanation seems to be feasible within the Model. Sigh.

Note: There are some hints of experiments finding as much as a one percent preference for recruiting protons than anti protons. If SLIGHTLY different decay of the anti-protons is found, then prevalence of protons in the universe would be plausible. The *mnp* Model sees charge structure (loops) as not being destroyed during "creation" and annihilation processes, but as being recruited and released. The Model does not require thinking of "dark matter" in those situations but does allow even encourage the concept.

Thinking About Axis Alignment and Travel Alignment

The *mnp* Model pictures quarks as six loops of charge material stranded and coiling. If one type of charge loops flows in opposite direction to the other type, the Axis Alignmentand Travel Alignmenteffects are both attractive. That may have been involved when coils and loops were initially recruited in an early universe. Such strands with filaments moving in opposite directions cannot move in space. Therefore, since movement must occur by ∃, the loops must travel in the same direction and therefore the Travel Alignmenteffect must be stronger at the quark scale than the Axis Alignmenteffect.

Expanded from (2012-10-31): Why, when the basic effect that leads to gravity is stronger than the basic effect that leads to electro-magnetic phenomena, are charge effects so much stronger? Charge fields do not "go away" nearly as fast as gravity. The m's in Electrostatic fields move perpendicular to the seen potential with Axis aligned with the potential rather than moving away from (and toward) the origin of the field as gravity does. The Axiseffect has a unidirectional effect, while gravity's Axis Alignmentaffects the coils of particles in both directions and it is only the divergence of the m's acting as gravitons that causes acceleration. True, the coiling of the charged particle and the prefential recruitment of m's exiting the surface of the particle transfer only a small amount of the particle's total Axiseffect to those mediators. Still, we measure ∃ electromagentism as stronger.

Chapter 9

Familiar "Elementary Particles" in the *mnp* Model

Now we turn to familiar entities to discuss how they are represented in the *mnp* Model.

Light is a "Particle" that Creates Fields and Waves and is then Influenced

A few wavelengths from the source, light has settled into a regular line of half a wavelength of m-figments with Axis (aka torque neè spin) in one direction, followed by half a wavelength of m's with Axis (aka torque neè spin) in the opposite direction. This is all that is needed for travel across the universe: a line of m's.

This is such a different picture of electro-magnetic radiation that a new term is needed to separate the *mnp* concept from optic's fhoton and from the different mediator of interactions in quantum mechanics and in modern particle physics which is also called a photon. Until the community chooses a different name or accepts the *mnp* description as the real photon (hah), the author will reluctantly use fhoton.

Since the universe also has m n and p-figments moving in random directions, this line of m's influences the m-figments to more closely match the Axis (aka torque neè spin) of the light's figments and to travel a little closer to the plane of the light's figments. This is the resulting magnetic field. The fhoton's figments but to a much greater extent the magnetic field directs n's and p's perpendicular to the magnetic field. This is part of the resulting electric field. These two fields are not necessary for the fhoton to exist or travel, but if they are interfered with, they affect the fhoton or its followers.

Further, these fields are important in the early wavelengths of the fhoton since the fields direct following figments into the line of travel. These fields interfere with the immediately following m-figments of the opposite Axis (aka torque neè spin), so that the figments gather in the middle of the half wavelength. This interference accounts for the need for more figments at shorter wavelengths. The influence radius and quantum energy of m-figments will lead to either a minimum energy for a fhoton with either a maximum length or energy that then goes up with longer wavelengths in cold vacuum.

In diffraction or diffusion, the electric and magnetic fields that are created by the fhotons influence the fhotons that follow. The first fhoton through a slit, if the first fhoton in the entire "wavefront," may travel straight through or be affected only slightly by the weak "leading" fields. Later fhotons are affected by the fields created by the leaders. Those magnetic and electric fields are traveling slower and are behaving exactly as Maxwell and the quantum field theorists describe, but those fields are not the fhotons. In a double slit experiment, the leading fhotons do not see the field but later fhotons do and are bent by the fields.

One detail: a leading fhoton passing within half a wavelength of an edge may be affected at its tail end if m-figments directed out by the front end cause a reflection at the edge to be directed directly back, perhaps encountering the end of the fhoton's line of figments. This is expected to be a small effect. Electrons (n-figments organized in coils) traveling toward a slit or two also create magnetic and electric fields of the same type, and can be guided by that fields and so may be influenced by the fields to appear according to the probability functions already well known.

So in the *mnp* Model, the cause may lead to effects, which then affect the cause. The Model intends to continue to develop that understanding of nature. The *mnp* Model suggests that there is a minimum wavelength for fhotons, since if the second half of the figments are within the range of influence of the first half of the figments, coherence of the fhoton

will be lost until the first and second half of the "wavelength" are far enough apart. This may well be related to the uncertainty principles. Minimum wavelength may be about two ring diameters. The *m*-figments that make up fhotons are expected to have a maximum separation or spacing in a low energy long wavelength fhoton. The *mnp* Model would expect that even longer wavelengths would have fhoton energies proportional to the wavelength rather than inversely proportional. The minimum acceleration of gravity is a similar phenomenon. (2012-02-03)

Turn On the Lights - How Light "Starts"

Picturing a fhoton, the *mnp* Model name for electromagnetic radiation as a particle, being released from an electron changing shell is easy. Then the coils of an electron are in a shell, the charge material loops are using some of their influence to resist the the nucleus' electric field and so recruit fewer *m* figments in tighter shells. The electron is seen as "lighter" in inner shells. When an electron drops down to a lower energy shell, the *m* figments that match (more or less) the energy difference in the shells pop off in one group, with Axisaligned. The direction of emission is expected to be random, though the shell's response to the stimulus if any may suggest less than complete randomness. The excess *m* figments come off all at once, polarized, as a unit from the electron. Exactly why they come off together is not fully explained in the *mnp* Model. (∃)

A more difficult picture for the *mnp* Model is creation of low energy fhotons from antennae. Here is an attempt, offered as an unapproved draft.

The universe is full of *m*-figments moving in random directions. For antenna's creating electro-magnetic waves, moving charges direct *m*'s toward perpendicular to the charge with Axis (aka torque neè spin) axis parallel to the charge movement. By their nature, *m*'s move away at the speed of light. If a charge oscillates, it first directs *m*'s with Axis (aka torque neè spin) lined up parallel to the charge's Axis (aka torque neè spin), perpendicular to the charge's travel. Then it directs *m*'s with opposite Axis (aka torque neè spin) again lined up parallel to the charges Axis (aka torque neè spin) now going the opposite direction. The *m*'s gather in lines for travel by setting up electric and magnetic fields that guide other *m*'s to join.

The electric and magnetic fields created by the moving figments are not part of the fhoton itself, but a disturbance in the random *m* figments that exist in space. (For a while, the *mnp* Model considered lone *n* and *p* figments essential to the spread of electric fields. Since they do not travel well (∃ again) the author invented ways for fields to spread with only *m* figments.) The disturbance of the potential that is the fields move (mostly slower than) light and are left behind by the fhoton to evanesce. If the existing figments are random before the fhoton arrives and not interfered with by slits, waveguide edges, or waving hands, the fhoton will continue unaffected. Conceptually, this must be true for light to travel at the speed of light in an entity based model such as *mnp* ; it cannot wait to be propagated by something else moving at the speed of light at an angle.

Polarization of a fhoton is the axis of the *m*-figment Axis (aka torque neè spin). That axis is not fixed but can be changed by external (or "internal") effects. For example, if light undergoes polarization and has a few wavelengths to travel, the *m*-figments of all the fhotons will align themselves to the average Axis (aka torque neè spin) direction of fellow travelers. Unpolarized light has no average Axis (aka torque neè spin) direction, so no orientation takes place. Once oriented, if the fhotons encounter a polarizing filter perpendicular to that polarization, they will be stopped. But if the fhotons first encounter a filter at 45 degrees, half will be stopped. The half that get through will then orient themselves again to the average of those remaining. The magnetic fields produced by the fhotons that get past the filters are probably a stronger influence on the fhotons polarization than is direct Axis Alignment between figments in different fhotons. Again, the first fhoton through will see little effect.

The *mnp* Model suggests that fhotons are not truly identifiable when they travel, that "fhotons" are absorbed and remaining figments continue. A thought (or physical) experiment could clarify (or has clarified?) the issue. Find a steady source of light. Measure the amount of light output as a number of fhotons (in a double slit experiment in one reference frame. Then measure the amount of light output as a number of fhotons in a different reference frame. Red shift occurs when emitting object is moving away from the observer (or vice versa). Is each fhoton believed to have lower energy, with the same number of fhotons? The *mnp* Model would suggest the waves are seen as longer (traveling as magnetic potential) so when it comes time to split off a fhoton or diffract them, the number of fhotons has increased and they are each lower energy. After a fhoton is absorbed, the electric and magnetic fields from the remaining *m*-figments would be expected to lead to alignment of those remaining figments.

Surely this has been done, and the author's ignorance of physical experiment can be rectified. From a satellite or the earth orbiting the sun, does the light (energy) output from a fixed star change or does the number of fhotons as the frequency changes?

Well, the author admits that wasn't very satisfying.

Some of the following explorations of the *mnp* Model seem to fit experimental reality well. Some do not. Some of the structural images may exhibit more the failure of the author's imagination or understanding of the Model than the *mnp* Model itself. The author also may not know enough physics to understand what the model should be explaining or may have misinterpreted experimental results within current paradigms.

Electrons

Electrons are a Surface of Rotating Coils of *n*-Figments in a strand.

All coils rotate the same direction perpendicular to the surface and progress the same direction with respect to the surface, hence a right or left spin. And perhaps a right or left chirality based on the progress of coils. Picture a free space electron as a small sphere with the a coils rotating right or left across the surface of a sphere. An electron "spread out" in an orbit would not interact much with another electron's surface of n filaments rotating the opposite direction (relative to the surface of the "sphere"). The two coils would not coincide exactly. A third electron would have to take one spin or the other and so would interfere with an electron present. There is geometrically no third choice for spin. Hence paired electrons in an orbit. Also, an electron could take another orbital shape as long as that shape is closed.

DeBroglie wavelengths are very useful for electron shell predictions. The speed of the spread of waves across a electron or quark shell may be approximately 2c/pi, given that perturbations spread around the coils of the surface. (2012-10-18 This prediction is not nearly as strong as earlier *mnp* Models when electrons were pictured as ring structures.) The *mnp* Model has not really explained why the quantized loops that provide the charge structure of matter are of the fixed length that determines the "charge" or "size" of the electron. The geometry of a "shortest feasible filament that will close on itself" approach may work. Or the *mnp* Model might follow the lead of other models and say coil length "is a fundamental quantity."

Paired Particles

By finding that the structure of an electron does have a spin "right" or "left," *mnp* obviates the need for "spooky action at a distance" with paired particles. A hidden variable, the orientation of the coils on the electron, explains the results.

At this point, the reader could skip ahead to the description of motion and mass and time in matter. Those four concepts depend on coil and "sphere" structures, since those structures are the only things that slow down enough to then have non-c speeds, time, and mass. Pages 59 and 59. More thoughts about electrons are included in the Ancillary Matter, page 264.

Neutrinos in the *mnp* Model (2012-12-12)

The paired rings of n and p figments rotating opposite each other is no longer the hypothesized structure of a neutrino. Clearly, a neutrino has a balanced charge structure, giving it no net charge but a small magnetic moment (correcting a mistake of about 2011-9-25).

The three flavors of neutrinos posited in the Standard Model are not clearly separated or quantized. Tiny neutrinos (electron neutrinos) come from the conversion of quarks and pions and are not well explained yet in the *mnp* Model. Muon neutrinos are easy to picture as the results of quark breakup, when two quantized charge loops of opposite Axis (aka Torque neè Spin) combine into a flat coiled strand and then travel perpendicular to the plane of that coil. Huge neutrinos come from growth as the neutrino travels through mass, and seem to form extended tubes. Whether the negative or positive charges travel first (in tube form, they are probably concentric) is probably random and unimportant. Having little magnetic moment, neutrinos will accelerate through mass to the speed of light by Travel Alignment(the main basis of gravity) since once they are moving they will see balanced effects to orient the figments even more in the direction of travel. All forms may collect n's and p's so that the neutrino becomes bigger. *mnp* predicts neutrinos can exist and travel at speeds less than the speed of light, so left and right hand neutrinos exist. Handedness is only a function of the direction of travel compared to coil rotation. When a neutrino is traveling at c, it does not rotate as a ring or coiled but when it slows the n's and p's will rotate left or right.

Designer Rings of *m* Figments are not Gravitons

At one time, in an attempt to create a picture of a massless neutrino, the author created "designer" rings of *m* figments in three flavors (the massless ring not a neutrino) which might be half the energy/mass of a neutrino (or perhaps half the energy/mass of a single strand pair) and stable in long travel, and like everything else would act like gravity. They should not be called gravitons.

The right two diagrams on the right are looking from behind the ring, the three on the left are axonometric drawings with the ring traveling to the right and upward.

This "designer" ring might be stable in a size smaller than a basic np ring and might be stable at larger diameters (to some limit) based on the Separation effect and Axis coherence.

This mistake did lead to the realization that *m* figments would travel along np cylinders. Cylinders made of multiple *np* rings are NOT needed to explain current experimental results up through the smaller quarks, but are an interesting thought.

Conservation of Charge Material and Quark Interactions

Conservation of charge material is one of the principles of the *mnp* and Constituent Models. A few examples of that conservation and thinking in the *mnp* and Constituent Models are included here. This section grows from one paragraph on Beta + decay of fluorine$_{18}$ in earlier documention and became blog 44 (2022-01-17) - *M*usings o*N* *P*articles.

Quark Charges

Quark charges seem to be exactly -2/3, -1/3, 1/3, and 2/3 of the "elementary" charge of the electron/positron e^+. Perhaps with puzzling corrections where the gluons seem to have a bit of charge in some types of experiment. The *mnp* Model can explain those ephemera as a result of the quarks contending for charge material. the quarks.

The *mnp* Model uses the basic experimental result to suggest that, mathematically and geometrically, those charges can be formed by combinations of +1/6 and -1/6 and that the quantum of charge is actually 1/6 of the "elementary" charge. In the *mnp* Model, these sixths are seen as filament loops. In the (or a) Constituent Model, the charge structure remains as just sixths with greater affinities for like charges and less for opposite charges, but quantized nonetheless.

Up is five positive plus one negative unit of (the new) quantized charge. Down is two positive and four negative.

Having a consistent size of charge structure for quarks has structural purity. The "sixths of a charge" picture allows positrons and electrons be "degenerate" quarks, which is attractive conceptually.

Current physics vocabulary does not seem to have a term for the smallest measured items with charge, so the author is casting about for alternatives. Lepton includes neutrinos but not quarks. Quarks include only fractional charges. New terms might be particulate, particulite, kwark, fepton, six-pack, six as a noun. No good word starting with f comes to mind. Fwark seems forced; the pun on fork might entertain some versed in software development but will dismay many others. For now, the author will use italic *six* as a noun. And call it \mnplepton in the latex source.

This picture of sixths also allows a three positive plus three negative "quark" that would be stable until it encounters another quark, when it would probably trade three of one charge or the other to convert the encountered quark into its charge opposite and produce a positron or electron. This neutral *six* has not been seen in experiment, unless the Z is a candidate. Since it is more mixed in charge structure, the mass/size of the *six*'s is expected to decrease from z to down to up to electrons and positrons.

This document will appropriate the letters n and p for the negative and positive quanta. Those are loops that strand as six in the *mnp* Model and just "sixths" in the Constituent Model. Apologies to particle physics for the overlap among the 26 letters. So the table of the charge structure of *six*'s would be:

The n and p notation is also used in discussing and diagramming the lay (layout) of filaments in strands. Since this document uses loop and figment indicators much more than "neutrons" and "protons" this admittedly overlaps Particle Physics use of n and p. Again, apologies. This sixth of the elementary charge idea has been around a long time, at least since Post 12 (2012-10-26) - *Many New Possibilities for the Charge Structure of Matter* page 214.

quantized charges	net charge	particle name
0 n 6 p	+1	positron
1 n 5 p	+2/3	up
2 n 4 p	+1/3	anti-down
3 n 3 p	0	z
4 n 2 p	-1/3	down
5 n 1 p	-2/3	anti-up
6 n 0 p	-1	electron

Table 9.1: Combinations of *mnp* quantized charge loops as *six*'s

Neutrons Emitting Electrons

The *mnp* Model posits that charge material is neither created nor destroyed, though it may be hidden at times. Neutron decay needs the charge material of an additional *six*. From 11/04/11 (a palindromic date if we ignore the century), neutron decay wants one down quark to convert to an up, so in filament notation, the neutron pppppn nnnnpp nnnnpp becomes the proton pppppn pppppn nnnnpp. Maybe a more readable way to write that is the neutron ppp ppn/nnn npp/nnn npp or 5p 1n/2p 4p/2p 4n becomes the proton ppp ppn/ppp ppn/nnn npp or 5p 1n/5p 1n/2p 4n. A solitary neutron would need filaments nnn ppp to change to a proton and create an nnn nnn which is an electron. The spaces are used like the thousands separator in currency notation and do not indicate that *six*'s have a three and three structure. If nnn nnn and ppp ppp are recruit-able with a big enough photon in a high energy decay/collision experiment, then nnn ppp should be available too.

Starting with

```
      p p
     p   p
      p N            p p
                    n   p
  p P     P p        n n
 n   n   n   n
  n n     n n
```

One of the two down will attract an n from the z (which holds its filaments less tightly) in exchange for the p not in contention.

```
      p p
     p   p
      p N            p p
                    p   p
  p P     P n        n n
 n   n   n   n
  n n     n n
```

That down (which has changed to an anti up) then attracts another n in exchange for the P in contention, which is no longer in contention but an integral part of the new up. The remaining n in the new up becomes a victim of contention as the new up tries to take the P in contention from the remaining down. This leaves the incoming z as an up with its N in contention, behaving and looking exactly like an up in a nucleon.

```
      p p
     p   p
      p N            p p
                    p   p
  p P     n n        N p
 n   n   n   n
  n n     n n
```

which is bound to the original up and one of the original down as a proton, leaving the electron free.

```
p p       p p
```

```
 p   p     p   p
  p N       N p

       p P            n n
      n   n          n   n
       n n            n n
```

The *mnp* Model suggests that a neutron in deep, empty or cold space cannot decay unless it encounters such filament loops. Whether the six figment loop of 0 net charge item called a z (the seventh and only neutral *six* in the Models) actually exists is open for debate. The LEP experiment at CERN did not find such a particle.

The author does not expect single filament loops to be available in just the right numbers for recruitment, though that is a possible explanation if experiment never finds z's as nnn ppp *six*'s or "particles." Single unaffiliated filament loops may well be present away from galaxies and might be part of dark matter.

Musings About 18F9 Decay in the *mnp* Model

Charge material conservation and figment and filament recruitment are central to the *mnp* Model. As an illustration, consider 18F9 becoming 18O8, for which two modes are possible. The more common is direct positron emission, the less common electron capture.

18F9 Beta Plus Decay

To give off a positron and convert a proton into a neutron, the *mnp* Model attempts a mechanism as follows, in keeping with the charge material conservation principle of the Model.

For reference, up is, in sixths notation, ppp ppn. Down is nnn npp. The proton is ppp ppn/nnn ppn/ppp ppn where the two up quarks are trying to recruit the same p filament coil from the down. If the two up were trying to recruit different p filaments from the down, the reaction would complete like most weak interactions in about 10^{-8} seconds yielding 2 positrons and an electron.

The neutron is nnn ppn/ppp ppn/nnn ppn. The competition here can be seen as both down trying to recruit the n filament coil from the up. Or as the up is trying to recruit a p loop from each of the down. For a proton to decay to a neutron and a positron, additional charge material is needed. Picture the original proton in filament picture notation, with 12p and 6n:

```
     n n
    n   n
     p P

  p p     p p
 p   N   N   p
  p p     p p
```

This needs to become, in beta+ decay, a neutron and a positron, with 9 n, 9p, and a 6 p positron:

```
     p p          p p
    p   p        p   p
     p N          p p

  p P     P p
 n   n   n   n
  n n     n n
```

An additional 3n and 3p is needed. If the proton is relatively exposed in the unstable fluorine-18 nucleus, so it is not protected by the other nucleons, and it encounters a neutral z, the hypothesized 3n 3p *six*.

```
     n n          n n
    n   n        n   p
     p P          p p

  p p     p p
```

```
 p   N   N   p
  p p     p p
```

The strongest attraction for rearrangement comes from the two up, which have 5 p's to attract a sixth though both are already distracted by competition for one of the P's in the down. The *six* z might be considered a donor by the two up's, which would likely attract different filaments of the z.

```
      n n       n n
     n   n     n   p
      p P       P p

      p p       p N
     p   N     p   p
      p p       p p
```

Since the z is not attracting its three p's as much as the up is attracting p's, one of the up will win a p from the z, which z then becomes a down. Since the remaining up is trying to gain a P from the now down which has been the z, we have the picture of a neutron with a freed positron:

```
  n n     n n
 n   n   n   n
  p P     P p

      p N         p p
     p   p       p   p
      p p         p p
```

18F9 Electron Capture

The electron capture picture starts here. This picture has been harder to develop. For an up to become a down when an electron is captured, many images of the change are possible.

From conservation of charge material, proton 5p1n 5p1n 4n2p plus an electron 6n to yield a neutron 4n2p 4n2p 5pn1 starts with a total 12p and 12n and appears to end with 3p3n. If charge material is conserved, it appears that 3p3n has disappeared. The *mnp* Model answer would be that a z has been created. Still, changing the quarks is not easy.

For a down quark, it would need to lose one n and gain one p. But the result needs not just the existing down but a second. For an up quark to become a z involves losing two p to gain n. The closest relative to the electron is the down quark, which would entail losing 2 n and gaining 2 p. A direct exchange of 2 strands between electron and an up would seem to be called for. Explaining that is a challenge, though "randomize" and see what is stable emerge is one approach.

The hardest part of an electron capture explanation is starting the breakup of the electron.

The original situation in filament picture notation where capital letters indicate the filaments involved in contention shows a proton (up up down) and an energetic electron:

```
      n n         n n
     n   n       n   n
      p P         n n

  p p     p p
 p   N   N   p
  p p     p p
```

The total input is a proton, with 12p, 6n and a 6n electron. Picture the expected result, a neutron and a positron, with 9 n, 9p, with the disappering 3 p and 3n as a z.

```
      p p         p p
     p   p       p   n
      p N         n n

  p P     P p
 n   n   n   n
```

```
 n n     n n
```

Perhaps the simplest explanation: an electron is in proximity and with the compatible spin when a positron is created in Beta + decay and the two "annihilate" to become not one but two z's. Those z's must be of a size to absorb a reasonable amount of energy.

For a direct explanation, the electron needs to be or become energetic enough that its coils are opened up to a similar radius as the quark with which it will start exchanging.

Maybe the down wrestles an n from the electron to yield two anti up and the two up still contending for the P in the original down.

```
  n n     n n
 n   n   n   n
  n P     p n

 p p     p p
p   N   N   p
 p p     p p
```

Then the new electron turned anti up tries to get an N from one or both of the up, since those N's are already accessible.

```
 n n     n n
n   n   n   n
 n P     P n

 p p     p p
p   N   N   p
 p p     p p
```

This contention appears nominally symmetrical. That might pull one of the anti up into close proximity with a down so that the coils can more closely align. If some portion of those coils arrange to a stranding of 3p 3n of the non-contending filaments, the coils will expand to a higher radius and separate from the other. Leaving briefly

```
 n n     n      p n
n   n   n      p   n
 n P     P      p n

 p p     p
p   N   N
 p p     p
```

The two 3 strands are still involved/intertwined with each other, so the N or P might drop out of contention. To go toward the observed result, the N would drop out and somehow the anti up gets a p from the nascent *six*. The author is not willing to end with either QED or "the simple details are left to the reader." This is not satisfying. Worse ideas can be found in the JNR Appendix page 247

18F9 Electron Capture - A Better Explanation

Direct explanation, number two, is just that the electron is compatible in energy and spin to one of the up, intertwines, and some of the coils reach 3p 3n and expand to separate from the other 6 strands. The temporary result can be pictured

```
 n n     n      p n
n   n   n      p   n
 p P     n      p n

 p p     p
p   N   N
 p p     p
```

the resulting *six* is a down, which is not interested in losing an N but in gaining one by latching onto the N already in contention, trying to give up a P.

```
 n n            p n
n   n          p   n
 p P    n n     p n
      P   n
 p p    p n
p   N
 p p
```

The nucleon stays intact. Voilá. With only one major appeal to magic. A slightly more satisfying explanation for electron capture. At least as a demonstration exercise in thinking about charge conservation and in recruitment toward stability, Not a total loss as a thought experiment. One hopes.

This emphasis on charge material conservation leads the author to suggest that the cross-section values for various interactions are not single numbers when the reaction depends on something outside or additional to the particles involved in the reaction. Some reactions like neutron decay may not happen in deep space, with little around. Vacuums in proximity to mass are not empty; "energy" in the form of recruitable *m*'s is available. Dark matter may be mostly recruitable, so some regions around galaxies are not empty either. And yet, the author finds himself, once again, suggesting alternates to the established physics. With no expectation of being persuasive.

Gamma Particles

From 11/05/11, another palindrommic date, Gamma particles from electron-positron destruction are seen as not just fhotons made up of *m*-figments the way fhotons are pictured in the *mnp* Model. They are not even particles with a given size. They definitely are mostly energy, the *m*figments as energy released by the reaction. They also contain *n* and *p* figments traveling at the speed of light. Those charge material figments are currently seen (2022) as staying organized in the quantized filament loops that provided the structure for the original particles. The *mnp* Model does not see the loops as being broken up by high energy reactions. All *n*, *p*, and loop filaments n and p do not have the ability to travel the very long distances that real fhotons do. Charge material will scatter faster.

If coils DO break up in high energy collisions, the individual figments will be hard to recruit into loops and thus would be seen as adding to dark matter in the current universe. Since the *mnp* Model sees black holes as retaining only figment count, momentum, and quantized charge material loops, this would also lead to loss of a significant portion of the only information retained in black holes. So perhaps the author's preference for the persistence of figment loops has an inherent bias toward existence. The mnp and Constituent Models see weak interactions as the exchange of quantized charge materials between particles leading to different particles and the strong force as quarks attempting to exchange charge material but being prevented by the contention of another quark for the same quantized charge material.

Regarding the central and residual Strong Force and the surface of the nucleon, the fields of *m*'s and less likely, *n*'s, and *p*'s are expected to be complicated but to cluster near the quarks and the surface of the nucleon, and to look like "gluons" and perhaps form the noted nucleon "surface."

The older five images of quarks are deprecated but included in the "Journal of Negative Results" for reference near page 247. Other deprecated discussions have also been moved to F.

Chapter 10

Fields and Traditional Forces in the *mnp* Model

The *mnp* Model hopes to explain known results in physics rather than just describe them, a daunting task. Even f=mA is difficult, because understanding velocity must precede acceleration! Velocity and momentum, after a false start, seem to be understood in the *mnp* Model. This is also documented in section Momentum Energy and h, page 26

Momentum as Geometry and the Intrinsic Speed of All Entities

The *mnp* Model now posits that movement and momentum of mass come from the angle of the figments in the coils and the intrinsic light speed of the figments in those coils, so is not dependent on the presence of gravitational or inertial effects in space. Investigating the angles required of figments in coils proves fruitful, and shows that a relativistic approach is the only approach that will work. Early work assumed rings rather than single linked coils, but illustrates the nature of movement.

A single figment changes velocity only by changing direction. Its speed is constant.

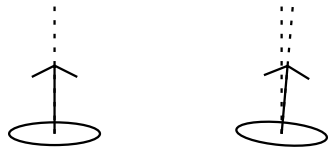


Figure 10.1: Figment Change Direction

Movement and Time Dilation

Rings of figments moving at c offer the simplest image of movement, though the coiled loops of matter will have many coils at different orientation.. At rest, the conceptual ring will have no velocity but the figments will be rotating in the ring at c. Imagine the ring can move at c, the figments are all pointing perpendicular to the ring, so the ring is not rotating at all. At .707c, the figments are all moving in a spiral, with the component of velocity around the ring .707c. At .866c, the component of movement around the ring is .5c. So the ring is rotating slower, and all coil or ring related processes including clocks are operating slower at increased velocity. This effect also operates in accelerating frames of reference, as the figments in the coils are being accelerated, the relative speed of coil rotation is the determinant of "local time."

Why would coil rotation determine time? Electron shells transmit vibrations and force across the shell as a function of coil rotation (where the speed of spread is essentially $2c/pi$ at rest and $2sqrt(c^2 - v^2)/pi$ when moving). A quartz crystal will slow as the outer electron shells or silicon and oxygen transmit vibrations slower.

So time, in the *mnp* "native travel" model is measured in "rotations" of the coils. When that rotation stops (as it would at light speed travel, with all the motion of the entities forward), all Axis (aka torque neè spin) would stop and the coils, moving sideways, would stay in place by Separation, Travel Alignment, and Axis Alignment. Near light speed, all coils would be rotating very slowly and putting most of their native motion into "forward" travel. The lateral (coil rotation) portion of that movement would be precisely $1/sqrt(1 - v^2/c^2)$ by geometry. In an "accelerating frame of reference" the speed of rotation would still be the arbiter (and driver) of time. An accelerating field would be pulling the figments in coils perpendicular in travel to be more parallel in travel, and so slowing them down. Rings in the plane of travel would be being flattened, with much more time spent moving forward and very little moving "back" so they would be slowing down too.

Numerical experiments with coils with plane in the direction of travel and then with arbitrary oriented coils determine that time would slows as predicted for coils in the "neutrino" position, and slow more than predicted if the coils at an angle to the direction of travel remain round. If the coils shorten by relativity's length dilation prediction, the time for a rotation matches at all orientations of the coil to the direction of travel also matched relativity's prediction. Any coil rotating in the plane of the direction of travel will eventually give up on the steepening rotation from going down to going up (the instantaneous rotation at the bottom of the coil to 360 degrees in the limit). Instead the coil would oscillate a little across the direction of travel. Eventually at high enough speeds, no coils will oscillate across the direction of travel but will rotate only one "side" of the plane of travel.

		Angle or Ring Axis to Direction of Travel									
v/c	compr	0.0	10.0	20.0	30.0	40.0	50.0	60.0	70.0	80.0	90.0
0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
0.5	1.0	1.1547	1.1575	1.1658	1.1783	1.1934	1.2092	1.2237	1.2354	1.2430	1.2456
0.7071	1.0	1.4142	1.4248	1.4547	1.4988	1.5505	1.6031	1.6504	1.6877	1.7115	1.7196
0.8408	1.0	1.8477	1.8809	1.9720	2.1010	2.2460	2.3880	2.5124	2.6085	2.6689	2.6896
0.95	1.0	3.2025	3.4155	3.9444	4.6124	5.2993	5.9327	6.4658	6.8671	7.1159	7.2001
0.995	1.0	10.012	15.428	24.611	33.978	42.677	50.279	56.485	61.074	63.890	64.839
0.9995	1.0	31.626	117.08	221.65	321.18	411.51	489.62	553.04	599.79	628.42	638.07

Table 10.1: Table of Time Dilation: No Compression

		Angle or Ring Axis to Direction of Travel									
v/c	compr	0.0	10.0	20.0	30.0	40.0	50.0	60.0	70.0	80.0	90.0
0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
0.5	0.8660	1.1547	1.1547	1.1547	1.1547	1.1547	1.1547	1.1547	1.1547	1.1547	1.1547
0.7071	0.7071	1.4142	1.4142	1.4142	1.4142	1.4142	1.4142	1.4142	1.4142	1.4142	1.4142
0.8408	0.5411	1.8477	1.8477	1.8477	1.8477	1.8477	1.8477	1.8477	1.8477	1.8477	1.8477
0.95	0.3122	3.2025	3.2025	3.2025	3.2025	3.2025	3.2025	3.2025	3.2025	3.2025	3.2025
0.995	0.0998	10.012	10.012	10.012	10.012	10.012	10.012	10.012	10.012	10.012	10.012
0.9995	0.0316	31.626	31.626	31.626	31.626	31.626	31.626	31.626	31.626	31.626	31.626

Table 10.2: Table of Time Dilation: Length Compression

The current (2012-12-02) understanding of electrons, positrons, and quarks as spheroids of a single coiled strand allows more accurate and reasonable images of movement that have not yet been diagrammed or calculated in three dimensions. The loops/strand is an essentially fixed length. With velocity, every figment in the strand has the same angle atan(v/c) to the coil direction of travel and the same distance to its successor and predecessor in the filament. So rotation around the coil slows, more of the native speed of the figments goes into "forward" movement, and the spheroid gets "squashed" as sketched inadequately below.

Note that given the Separation effect, the Lorentz length contraction is accurate in the limit as velocity approaches zero, since the Separation effect will resist compression of length to 0 at c.

Length Compression

The time experiment suggests that length dilation is "real" not just perceptual - if time dilation uniform for all rings traveling at a speed, then length dilation must occur. The *mnp* Model is not yet developed enough to answer "why the ring is flattened" to the author's satisfaction, with a mechanism of Axis Alignment combined with Travel Alignment and Separation. Finding the Model provides a mechanism for time dilation, in which length dilation is just a "correction factor," offers promise that both effects do not rely on a magical structure of space time but arise from the entities themselves (!)

Ongoing investigations: Do figments in a ring undergo constant rotation, so the spacing varies around the ring? Is spacing proportional to involvement (how much of the movement is actually around the ring at a given point)? Is spacing proportional to the rate of change in angle/direction of travel? Is spacing proportional to the difference in angle of travel fro figments in front and behind? Is Separation based on the square of the cosine of the angle or the product

of the longitudinal and lateral distances? Is Separation a result of "disks" flattened relativistically interfering with each other, so differences in angle are required? Is Axis Alignment based on many figments seen in the forward direction?

Space-Time

The *mnp* Model sees all figments moving in a flat four dimensional space akin to the computational Minkowski space, at a constant ratio of distance in the first three dimensions of the Universal Reference Frame to distance in the fourth dimension (URF time).

The observable universe and we observers in it are made of matter formed by those figments, and our measurements of distance and time depend on matter and the particles of electromagnetic radiation the *mnp* and Constituent Models call fhotons. Matter traverses gravitational fields in paths that are also well explained in General Relativity.

"Time" is the shared experience marked off vibration of atoms, which rates are determined by the rotation of coils and rings of the tiny units of charge that structure matter. "Time" is affected by the frequency of those rotations as affected by movement in the URF and by gravity.

"Space" is the shared experience that led to the current condition of the universe as measured by the movement of the tiny units of charge and mediators that make up matter and energy. Measurement is based, essentially, on counting electron shells, which are affected by movement through the Universal Reference Frame and by gravitational fields.

"Simultaneity" is a human construct that holds some interest in the *mnp* Model, but is addressed in the Model as events that occur in space with travel distance/time between. Gravity travels at finite speeds in the *mnp* Model, so gravitational calculations will be very interested in (and will probably define) more than one concept of simultaneity. As of 2012-01-24, with the *mnp* Model offering a non-relativistic explanation for the basic experiments that "proved" relativity, simultaneity may not be an issue. See "Special Relativity in the *mnp* Model," later in this document page 68.

Mass

Mass arises from the effect of figments on each other and from their corresponding resistance to change when the figments are organized by the coiled loops of charge material so that they can remain stationary or move "slowly" that is at less than c.

The heuristic definition of mass in the *mnp* Model is the number of figments (nfig?) with, for now, each figment having a relative mass of 1. This is remarkable close to the concept of relativistic mass; the *mnp* Model's image of moving particles attracting mediators as an essential part of movement has been discussed elsewhere. At some point, perhaps Hauser's number will represent the number of figments in a kilogram. The *mnp* Model 2012 is not close to such a determination.

Fhotons have no rest mass, but they are made up of a countable number of figments, which represents their energy. Electrons, positrons, and quarks attract and interact with m figments are a function of their size, leading to the concept of effective mass.

Rest Mass

Started (2012-12-12) Rest mass comes from coils that "stop" figments by rotating. The rotating coils recruit and direct m-figments to also rotate, at larger and varying curvatures, across the surface of the three dimensional structures. The organized figments are the components of rest mass, and can be thought of as nfig.

The momentum of a fhoton is the number of m-figments in the fhoton times c or (m)c. The mass of a stationary electron or positron or other structure without m-figment glue is the number of n and p figments. Momentum is 0, potential is $(n+p)c^2$. If those figments are turned perpendicular to the coil to travel at c, their momentum becomes (n+p)c and energy $(n+p)c^2$. When the speed v is between 0 and c, momentum is (n+p)v, potential remaining is $(n+p)sqrt(c^2-v^2)$. Rest mass is redirected to velocity, so perhaps the concept of "resting mass" would be useful; the potential remaining (above). Nothing becomes infinite at c in the *mnp* Model.

The third diagram above shows figments as gray spheres, with black equators. The other diagrams show figments as disks.

For figment counts, use # The Pythagorean theorem(!) leads to constant $E = sqrt(\#^2v^2 + \#^2(c^2 - v^2))$ or $nfig(v^2 + (c^2 - v^2))$ since the figments motion that is not travel at v is around the coil.

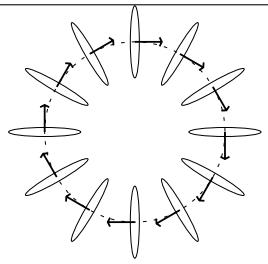
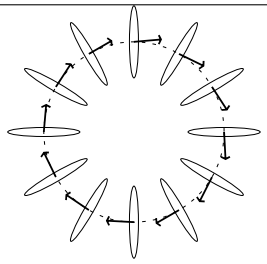
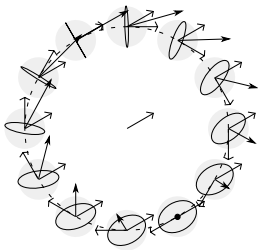
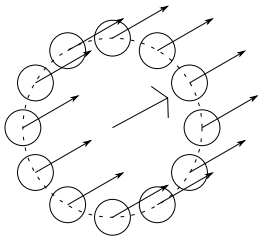
				
Velocity	0	$v \ll c$	$.707c$	c
Potential/ Rest Mass	mc^2	$mc^2 - 1/2mv^2$ $\approx mc^2$	$.5mc^2$	0
Kinetic Energy	0	$\approx 1/2mv^2$	$.5mc^2$	mc^2

Figure 10.2:
Figments in a Coil - Velocity, Mass, and Energy
Coil Moving Perpendicular to the Plane of the Coil

From the wikipedia article "Mass-energy equivalence"

> the relativistic mass and the relativistic kinetic energy are related by the formula:
>
> $E_k = mc^2 - m_0c^2$
>
> Einstein wanted to omit the unnatural second term on the right-hand side, whose only purpose is to make the energy at rest zero, and to declare that the particle has a total energy which obeys:
>
> $E = mc^2$
>
> which is a sum of the rest energy mc^2 and the kinetic energy. This total energy is mathematically more elegant, and fits better with the momentum in relativity. But to come to this conclusion, Einstein needed to think carefully about collisions. This expression for the energy implied that matter at rest has a huge amount of energy, and it is not clear whether this energy is physically real, or just a mathematical artifact with no physical meaning. (`http://en.wikipedia.org/wiki/Mass%E2%80%93energy_equivalence`.)

In the *mnp* Model, $E = mc^2$ does have physical meaning. The constituents of rest mass are figments moving in coils (and as glue over surfaces) at c. Elegance is not proof, of course. BCI += 5

Some theorists may see benefit in considering "rest" as the unique situation and movement as the normal state of figments, since (some) dark matter and all dark energy is moving at c. Such upending of our concepts of velocity may be useful, just as upending our concepts of the universe expanding by seeing it as a bubble with everything shrinking (exponentially, with a base less than 1) may prove interesting.

Acceleration in the *mnp* Model

Only particles can experience acceleration. Figments, fhotons, and pure neutrons can only be changed in direction. Picture a single figment. It is traveling at a constant speed in a direction. in a ring (actually a coil but we use ring for simplicity). To move it slightly from that direction requires redirecting that figment, perhaps by Axis Alignment. The aggregate change of the aggregate (vector) momentum of the figments in the ring is the acceleration. The net change in velocity is a vector.

Force in the *mnp* Model

Force is the (emergent or human construct) cause of a change in direction of a figment. If the figment is not organized into matter or another entity such as a fhoton or an existing field, the cause of those forces will not be affected by the change since other random figments will (probably) be affected in the opposite direction and hence leave no lasting effect on the cause of that force. This "no net effect" is how fields such as electromagnetic, magnetic, and gravitational fields are created without diminishing the cause of those effects (the fhoton or electron or …) Axis Alignment in the *mnp* Model is a reciprocal effect, so if an *n*-figment encounters an *m*-figment with similar Axis (aka torque neè spin) (traveling nearly perpendicular), the two figments will adopt a Axis (aka torque neè spin) closer to that of the other. The *n*-figment will be changed in direction, the "field" created by the *m*-figment will be changed. Needs diagrams, plural.

Magnetism and Charge in the *mnp* Model

Magnetism and charge are relatively weak and may be hard to picture in the *mnp* Model since charge and magnetism are tendencies and "net effects" rather than discrete effects on specific entities.

"Charge" is a stable collection of n figments (-) or p figments (+). Stable collections (such as electrons) have no net direction to the n or p Axes when stationary. When a collection moves, it attracts m figments which are randomly moving in space to move away perpendicular to the line of charge movement with Axis (aka torque neè spin) more aligned with the axis of the net charge. Magnetic lines have no physical meaning but are lines perpendicular to the net m-figments leaving the line of charge, representing equal Axis (aka torque neè spin) effects. When charge moves perpendicular to the imaginary magnetic lines, the Axis (aka torque neè spin) of the m-figments tending away from the source will turn the charge in the expected direction. Note that if a single n or p figment is traveling perpendicular to a single m figment, there will be no effect even though at a macroscopic scale a net result of charges moving the same direction attracts. Electromagnetism with huge collections of charge like electrons and positrons is more complicated and the Model must model known behaviors.

Moving Charges Skew Magnetic Fields in the Direction of Charge Movement (2012-02-02)

For observed magnetic and electro-magnetic forces, the *mnp* Model will (must) find that m-figments oriented by a moving charge (or a single n or p) must be oriented slightly in the direction of the moving charge, so that the magnetic field spreads in the form of a shallow cone. The Axis Alignment attraction effect is stronger for Axis (aka torque neè spin) axes that are within 90 degrees than the Axis Alignment repulsion of Axis (aka torque neè spin) axes that are more than 90 degrees apart, otherwise magnetic fields would create no net electric fields. The Axis Alignment effect must repel axes that are more than 90 degrees apart somewhat, otherwise fhoton "half waves" would not keep their polarities aligned. No "special deals" should be needed in calibrating the Axis Alignment effect to create the shallow cone. If m-figments with axes less than 90 degrees from an n's axis (and direction of travel) pass through the n-figment's region of influence, those arriving with Axis (aka torque neè spin) axis away from the n's axis will be oriented downward less than those arriving with Axis (aka torque neè spin) axis toward the n's axis will be oriented upward, since the latter will remain influenced by the n over a longer path. The diagram shows figment boundaries of effect with m's arriving at the midpoint of the n. The same effect applies at any approach point or angle to the n-figment.

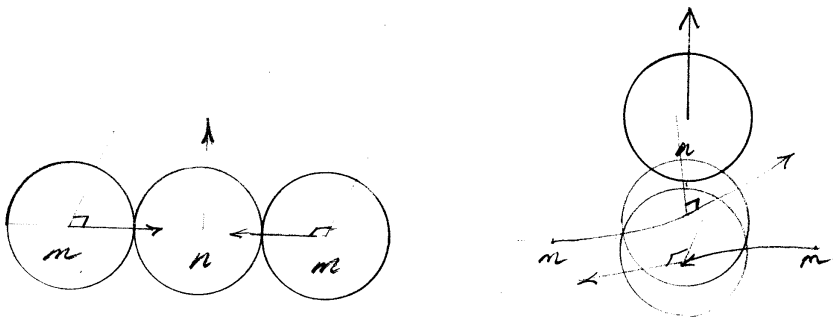


Figure 10.3: Moving Charge Skews Field

Magnetic Fields - Tangential Thoughts

At the scale of electrons and magnetic fields seen in everyday life, magnetism is predictable. The behavior of m figments to form the magnetic field is not at all deterministic - the m figments will be repelled toward traveling perpendicular to the prevalence of the moving current, but m figments will be moving in all directions. For an electron at rest, its n figments would be orienting m figments all the time (and those m figments influencing the n figments of the electron in like amounts), but the net result is no magnetic field of m figments with oriented Axis (aka torque neè spin) and no substantive change to the electron and the electron is capable of maintaining its stability, since the balance of the movement of the n figments is 0.

If we adopt a deterministic model for illustration only, the m-figments affected by a moving charge are moving away from the line of the charge, Axis (aka torque neè spin) axis parallel to the line of charge movement. If positrons are moving, the Axis (aka torque neè spin) axis is reversed.

Charging On

Electro-static charge has posed a challenge to the *mnp* Model from the beginning, with a number of unsatisfactory explanations.

The best current picture is that the coils of the charge material are perpendicular to the surface, that exiting m's spend more time in proximity to the portion of the coils rotating toward the surface, so pick up an Axis orientation parallel to the charge. Electrons would have the Axis pointing back toward the electron. This would attract positive charges. Positrons would cause the Axis to point (more) away. This would attract negative charges.

The Axis toward or away from the electron would tend to attract surrounding m's to point the same way and so to change direction to parallel to the surface. This redirection of m's is part of why energy is seen as being stored in the field in current Electro-dynamics. This picture is reinforced if the Axis effect travels at c, which should be elucidated elsewhere. To be continued.

Strong Nuclear Force in the *mnp* Model

The Strong Force arises when the exchange of filaments between two quarks of opposite spin is stopped by the presence of a third quark, which itself is attempting to exchange filaments. The exchange is arrested long before complete loops of charge material are traded.

Since the dynamic trios of quarks are interacting because of their figments' intrinsic speed, the three basic effects, and a stable but dynamic configuration, protons will live up to their "lifetime of the universe" guarantee.

The Residual Strong Force does not yet have a single explanation. Two are offered in the blog entry "Weak and Strong Join as One Phenomenon" on page 194. A major criterion for a successful description of the Residual Strong Force is that the force must travel well and conform to the experimental knowledge of nucleon behavior.

Weak Force in the *mnp* Model - Thoughts from (2012-12-11)

The "Weak Force" is seen in the *mnp* Model as the set of interactions that change the charge structure of mesons, baryons, quarks, and muons by trading quantized loops of n-figments - the n loops and quantized loops of p-figments - the p loops. Changing the charge structure by breaking apart the filament/loops that form strands and provide the charge structure of quarks and electrons and positrons and by rearranging the charge balance may require much energy if the particle is stable, or very little energy if unstable. Since the charge structure is being rearranged, these interactions do not respect baryon or quark or lepton or hadron count, charge, or spin. Parity is probably not a useful concept. Time symmetry is not a concern or an issue in the *mnp* Model. At times, quantized loops of charge material are present where other weak interactions have taken place and are available to be recruited to, for example, create electron and positron pairs. More often in high energy accelerator experiments the loops are part of the interaction and form themselves into the stable and preferred "elementary particles."

Size of some items is quantized in the *mnp* Model (and "why" is not fully answered yet), but some concepts of "quantum numbers" are descriptive of interactions and not laws of particle behavior. The weak interactions will be reactions of coils and so combinations of Axis Alignment with Travel Alignment and Separation also figuring. Clearing out, ignoring, and re-recruiting the m-figments that make up glue flowing on the quarks and other bulbs is part of the interaction.

The gamma particles that come from "weak" interactions are mostly mediator m's and charged material n and p loops. The *mnp* Model will benefit (and may aid) the separation of "gamma particles" and fhotons into those made of one type of charge, those made of a mixture of charges, those made from m-figments oriented randomly but traveling in one direction, those m-figments oriented with one axis, and those m-figments with the front half oriented with one axis and the second half oriented with the opposite axis. The last are seen as "true" fhotons in the *mnp* Model. The *mnp* Model has not done extensive simulation on weak interactions yet. The basic principle of the speculations included here is that figments are conserved, so initial thoughts about weak interactions are mostly involved in "counting" the charge structure.

The *mnp* Model no longer sees loose charge figments n and p as relevant or even present in the particles and fields of "everyday" life. They may well be a part of dark matter. So the next paragraph is "legacy."

One possible confounding issue with "charge conservation" is that recruitment of charge figments around the strings is possible. When those recruited filaments become coils and how and when those coils are shed is not pictured. Whether

that recruiting is close of symmetrical (negatives and positive filaments are recruited at approximately the same rate) is not clear. The Model sees Axis (aka torque neè spin) as changeable (when a bulb is turned inside out). A negative gamma ray could result instead of an electron if the electron can't "regroup". (Why an electron needs to be 6 full coils worth of negatives is still unexplained.) Extra positrons and electrons appearing from neutral decay would be seen as possible if there are enough bulbs of the right material with appropriate (or convertible) Axis (aka torque neè spin). Gamma "fhotons" could be either negative or positive, they will tend to line up by Axis Alignment(?) when leaving. Gamma particles could be a pair or could be two pairs in some cases.

The *mnp* Model does not include a comprehensive catalogue of mesons and baryons, but the structural approach looks promising as a way to understand the plethora of particles (and perhaps revise the list slightly with respect to pions)

"Virtual Photons" (2012-12-12)

Three alternates are collected in the phrase "Virtual Photons." Neutral quarks, z in the *mnp* Model, have six loops of charge structure, three n loops and three p loops, in the same stranded coiled form that quarks have. Separated loops may travel together or be recruited to be together. As of 2012-12-12, n and p loops are seen as almost indestructible.

Side note: Single loops are flexible enough to participate in fields with single figments. If single n and p loops are mixed, they would remain almost undetectable, as are the single figments.

The third alternate, involving only *m*-figments, would see some "virtual photons as bundles of energy without structural current loops. *m* figment release sends off the same *m* figments as fhotons though not yet organized for long distance travel.

These alternates for "Virtual Photons" provide some basis for understanding principles of particle physics. For example, the OZI rule can be paraphrased as "if an interaction becomes ALL 'virtual photons' on some space-time boundary, it will be suppressed." This can be interpreted in *mnp* as "if the results of an interaction must be re-structured/re-formed entirely from unstructured and neutral material, that interaction will take longer and be less likely over a given time."

The author seeks another term for the hidden charge material in an interaction to replace the ambiguous term "virtual photon." For now, "recruitable mediators and charge loops" will suffice.

Gamma Particles

Adapted from (2012-12-12): Many interactions in the weak force give off or require "gamma" or "fhotons." The *mnp* Model sees a sharp distinction between fhotons made of *m*-figments (light and glue) and gamma "particles" mixture of *m*'s, *n*'s or *p*'s, or n loops and p loops which result, for example, from electrons and positrons meeting destructively. Pions come in multiple sizes. Some kinds have two strands of six loops each, some with opposite Axis (aka torque neè spin) s and some with the same spin connected only by charge attraction. If one of the coiled strands in the later pairs can be turned inside out, so that the spins are opposite and the coils can trade loops, weak force interactions can take place.

Gamma particles will require the same care and clarification and classification as "virtual photons."

Better coverage is offered in section Conservation of Charge Material and Quark Interactions, page 53

Other pions are two quarks in structure, hence the kaon's multiple decay possibilities.

Color in the *mnp* Model (2012-12-11)

Color Change is the tendency of quarks to try to swap units of charge and fail, and the connection between quarks is at least partially the strings that result as these sixths are partially loaned.

It takes time to pass part of a charge structure loop, and the loops may well elongate if the quarks are pulled apart. The stretched loops will get increasingly strong as they straighten. This binding by loan is a dynamic process, which seems to match well the description of quark interaction.

Color and RGB themselves seem to be concepts not needed in the *mnp* Model.

Quantum Chromodynamics is not being thrown out with the bathwater yet. QCD is seen as not helpful to the Models.

Gravity in the *mnp* Model

The *mnp* Model was developed to provide a simple, non-magical explanation for gravity. The magic, across all space and time aspect of space-time structure posited by General Relativity is now gone. But gravity has become complicated rather than simple. All figments near each other attract each other so all act as "gravitons," but since particles and free figments act differently, gravity gets complicated. As of 2012-03-31, the mechanism for gravitational effects is not fully developed. In order for gravitational potential (not acceleration) to lead to time dilation and length compression, the potential must lead to figments traveling at angles (at net speed c) to their unencumbered path. The mechanism for this is not well developed.

There are three classes of mediators: medium distant mediators (*n*-figments and *p*-figments), medium long distant mediators (*m*-figments) and long distance mediators (fhotons, protons, neutrinos, or neutrinos. There are five or six types of entities: dark matter as large separate masses (unorganized *n*'s and *p*'s), darkened (black holes), possibly dark energy if it forms large separate masses (unorganized *m*-figments), terrestrial (non emitting bodies), solar (emitting bodies), and cataclysmic (radically emitting bodies and supernovae). These bodies range, respectively, from apparently less to apparently more massive than their constituents would suggest.

The time frames over which gravitational effects are felt varies as well (see A Matter of Great Gravity or Matters of Great Weight in the Ancillary Matter) So General Relativity has been useful and will continue to be useful in the validation of *mnp*, but it may be part of the "good old days" as *mnp* or a similar model becomes accepted.

Astro-physics measurements of the acceleration of stars distant from galactic centers show a "minimum acceleration due to gravity" of about $10^{-}10m/s^2$ which then does not drop further with distance. This strong suggestion that gravity is quantized and subject to Separation effects is discusses in "Musings on Gravity" in the Ancillary Matter, page 90.

Chapter 11

Phenomena, Large and Small, in the *mnp* Model

Dark Matter in the *mnp* Model

Dark Thoughts

Lone n and p figments (or small groups of random n or p figments) do not travel long distances in the presence of other figments. Nor do quantized loops of n's and p's when not combined into particles. They tend to scatter when encountering other figments with random Axis (aka torque neè spin)s. Lone or random groups of m's can change Axis (aka torque neè spin) orientation without much effect on their direction of travel, so are capable of traveling longer distances. The *mnp* Model suggests that these different properties of unorganized and partially organized n's/p's and m-figments account for observed dark matter and dark energy respectively. Once an organized group of m's gets going, m's tend to stick together as fhotons or perhaps designer m-rings). Neutrinos also travel long distances, as can protons and neutrons.

Matter Anti-Matter Collisions in the *mnp* Model

Collisions are seldom a huge explosion in the *mnp* Model. If an electron and positron of opposite Axis (aka torque neè spin) encounter each other, they may pass through each other if the coils do not line up well enough. If the two spheres become mostly coincident (or two parts of the surface become coincident), the filament loops of n's and p's in the respective coils will lose their ability to maintain the strand/coil structures. The n and p loops in the strand making up the coils will come apart but the loops will probably not revert to being random figments of n's and p's. The number of neutrinos released may be quite high? Loops are seldom destroyed. Figments are neither created nor destroyed, thought perhaps just their organization into a recognizable structure. (2012-12-02)

Black Holes in the *mnp* Model

With the 2012-05 changes to Travel Alignment and gravity, black holes become "scarier" than previously imagined.

Any basic entities (m;s mostly) moving straight outward from a black hole will continue outward and in fact will act as gravitons. Any matter entering the black hole at less than the speed of light will be torn apart. The fraction sent outward as mostly incoherent entities (dark matter and dark energy) will be 50% as the velocity inward approaches 0, 0 % as the velocity approaches c, and about $.5sqrt(1 - v^2/c^2)$ for intermediate speeds, where v is the velocity toward the event horizon. This is in the limit for small objects. The trailing parts of larger objects may pull some of that outbound dark matter and energy back into traveling toward the black hole.

Neutrinos can transit black holes.

Escape is possible, merely unlikely. Figments at the surface are moving out as well as in, given the attraction due to Travel Alignment and the constant travel speed. If no figments were moving out, the black hole would be acting as a passive collector of whatever came its way. Seen leaving a black hole: m figments would be most common, fhotons

possible, solitary n and p figments possible, neutrinos not unlikely if they went all the way through, full electrons or protons highly highly unlikely (until all the other energy leaves). Since a black hole is sending out mostly m figments, it will appear less massive to its surroundings and even less massive to very distant objects than its total content of figments would predict in classical gravitation theory. It will have less long range effect than classic predictions indicate. The *mnp* Model suggests that the radiation from the entry of an object into a black hole is the (mostly) m-figments pulled out of the black hole by the object entering it. And (2022) m figments torn from the particles in the incoming object. The boundary is not a fixed line in the *mnp* Model, just space with more entering and exiting gravitons in the form of m figments.

The balance of gravitational forces with the tendency of loops of charge material to maintain their integrity is not determined, though the author would guess that most (all) loops remain loops in a black hole.

The Big Bang in the *mnp* Model

The *mnp* Model suggests that the initial expansion is irreversible. There is no effect that would bring all figments closer than the Separation effect would repel, and the chance of all figments heading inwards toward small area (almost a point) are vanishingly small though not zero. Given the durability of charge material loops, the author considers that probability of all loops reverting to figments to be nil. If all figments did pass through that small area at the same time, they would still be figments moving through that point in a universe "expanding." The Separation radius is a mathematical construct, since the figments are moving and can overlap, as is the "radius of the universe when all figments first became independent." It would take yet another effect to compress figments smaller than their native size, though size of figments is NOT important or relevant to the *mnp* Model. Figment size could be 0 as long as the "Axis (aka torque neè spin) and direction" properties are maintained and constant. What we think of as "energy" or "mass" results from the existence of the figment and the effects. If the size of figments IS 0 (and we may never have a way to determine that) then the chances of another Big Bang ARE 0.

The *mnp* Model needs to postulate that either Separation operates in a random direction when figments are at the same point OR that figments cannot be at the same point OR Separation always operates in a random direction. If coils are stable with random or random and non-reciprocal Separation effects, then the model need not choose. The choice will not affect the feasibility calculations and is more philosophical at this time.

"The universe will still be there."

Universe Expansion in the *mnp* Model

The *mnp* Model suggests the speed of light as the maximum rate of universe expansion, with an ever "thinning" edge to that universe. It does suggest that mixing and return toward the center occur. Further, return of the gravitons/m figments may have been an essential part of establishing gravity as we know it in the early stages of the universe.

Since the calculations of gravity are so deeply affected and currently suspect, the *mnp* Model suggests NO firm conclusions about the future of the universe be made this decade or century.

The MOND effect, of a minimum influence of gravity for objects exiting a certain radius of a mass in deep space, suggests that the separation of the masses in the universe slowed at some point in the past more than classical calculations would suggest.

Special Relativity in the *mnp* Model

Inertial reference frames, where there are no net effects, are very hard to find in the universe and the *mnp* Model (and presumably quantum field theory when it includes gravity) and therefore changing viewpoint does not work when examining the fine grained structure of matter and energy and time. One cannot "change points of view" and expect the structure of matter or energy to change, since if the first viewer had been lucky enough to find a true inertial frame, the moving frame sees unbalanced distributions of figments. Of course, the last hundred years of physics has proceeded very well with the opposite assumption, that there IS no structure.

In space, between two masses, the m-figments will tend to be oriented toward one mass or the other, and to be directing figments to the direction opposite their direction of travel. Entities with a chosen direction of travel will be only accelerated by those traveling the other direction. When an entity wanders into this "field" it will look balanced side

to side, but as soon as that entity starts moving one direction or the other, it will be preferentially accelerated in that direction. That position between the two masses will not be balanced in any other reference direction. Balance in the inertial frame is "random orientation and distribution of the unattached figments in all planes."

Special Relativity (and relativistic thinking) has some value in the *mnp* Model, since lengths in faster frames will appear compressed from a slower frame. Clocks in faster frames appear slowed from a moving reference frame. But the *mnp* Model suggests that the slowing and compressing is absolute, based on the movement and angles of figments. Among many heresies, this may be the greatest. The author is looking for an experiment that will determine, from the point of view of a fast reference frame, whether slower frames appear faster or slower and "shorter" or longer. He suggests such experiments have not really been done or interpreted as answering this question. If high speed particles interact at right angles, two disks would be interacting with figments mostly at right angles, so Axis Alignment would have little effect. Clocks and coil rotation would be slowed in both particles. At acute angles, Axis Alignment would be similar and the time for interaction greater, since the figments will stay in proximity longer. If a high speed proton hits a slower proton moving the opposite direction, *mnp* would expect the results to NOT be symmetrical from each particle's frame.

If the *mnp* Model can lead to experiments that determine the inertial frame (or the sun's or earth's velocity relative to that frame), then the direct time and length effects posited by the *mnp* Model will be established.

Speed of Light in Reference Frames (2012-01-22)

Classic (and incredibly precise) experiments on the speed of light indicate that the "light travels through an ether at a constant speed" is false. The expectations of light traveling back and forth over distance L in a frame with speed v parallel to the ether P(par) = L/(c-v) + L/(c+v) = [2L/c]/(1-v2/c2). Perpendicular to the ether would suggest P(perp) = 2t = [2L/c]/sqrt(1-v2/c2). Yet the extremely precise measurements with a fhoton clock by Brillet and Hall (1979, PRL, 42, 549) show a difference at all orientations of less than (1.5 +/- 2.5)*10-15. Eisele et al. (2009,PRL, 103, 090401) achieved 10^-17 precision. "Relativity Tutorial" `http://www.astro.ucla.edu/~wright/relatvty.htm` 2012-01-22. This result, rather than disproving the *mnp* Model, is consistent with that model. How? The *mnp* Model sees clocks in a frame moving with respect to "the ether" as slowing by $sqrt(1-v^2/c^2)$. The *mnp* Model sees lengths parallel to movement in a frame moving with respect to "the ether" as shortening by $sqrt(1-v*2/c*2)$. So if moving parallel to "the ether", clocks are slow and lengths are short, so the round trip would be seen as $sqrt(1-v^2/c^2)*sqrt(1-v^2/c^2)[2L/c)/(1-v2/c2)$ or $2L/c$ which is the same result seen by a frame stationary to "the ether." If the frame of bouncing light is moving perpendicular to "the ether" the clocks in the frame are slowed by $sqrt(1-v^2/c^2)$ but lengths are not shortened. So the round trip time will be $sqrt(1-v^2/c^2)*[2L/c]/sqrt(1-v^2/c^2)$ or $2L/c$ as measured in the reference frame and in a frame stationary to "the ether". The classic Michelson-Morley experiment and more accurate successors seem to all use the round trip time (looking for interference fringes or similar fine tuned differences) to prove the constant speed of light in a reference frame. `http://en.wikipedia.org/wiki/Michelson%E2%80%93Morley_experiment`, 2012-01-22.

The *mnp* Model suggests that the round trip time WILL match in all cases, but the experiments do not prove that the velocity of light moving in one direction is always the same as light moving the opposite direction. The Kennedy-Thorndike experiment with differing path lengths showed that the FitzGerald-Lorentz contraction (which like the *mnp* Model calls for all objects to physically contract along the line of motion) would be false unless the predicted time dilation is correct.

`http://en.wikipedia.org/wiki/Kennedy%E2%80%93Thorndike_experiment` 2012-01-22. Since the *mnp* Model sees time dilation as an integral result of movement, these experiments also "confirm" the *mnp* Model.

Quixotic ed Diversus

One way experiments on the speed of light are discussed toward the end of the Ancillary Matter, Appendix B. Some suggest the one way tests can be explained by theories in which "the effects of slow clock transport exactly offset the effects of the anisotropic one-way speed of light (in any inertial frame), and all are experimentally indistinguishable from SR." (T Roberts `http://www.edu-observatory.org/physics-faq/Relativity/SR/experiments.html`) 2012-01-27 The *mnp* Model depends on a universal reference frame for movement unless space is even more fluid than current theories propose.

Testing Special and General Relativity (2011-12-24)

Testing of relativistic effects seems to have been done in a countable number of experiments. Muons survive longer at relativistic speeds, therefore time-dilation. Light bends as it passes the sun, therefore gravity bends space. Far distant galaxies are red-shifted more than expected, therefore space is expanding. [At an expanding rate?] Quantum mechanics

models of collisions work well as viewed from the center of momentum, therefore momentum increases with approach to c.

What experiments in a relativistic frame have been performed to measure events in a frame not moving with respect to earth? That is, how fast frames see the not so fast Earth frame?

If a single or double slit experiment could be performed in a high speed frame, with the direction or axis of the experiment varied, the *mnp* Model suggests that different spacings between the bright bands would be measured. The earth's motion around the sun (3x10^4 m/sec, c*10^-4) is not relativistic ($sqrt(1-v^2/c^2)$ is 5x10-9 less than 1) . The solar system's motion around the center of the galaxy is a weakly relativistic speed: 2x10^5 m/sec, c*7x10-4, $sqrt(1-v^2/c^2)$ is 2x10^-7 (Giancoli 2005, pg 916), but since the time to reach the other side is 100 million years, humans are not in a position to perform experiments with the two parts per million relativistic effect due to rotation around the galaxy. If slit experiments at varying orientations with accuracy greater than .2 parts per million were possible, then it would be established that the inertia of the galaxy has been spent and the galaxy is stationary in its surrounding space, which appears to be expanding. If a (perhaps much) greater variation were seen, then the galaxy would retain some inertia from the Origin and the galactic velocity with respect to local space could be determined.

Earth's Movement in the Universe (2011-12-24)

Does the Galaxy Have Any Inertia From the Origin?

If the galaxy has no inertia and is not moving with respect to the space it is in, then the *mnp* Model would need either expanding space/shrinking matter or a radical re-understanding of the red-shift and apparent size of far galaxies or to fold its tent and admit that understanding physics takes a doctorate. If the galaxy does have inertia and is moving at a relativistic speed, the *mnp* Model suggests that the clocks in the entire galaxy are operating at a different rate than the clocks in other galaxies. Fermion masses would differ, as might the ground state of hydrogen's electron.

(2012-01-24) The apparent movement of the galaxy compared to the cosmic background radiation, 627+-22 km/sec, is somewhat relativistic. The author suggests that this apparent movement might be a proxy for the real movement of the galaxy in "The Frame" so that the "relativistic" effects will be fairly small

For reference, the earth's speed at the surface at the equator is about 0.46 km/sec, around the sun is about 30 km/sec, around the galaxy is 200 km/sec. (2012-03-27) The "minimum acceleration of gravity" suggested by the MOND data suggests that the galaxies' initial inertial expansion was slowed for a longer period of time and over a longer distance than Newtonian or relativistic calculations would suggest.

Maximum Proton Speed (2012-02-01)

Protons have a maximum speed and maximum energy (GKZ) and create pions if exceeded. The AGASA experiment looking for those protons may be measuring an anisotropy in the speed of light. Whether those "too high" protons are coming from the edge (CMB blue shifted) or the center (CMB red shifted) is not crystal clear. The author leans toward "out of the blue" since the speed and energy of the protons is related (in *mnp* and frame dependent models) to absolute speed. Of course the author could misunderstand the creation of pions, and the slight shift of the CMB is the determining factor in pion creation. The difference in speed is minor, the difference in energy is significant, using the universe as the lab to create high energies we cannot generate on earth.

Metric of Universe Expansion (2011-12-24)

The *mnp* Model suggests that relativistic effects are a property of light, energy, and matter, so a relativistic double-slit experiment in different directions would be interesting. If less than expected variation is seen, then the *mnp* Model would need to admit that the space of the universe is expanding. Gravity in the *mnp* Model is seen as not working all that well at intergalactic or at least inter-cluster distances. Modern astro-physics seems to be down-playing gravitational forces beyond galactic super-clusters and suggesting that spatial and inertial effects predominate. The suggestion that the space of the universe is expanding is interesting

Red-shift Greater Than Expected for Far Galaxies (2011-12-24)

One possible explanation for the extreme red-shift of galaxies far away is that fhotons, as self-organizing collections of *m*-figments, undergo "loss" over long distance travel, on encountering neutrinos or other matter or concentrations of figments. That loss may have been greater when the universe was denser. This is suggested as an alternate to the

"accelerating expansion" explanation of extreme red-shift. It is not anticipated to be the source of ALL red-shifting in a static universe. A number of measurement techniques are used in looking at far galaxies: red-shift, luminosity distance, angular-size distance. Ideally, an explanation will encompass all types of measurements [authors question: luminous distance refers more to intensity seen by the viewer than total intensity divided by spherical area of the source?] Explaining variation in angular-size may prove the most difficult for the *mnp* Model.

Turning to gravity and how that is expressed in the Model: The *mnp* Model and *mnp* Unified Model have much more to say about gravity and offer many interactions between figments that cause gravity, but one type of accelerating field would be *m*-figments directed in parallel. The author is finding the elevator model not useful at the figment/entity level. Muons find circular acceleration different than gravitational acceleration.

General Relativity in the *mnp* Model

General Relativity posits that any accelerating field is equivalent to a gravitational field of the same magnitude. This image works fairly well in the *mnp* Model when that gravitational field is created by almost random *m*-figments, which are moving away from the mass doing the attracting. The author does not want to be in the elevator when the acceleration is created by large masses of neutrinos, but the image is useful. Sweeping through a system of figments should be the same as being swept by those figments. Just such an image was essential to the author in the creation of the *mnp* Unified Model's understanding of relativistic mass.

In the *mnp* Model, light passing a large mass would be expected to be bent, since the *m*-figments/mediators that make up light will be affected by the gradient of figments/elementals that is slightly denser closer to the large mass and by the figments directed away from the mass. The interactions that lead to gravity have a statistical similarity to interactions in a gas. Every interaction seems random, but taken together the pattern emerges. Because a fhoton, for example, is an organized, self adjusting collection of mediators, so the random effects on one figment/elemental in the fhoton will be shared and averaged out with the others. Gravity is at least as more complicated in the *mnp* Model as in current physics, and will require much further study. The three figments/elementals and their interaction and the complete lack of a graviton will make the *mnp* Model both testable and difficult for the astronomers and cosmologists to handle.

Gravity and Time Dilation (2012-03-28)

If the *mnp* Model's predictions eventually correspond to the known experimental results, the author will be content. If the Model's predictions match General Relativity as well, that is an added benefit for achieving tolerance in the physics community. If the Model makes predictions different than General Relativity but testable, then it becomes interesting. Given that the author is grappling with "time stops for ALL matter at the boundary of a black hole whether it is restrained or is following its geodesic" the Model is nowhere close to any of its objectives with respect to gravity. (Preliminary) 2012-01-23

Now to start a look at clock motion in accelerating fields, with the basic experiments the Pound-Rebka (Harvard Tower) and then the hydrogen maser space Gravity Probe experiment by Vessot etal (1980, PRL, 45, 2081). Ref `http://en.wikipedia.org/wiki/Pound%E2%80%93Rebka_experiment`. The equations for time dilation (and escape velocity within the Schwarzchild assumptions) suggest that the time dilation effects of gravity are exactly the same as the time dilation effects of the matching escape velocity (which matches the velocity achieved by an object falling from rest at infinity to the point of interest.) After some introspection, it is "clear" that the *mnp* Model must show a different pattern of motion of figments around the coil than that associated with motion, that the two must coexist, geometrically "balance" each other. Question: does being held in place lead to the length contraction and time dilation or does acceleration also apply in free fall? It is true that a frame (or ring) in free fall does NOT experience time dilation or length contraction due to gravity? When restrained in an accelerating field, first guess (not ready for prime time): since gravity at a macroscopic scale is just a pull on the figments, the path of figments in a coil is bent down with additional slides sideways to restore the figment to its position with others in the coil. That the time dilation effects are related to escape velocity $sqrt(1 - 2GM/rc^2)$ and not the local acceleration due to gravity (9.8 m/s2 on earth) is intuitively surprising to the author. Also surprising is that gravity seems to be an "easier" way to affect clocks than velocity. Does that equivalence have a name?

$GM/r = gr$, or $g = GM/r^2$ (`http://en.wikipedia.org/wiki/Escape_velocity`.) First guess: Time dilation/figment redirection due to gravity may need to account for the "angle" of splay of the field, hence the "extra" factor of r? Second guess: related to the derivative - how fast the gravitational field is changing from the center. The dimensional analysis certainly calls for acceleration times a distance. Notes: Escape velocity at a point matches the speed an falling object starting at 0 velocity at infinite distance reaches at that point. The idea that massive objects put out gravitons from

their own mass, that the speed of rotation of entities in the coils slows in proportion, and that the "loss" ends when gravitons start coming back (2r) is not attractive to the author. For a lone mass, the gravitons might start coming back when they reach the critical radius (ra0) when the acceleration due to gravity falls to a0. See "Gravity Experiments Corroborate" in the Ancillary Matter. Instantaneous travel across r is even less attractive.

Gravitational Blue and Red Shifts

The gravitational red and blue shifts of the Pound-Rebka experiment require further thought in the *mnp* Model's quixotic search for "mechanism." Accepting G, the Scwartzchild assumptions and seeing if the *mnp* Model is compatible may be just a first step. Whether those assumptions will need to be looked at carefully, as with the Michelson-Morley experiment, remains to be seen. The difficulties with gravity in absorbing or energy emitting situations are discussed elsewhere in this document.

Gravitational Fields and Acceleration are Different 2012-01-26 Muons do NOT see time dilation when stored in rings, so acceleration by magnetism is not the same as the presence of gravitational potential, either accelerating or in "free fall.". The muons do see time dilation, but only from velocity. Tom Roberts `http://van.physics.illinois.edu/qa/listing.php?id=1360` refers to Farley 1966. Reference "Gravitation" by Misner, Thorne and Wheeler p 1055 (2012-01-26)

Frame Drag in the *mnp* Model

The effects on time seen by a rotating object around a moving object should differ depending on the orientation of the rotation compared to the movement. Objects rotating perpendicular to the movement of the center will see time slowing compared to clocks at the center. Rotating parallel to the movement of the center should see time in the "new classic" speed-up manner. To be calculated.

Standard Model in the *mnp* Model

While the author might suggest that the experimental findings and much of the theory in the Standard Model has a place in the *mnp* Model, he recognizes that for now the *mnp* Model will be accepted only if it is seen as having a place in the current models. The behavior of electrons is well explained by quantum dynamics, so the *mnp* Model can be seen as merely explaining some of the "why" questions. Quantum electrodynamics are a good description of the electro and magnetic fields. The *mnp* Model describes fhotons and how they start/cause the EM fields and then are affected by those fields. This explanation may make more intuitive sense to undergraduates (and even to physics professors). Field theory's approaches are useful and, in ways, sound a lot like *mnp* to the author. Even in the *mnp* Model, the fhoton may or may not show up where we expect it since it might run into a quirk or concentration in "The Field". Figments which are not organized can be seen as the potential of The Field. Infinities in the *mnp* Model 2012-02-01

Infinities: A structural model like *mnp*, positing tiny entities that can overlap, will have no infinities. One that posits all constituents moving will see very few singularities, perhaps none since the first.

Simultaneity in the *mnp* Model (2012-02-05)

Simultaneity does not seem to be the pressing issue in the *mnp* Model that it is in Special Relativity. What happens at a location in the reference frame can be known to another location at the speed of light. Reciprocally, an event at that other point can be known to the first location at the speed of light. In the reference frame. In a local frame, clocks will be slowed, lengths will be shortened in the direction of travel from the point of view of the reference frame and the figments that are moving at c in the reference frame. By a mean value theorem, if event E1 is known before event E2 at one location L1, and another location L2 sees E2 before E1, there would/should exist at least one plane where the events are seen simultaneously.

In a local frame moving, clocks will be slowed as a function of movement. Lengths will be contracted in the direction of movement from the point of view of the reference frame. If movement is along that plane of "reference simultaneity" and happens to be at the midpoint when "news" of the events arrives at the midpoint, the simultaneous event will be "I saw those two at the same time" not "those two happened at the same time." Even if the events occurred at locations the viewer had known at the time the viewer left that location, there is no absolute assurance that the event did not happen elsewhere, perhaps with only a small displacement.

Simultaneity is, suggests the author, only interesting as an absolute as it applies to a single observer with a specific movement and acceleration in a specific gravitational field at a single time in that observer's history. That observer, if moving less than the speed of light, will have a linear history. Observers may share those conditions more or less and so agree more or less. The author is not interested in which is "right" but is interested in how those views differ from the reference frame that allows those observers to move and to come to understand and measure their environments.

The question of "is an event close enough to another event in space and time to cause or be caused by the other" is answered if travel from one location to the other could be accomplished within the speed of light or whatever the mechanism of transfer actually is in the difference in time. For waves across an electron shell, the speed of information transfer is more like 2/pi times c. Beyond h distances, cause is expected to be one way unless the "locations" are diffuse and mixed, as in electromagnetism. Paired particles do not pose any difficulties. Their properties are chosen when created. Discovery of properties does not cause anything (other than to increase the experimenters knowledge and, if he or she can find a willing counter-party to bet, increase the experimenter's bank account.)

Emergence in the *mnp* Model (2012-02-05)

Do we think of locations emerging when figments formed rings and coils and therefore formed a center that could be used as a reference location? Do we think of space emerging from the comparison of that location and the behavior of unbound figments? Do we think of time as emerging from the rotation of the rings and coils or do we think of time as emerging from those coils forming spheres that then passed information around the sphere along the filaments of the coils. Passing information around the shell is how mechanical waves propagate and how shells vibrate and communicate with each other. Do we think of lengths as counting the number of atoms between two locations, which may have been converted into a ruler of a certain number of atoms. Once a length is known, does our understanding of the velocity of light emerge from the number of atoms in a length compared to the number of vibrations it takes for light to traverse that length?

Does slow velocity emerge from rings and coils reorienting the constituent figments so that some of the intrinsic movement of the figments causes the ring or coil to leave its initial location? Slowing the rotation intrinsically emerges from this translation.

So the *mnp* Model sees a blank slate of three dimensions in which concepts of measuring time and measuring distance arise from the behavior of figments moving constantly.

Emergence seems to be an important word in some theories. Questions for the community: has the author used "emergence" properly? Does that make a model like *mnp* more palatable or understandable?

Didactic Advantages of the *mnp* Model (2012-02-01)

The author suggests that if the *mnp* Model can merely be consistent with experiment without predicting new results, it may still have advantages in teaching. Not having to hear professors say "due to some weird property of space-time" nor seeing string theorists worry about replicating special relativity in all its forms nor seeing quantum loop theorists tie themselves in knots to show background independence may make an alternate worthwhile. For now, the Model is neither developed enough nor investigated enough to let it near undergraduates hoping to continue in physics. It IS provided a basis for the author to further his own education in physics, the need for which should be apparent to the most casual observer.

Conclusion

At present, movement in the *mnp* Model is fairly well understood (it has time dilation as an integral aspect of movement of mass!) The three part nature of fhotons and their resulting electric and magnetic fields is solid but not modeled. The coil based nature of matter is proposed with confidence. The rest of physics is sketched but not calculated.

The author hopes to continue to refine the hand waving into precise and accurate conducting by baton, but that effort will take time.

A number of sections are appended:

Appendix A

*M*editation o*N* ex*P*eriments

- Edited 2022-01-30 - Experiment notes incorporated, Addendum reduced
- Edited 2022-01-29 - Found notes added as Addendum

From Denis Diderot, circa 1760:

> There are three principal means of acquiring knowledge available to us: observation of nature, reflection, and experimentation. Observation collects facts; reflection combines them; experimentation verifies the result of that combination. Our observation of nature must be diligent, our reflection profound, and our experiments exact. We rarely see these three means combined; and for this reason, creative geniuses are not common.

From J Bellinger, circa 2015-04-01:

> A lot of people are good at going to places they've been before but few are good at figuring out how to go some place no one has been.

Part of transition from undergrad to grad student is applying. Part of applying is making oneself an attractive candidate. Part of being an attractive candidate is showing promise of good work and talks and papers in support of a principal investigator. Most (all?) doctoral programs expect to support their students for five to seven years, to get good work and talks and papers out of them. Graduate students are expected to graduate without embarrassing the program. Graduates are then expected to be a credit to the program.

Experiment as an Adventure

It is clear the author is not smart enough to be a physics theorist; witness this blog and the main *mnp* Manual document. Here, I attempt to establish a reason to be an experimentalist by listing experiments I'd like to do or see done. Since professional experimentalists report report irritation with theorists who come up with a new experiment every week, my output of a countable number of experiments is not THAT impressive. Asking questions is certainly easier than answering them!

The author has been identifying interesting experiments for many years. Not doing them. Those experiments fall, unfortunately, in many branches of physics. They fit conveniently neither into any branch of physics nor any one principal investigator's interests. Instead of a one page summary, this goes on for 1100 lines of markdown, 8 pages of dense typing, 10 pages of pdf. Enjoy. Or ignore.

The experiments are listed by area of physics.

- Particles
- Astrophysics/Cosmology
- Solid State
- Electromagnetism and Optics
- Experimental Design and Presentation (a minor)
- Beyond Physics (for fun)

Some experiments overlap fields. The experiments can be also be categorized by difficulty and cost:

- new experiments that might cost a fair amount ($$$),

- new experiments that can be done from a garage ($),
- review of existing data looking for other phenomena (t) or (+),
- very expensive experiments ($$$$$),
- dangerous experiments (*#x̂!) (!‾!).

The last, of which the author has a few, will not be discussed in public. You're welcome.

The ($$$$$) experiments are unlikely to be done at the authors request, so will get short shrift here. They can go on a wish list. The experiments ($) that can be done in a garage should perhaps be done in a garage if interested researchers cannot be found. The review experiments, except perhaps for neutrino review, are probably not a basis for a grad school application. Though those experiments would certainly benefit from guidance and review.

So the most relevant experiments for an application (** or ***) are the not very expensive new ones. In addition, the best experiments do not threaten current interpretations. Oh well, blew that one.

Some experiments and areas have an additional judgment in parentheses; the likelihood of success. (-) is unlikely, (x) impossible.

Experimental Attitudes

While it is attractive to see an anomolous result as, given n explanations, plus a pet explanation, the author will be the first to admit that interesting results in an experiment falling outside expectations would NOT prove any particular pet Models even if the experiment were motivated by those Models. In science, I can bet the farm but there is no double or nothing, only clawing back from losses.

Choosing instead the nth: the most interesting, challenging, new, or revolutionary explanation is not a good idea. Though the author has seen that done frequently. More likely is the simplest explanation possible, which may be error, bias, or random variation. Even in low temperature solid state physics, I see that and benefit from a PI who likes the simplest explanations. Attitude picked up over year(s) or group meetings and reviews of papers. Not that I can cite specific dates and examples.

Undergrad physics experience supplies many examples of homework problems in math proofs and developments; when I expected something to cancel I worked extra hard to make sure it did, with an occasional wave of the hands. Many questions asked for proofs of a specific answer, which allows one to look at the expected answer and figure out how to get there. For designing experiments, this can be a useful exercise in asking "what would prove x result" if used with care and honesty about what proves. For performing experiments, having an expected result is a huge mistake. Done all the time, at all levels, but a bad idea.

Experiments in Particles

Left Hand Preference (***)

The author would like to confirm that the left-handed preference seen in the Beta decay of Cobalt-60 experiments by Constance Wu's team in the 1957 and confirmed with many other experiments since is truly a universal phenomenon. If not already done carefully, making one or preferably more of those experiments compact and traveling to the North Pole, Equator, and Southern Hemisphere sound like a good time to the author.

Why do this? Null hypothesis answer: To confirm that the Standard Model LaGrangian needs the doubling of term count that results from the left-handed preference shown in the 1950's experiments. Certainly not to disprove the *mnp* Model's conjecture that all movement involves internal change and all angular movement or matter involves subtle internal rotation.

***M*aybe *N*ot *P*ersonal**

Even if the result IS interesting, that proves nothing in favor of the *mnp* Model. A universe of other explanations is available if experiment does happen to show that left-hand preference is a local phenomenon. Should explanation be needed, the author suggests that portion of the conceptual universe that sees moving labs as truly undergoing Lorentz transformation will better explain local left-hand preference.

Such an experiment also calls for extraordinary care, almost forensic in detail, to assure that the results are reliable.

I have a strong interest in an unexpected result. Further reason for care. From (2018/11/09 21:55):

I would do Southern hemisphere carefully A) to develop or prove chops with experiment B) to make sure my personal interest, hidden as I may try to keep it, did not interfere with the results. Someone content to validate the left hand preference would run the risk of missing an interesting result but might take shortcuts with verification of direction. We would probably never know, since the experiment is not worth doing THAT many times if left hand preference IS universal. The motivation to be careful should be there, even for an experimenter expecting to confirm the expected left hand preference, since an interesting result would be, well, interesting.

The scientific method does have a definite advantage - surprising results are remembered and valued, if and only if they hold up. If. Retracting articles is not just embarrassing, it is ugly.

*M*inor *N*otes on *P*rocess

Test spin measurement separately from other experimental setup, with known spins. Have more than one measuring device. Test in areas with materials for which the answer is known. Test the whole setup to verify known results. This is a standard precaution, skipped at peril to the experiment.

Work on measuring everything possible blindly, either by automated equipment or by not knowing the inputs when recording the outputs, with inputs recorded elsewhere or automatically. Calibration might require knowing inputs and okutputs, but then let the randomizations be driven automatically. Best when the inputs be randomly presented, in this case perhaps by not knowing which way the spins are aligned in the sample. Or by not knowing how the testing apparatus is oriented. From (2018/10/15 21:48) make sure sensor can in fact measure both ways, consider putting it upside down or backwards sometimes

Standardize tests for the equipment; we may not need ISO 9001 certification, but want reproducibility. Strive to test the equipment blindly too: have something else produce spins of a random direction and run it through the detectors. Only look later at the magnetic fields that produced or chose the spin after the test data are gathered.

A principle of software design has been that one can strive for "idiot proof" but one may not be able to protect against Machiavelli. Operating systems and networks are finding that many programs need protection against Machiavelli as well. Check software with external tools to make sure changes have not been made. Check materials or inputs with external tools to make sure changes have not been made.

Pay attention to the chain of custody and the handling of materials, devices, software, and data.

*M*inor *N*otes on *P*reparation

Check literature and friends of friends in the southern hemisphere to see if spin preference experiments have actually been done there. Understand the classic experiments, including confirmations. This list may get very long. Start with initial confirmations (from 2018/10/29 17:05) [http://www.fas.org/rlg/021557 Garwin-Lederman-Weinrich.pdf] and [http://puhep1.princeton.edu/~kirkmcd/examples/EP/ambler_pr_106_1361_57.pdf]

Review and understand the classical dynamics techniques for finding reference frames for rotating labs. Look again at *The Ambidextrous Universe* by Martin Gardiner for its long lucid discussion of parity and the Wu experiment.

(2015-01-29) Background research: Table the velocities and angular velocities of the galaxy, the solar system relative to the galaxy, the earth's rotation around the sun, the earth's spinning, and Coriolis effects at various latitudes. Compare diurnal, seasonal, and arm rotation effects for magnitude. Yesterday.

Particle Deceleration ($$$$$ or (!ˆ!))

(2015-02-25 1757) Investigating particle deceleration is offered as one of the highly unlikely-to-be-done experiments. The Model suggests that ultra high speed particles may already be a plasma. Can we slow the .9999c particles back to lab frame and find the same particles? If the original particles/protons/lead nuclei still exist, then the suggestion that a plasma has already been achieved at high speeds before a collision can be ruled unlikely.

It is probably very hard and maybe hazardous to slow at the end of a run; just dumping the particles is probably easier than slowing the protons/Pb nuclei.

Smashing those particles with a transverse bolus of energy or electrons or muons has probably already been tried, thought about, or rejected. The Model predicts that at very high speeds and ninety degree orientation, the interaction would be surprisingly small. Though subtleties of widening of the particles may allow for a somewhat extended interaction time.

Neutrino Review (+)

Review whether mass traversal is a major contributor to neutrino (energy and type) change. If experiments measuring solar neutrinos are not comparing to solar neutrinos that have passed through the earth, that's a major (*** or $$$$) opportunity.

Review whether traversing stronger gravitational fields leads to energy change. This one will be harder and more subtle, since multiple cosmological sources will probably be needed. Finding a standard neutrino source or a star or galaxy type that produces predictable neutrino types and amounts is probably harder than finding astronomy's standard candles.

Neutrino Experiments ($$ to $$$$)

What is a neutrino? The reports of charge, magnetic moment, handedness, even Majorana effects seem all over the map. Majorana seems to boost blood pressure and increase heart rates in other branches of physics, so I'm skeptical pending experimental verification.

Do hotter detectors offer more variation and so yield higher detection? ($$$) or ($$) if existing detectors can be warmed. This from (2015-02-12) Is directional oscillation of the detector possible, particularly in line with neutrino travel? This might make directional sensing (over time) possible. Of course ($$$$|$) Restated: (2020/09/09) Would heavy atoms vibrating in line with the neutrino path yield even higher detection if 2-d vibrating crystals can be reasonably fabricated? ($$$$$)

Would a long imbalanced magnetic field followed by a long vacuum make neutrinos more detectable? ($$$ and up)

Neutrino/Cosmology/Astronomy Review (+ or $$$$$)

The author has seen physics writers claim neutrinos travel exactly at c, that neutrinos and light from supernovae arrive at the same time. The author has seen physics writers claim neutrinos travel close to c. The author has seen physics writers claim neutrinos, since they have mass, must travel close to c. The author is interested in seeing what experiment shows and understanding without assuming neutrinos behave like all other particles we've seen. If neutrinos have mass and travel at c, well, nature is real different.

Do neutrinos traverse black holes? This may be a question for neutrino astronomy, not a field for easy experiments. If astronomy has identified light (and presumably neutrino) producers traversing behind black holes, can a difference in neutrino arrival at Earth be seen? Can neutrino output from pulsars be measured? The author would expect finding supernovae traversing behind black holes while producing neutrinos to be exceedingly rare.

Collision Review (+)

The *mnp* Model posits strict conservation on charge material, so I suggest some decays and some cross sections will produce different results depending on the intensity of the experiment. Experiments producing more stuff will have higher success rates on those reactions requiring the recruitment of charge material. An example would be muon decay to two electrons and a positron. Not all reactions recruit charge material. For those interactions, the author would expect to see much better agreement between experiments run at different intensities.

If experiments keep track of data during the startup of runs, the author would expect to see interactions that do not need material occurring at the expected rate, but those requiring additional material to show lower cross sections than when the run is operating at full intensity. From (2020/11/08 09:38)

I cannot imagine getting support for this unless the Particle Data Group is concerned about variations between some experimental results but not all. If there IS concern, I would like to be blind to which reactions are problematic.

I propose to categorize reactions in terms of recruitment needed and results freed before looking at the variation in experimental results. Only then is checking different experiments appropriate.

- Hypothesis: experiments where recruitment is needed have higher cross sections when they are run at higher intensities.
- Null hypothesis: experiments show the same cross sections for all reactions no matter what intensity they are run at.

Further conjecture: (2022/01/21 14:29) There is an upper bound on effective density of recruitable material particles. Increasing cross section/yield may be asymptotic in intensity or may saturate, so experiments exceeding some intensity

may see no increase in cross section. There may be curves we could fit, even from different experiments, based on calculating availability in those experiments.

Hunt for New Particles (+)

This hunt might amount to a PDG Review or might include a deeper dive into promising experiments. The hunt for versions of strange is not expected to receive support. The *mnp* Model sees down and strange as related, since 1/3 charge quarks are seen as offering 3 possible arrangements of charge while 2/3 charge quarks offer only one. Look for other versions of strange (higher energy but shorter lifetime), then look for other versions of bottom, or bottom + bigger version mesons.

The hunt for neutral particles/quarks larger than up and down but smaller than Z is also unlikely to gain support. The *mnp* Model sees three possible flavours of smallish neutral particles. A second family is not considered likely below Z (which might be a family as well), and a third family is expected to be larger than tau and top, so unattainable.

Examining the Higgs (from 2019/07.18 22:07) to see if its spin and products are consistent with a meson of bottom-like and anti-bottom-like quarks is not likely to be endearing to particle physicists. Best left unsaid.

Null hypothesis: there is nothing to be found

Particles - Room Temperature Annihilation or Interaction ($$ or (!?!))

Advances in quantum computing and particle storage and optical tweezers may allow single particle interaction experiments. Storing positrons is not any harder than storing electrons and not really much more dangerous. I hope. I suggest considering single electron/positron combination first. Might involve destroying the intersection part of the apparatus, but if enough knowledge can be gained or the apparatus is cheap enough, that may be OK.

Look at the resulting detritus direction. If enough experiments can be done and a preference is seen, controlling for time of day and time of year, that would be interesting. The Model posits that the (apparently) unorganized charge material from the reaction is a form of dark matter, so there may be some (but not a lot of) drag of results toward a rest frame. The Model can see partial coils interacting and being dragged some, so the effect of ceasing to move in the Earth's rotating frame is not immediate.

Questions destined to irritate experimentalists: Do we keep track of time of day and day of year in high energy experiments? Latitude, Longitude, and orientation? Would an oblate testing chamber with tests at different times of the year make a difference?

Fantasy: Isolate a kaon away from other events to see if decay results are different. From (2020/11/06 19:37)

Casimir Effect Experiments; Courting a Vacuum Catastrophe (+ to $$)

The Casimir Effect has received much work. Calculations and predictions are well developed. Repulsion, usually from fluids, has been found interesting. A chip has been developed to make experiments easier to do while reducing the needs for physically exact positioning. This from a quick reading of the Wikipedia Casimir Effect article, https://en.wikipedia.org/wiki/Casimir_effect.

As an independent focus of study, the Casimir Effect may offer only a low probability of success of finding new materials or levitation techniques or new physics or averting a vacuum catastrophe. As an adjunct, for example by adapting Casimir effect measurements to STM appartus either as an independent study or a way to study surfaces currently studied in (some) different ways, looking at effects of different temperatures or using STM techniques of different bias currents or magnetic fields or varying fields, interesting results may.be available.

If the optics investigation of diffraction in materials, temperatures, and fields yields interesting results, the Casimir effect might become more interesting and easier to add on to those experiments.

- Model Hypothesis: (2017/11/02 22:22) The Casimir Effect is not vacuum energy but a surface effect of electron coils attracting and in some cases repelling.
- Hypothesis: Different temperatures and bias fields yield interesting results, not in keeping with calculations.
- Null hypothesis: No explanation will be found or is needed for the experimental results. No difference from (others) predictions and measurements. No new or exotic materials will be found. The Casimir Effect shows the vaccuum potential is very large.

AstroPhysics

Looking out at regions we cannot visit has been fruitful not just for what we can see for what we can learn from what we see. Cosmology and particle physics have benefited.

Shapiro Effect (+ to $$$$$) (?-)

The Shapiro Effect shows electromagnetism passing close to a massive body slowing. The Model hypothesis is that this slowing is the radiation is taking a longer path, further out from the body, rather than going deeper into a light well. This can be examined if the data on satellite antenna aiming has been collected. (+) If the data has not been gathered I suspect it will not be added to satellite programs just at my request ($$$$).

From (2014-04-04) a Shapiro light ranging test would involve keeping track of location and antennae direction if the antennae are automatically seeking signal optimization. Presumably the transmitters and receivers on satellites are sensitive to direction and auto correct to optimize transmission. (Better than amateur Yagi, anyway.) If the data exists, this experiment becomes a review (+) Easier is to keep track of antennae orientation on Earthbound stations if the antennae are capable of fine tuning. ($$) If VERY fine tuning is needed, highly directional antennae might increase the sensitivity. ($$$)

From (2018/10/15 21:29) the fantasy develops further. If a satellite can aim a collimated beam where it wants and advance or retard the angle, we could do the measurements from Earth with atmosphere and weather as confounding factors. Unless can choose a wavelength not much affected by the atmosphere. Measurement on the ground at various places might be an effort, but perhaps less expense than sending sensors up in a satellite too. If the satellite is on the ecliptic, needs only to aim along the ecliptic. And mis-aim to see what and when the best signal is received. If signal is time varying then timings can be calculated or deduced. The Null Hypothesis is that GR calculations are correct. The *mnp* Model hypothesis is that there is not as much slowing as expected, but the path is different, first tending in until the beam is tangent to a sphere around the sun and then diverges outward more toward parallel to going away from the sun. The author needs to determine actual factors of gravity for calculations. Experimenters with unlimited funds could also recalculate a lot of transits and compare to measurements and GR predictions. A collimated beam is even better if it cycles through an off or on off pattern. If a fixed period of output is easier, just vary the gaps between transmissions. Ojala.

This might be turned into a relevant topic of review if satellites have been lost when turning them off when the satellite is a long way away but at 90 degrees from earth with apex at sun? If only a few satellites have been lost, investigating the distribution of positions may not be a large statistically powerful sample.

Relativity (+ or $$$)

Since GPS satellites are moving faster than the surface of the Earth, Special Relativity would suggest they would see Earth clocks moving slower. From (2014-07-15), is there a "simple" experiment of asking the GPS satellites what they see of Earth clocks. Corrections are needed to Earth receivers and have been successfully implemented. Have the GPS satellites been asked the same question? If this has been done, only review is needed (+). If easy to implement, ($$). Since the muon storage experiment shows clocks undergoing angular acceleration do not show any slowing other than due to their speed, clocks in an elevator are NOT slowed by acceleration while those in gravitational fields are, this satellite question is a relevant test.

The author continues to look for experiments of fast reference frame looking back at a slower one. (+) (-)

Galactic Dynamics (+)

(+) (-!) From (2014-10-20 1745) do galaxy arms evolve in predictable manners? Does astronomy show a range of galaxy patterns that suggest evolution or change?

(+) (-) Is there a way to see if loose particles or dark matter slows beyond the MOND limit, perhaps if cosmoligical evidence suggests less mass loss from galaxies than might otherwise be expected?

Dubious Propositions (+ or $$$$$)

Photon Count (+) (x): I need to review results from astronomy to make sure photons are never split, that measurements from different references show different energies only

Brehmstrahlung (+ or $$$$$) (-): Does brehmstrahlung slow particles? Is there a way to see if it even happens in deep space? Only if a Pioneer sees it or can be asked to look.

Solid State Experiments (+ to $$)

From (2021 and 2022): In STM, are we imaging nuclei or electrons? Nuclei. Regarding moving samples with the tip, was pushing things around with an STM tip better when aiming between high points? Would a poorer/broader/multi-point tip work better for pulling or pushing? Regarding tip adjustments, would having an area of lower or higher albedo make picking up or dropping off of a tip, for example, CO easier?

STM approaches and environments would be useful for free electron investigations (below). Casimir Effect investigations (below) and optical investigations (below) would also benefit from scanning tunneling microscopy.

From (2019/07/18 22:13) The vacuum and cold available in condensed matter labs may offer a low expense site for experiment. Or not. NB (2022-01-29) One needs to make sure nothing that will out-gas is introduced. Need to determine the dimensions of what can be introduced with the fiddle arm and how much freedom of location is available. Introducing new wires is hard, it seems. Dropping stuff to the bottom of the chamber is bad form. Having a tool or grasper or two might be interesting. Storage space for five or six 1.5cm square samples does not offer many options. Clearly, the author is not well enough immersed in the lab to have the background to be asking good questions in this Covid era. LoL

Electromagnetism Experiments (+ $ $$)

Many of the experiments listed here may be unnecessary if already done or the results can be predicted clearly enough. The null hypothesis is that all is known about photon/material/material wave function/edge effects. The *mnp* Model hypothesis is that matter and its wave function is necessary for all interesting redirection of photons. Yet in apparent contradiction, the *mnp* Model hypothesis suggests electrons can interact with photons.

Photon - Free Electron Interactions (+ to $$$)

In potential overlap with Solid State (cryogenic) or Room Temperature Particle categories, is it possible for a photon/laser beam to be absorbed by a free electron? The undergrad answer is no of course not. The author suggests this is a relativity confirmation test, since free electron absorption would indicate mass actually goes up with momentum increase. This question has been festering for years. The author suspects that in STM no electron would be seen as truly free even when tunneling from tip to sample.

Electrons on negatively charged conductors, on graphene, on semi conductor donor materials, glass, rubber (?) might be almost free, so might be candidates for trying. An electron shower in a laser beam might see the occasional errant electron. Sweeping the light through the shower or the shower across the light?

Measuring where the electron goes, noting what momentum and energy it has, is expected to be difficult. Perhaps almost as difficult as finding a free electron to zap it. The electron confinement techniques currently available may make that almost possible. Measuring momentum transfer to the confining field or worse, showing there is no transfer, might be difficult.

- Null Hypothesis: Free electrons cannot absorb photons
- Hypothesis: Free electrons can absorb photons
- Null Result: We cannot even hit an electron with a photon to find out. No effects whatsoever are seen.

Diffraction and Diffusion - Materials and Methods (+ to $$)

The author would like to understand the parameters (and non-parameters) of diffusion and diffraction. As with all experiments, understanding the physics and literature review come first. Then finding an inexpensive big enough CCD. Old cameras with a 25mm CCD might be candidates, though a much bigger one allows larger experiments or larger fingers.

- Null hypothesis: All is right with the world. Optics and (maybe) quantum mechanics understands optical phenomena perfectly. Enjoy the learning opportunity.
- Hypothesis: By changing slit conditions and experimental procedures, interesting results will arise.

- Model hypothesis: Matter under the influence of electromagentic fields away from radiation itself is necessary to produce the optical phenomena seen.

Review will involve (from 2016/07/11 18:44) categorizing experiments by distribution pattern, coherence, selection mechanism, author cooperation or belief that info is useless, and other criteria to be determined. A database, bibliography, almost an encyclopedia of experiments should result if I do this investigation.

Quantum mechanics and perhaps quantum field theory will be important for this investigation.

What Level of Coherence is Required

From (2016/07/11 18:45) understand coherence.

Delayed choice experiments: From (2013-11-07) review the John Wheeler experiment of shining light across the destination screen. Could we clear the "guide waves" by sending stuff across in between photons. Experimenters pick interval between photons or electrons, when within that interval the clearing can be done, perhaps at a randomized time.

- Hypothesis: Superposition will not maintain the "guide waves" enough, so sweeping should clear diffraction patterns
- Null Hypothesis: Sweeping will have no effect

Varied "clearing" spacing: From (2016/06/21 21:37), clearing photons or other field disturbers could be random or spaced - could have different spacing than fhotons going through, so could statistically measure how much effect a recent clearing has.

Varied photon energy: From (2016/06/21 21:39) could we have different wavelength photons go through a coherent field from a cascade of different photons?

Varied photon spacing: From (2016/06/21 21:35) can we get photons out of phase with the previous trapped/measured photons in an experiment? Rephrased (2016/07/11 18:45) can I introduce stutters?

Varied photon aiming: From (2016/07/11 18:36) if electron or photons are aimed at one slit, what is the yield pattern on the other side? How much deviation can be tolerated on the inbound side? Does de-focusing have an effect? What is the effect of the defocus covering both slits? Is there a lag between starting the experiment and collecting results?

Understanding Single Photon Experiments

Do all that see diffusion and diffraction have coherent fields already set up, or are some sending photons or bucky balls with no prior history?

- Null hypothesis: No prior history is relevant in single photon experiments. Of course.
- Hypothesis: Well, maybe some history matters.

2014-07-19 single photon experiments seem to occur in the presence of coherent fields from subtracted photons. Somebody (Clark) with clearing between photons finds no interference??

Materials in Diffraction and Diffusion Experiments

If experiment conditions can change the wave function of the electrons in the material making up the slits, so we get higher or lower diffraction? Does cold affect the effective width of the slits? Do electric or magnetic fields imposed on the grating (as a bias as in STM investigations) lead to interesting results?

Do different materials and conductors change the behavior of slits? Can materials be found that hide (or enhance) their presence in diffusion/diffraction experiments?

Changing conditions can include different materials or different material temperatures on each side of a slit, very hot or very cold materials forming the slit. Comparing materials with very active and available electrons on the surface against materials with very little electron availability on the surface. Do superconductors near or just above their temperature of activity act differently?

Momentum Transfer in Diffusion and Diffraction

Does very thin material retain its function as a diffuser? Can thin opaque materials be used to measure momentum transfer, perhaps by noticing increased variation in results if the diffuser is vibrating or moving?

Diffusion and Diffraction Without Presence of Matter (+ for now) (b46-no-matter)

Can a curtain of free-ish electrons in or near a slit lead to differences? Reflection? Random redirection of the photons? Redirection of the electrons? Increased velocity of the electrons? This touches on the free electron-photon interaction pursuit above.

Does diffraction, diffusion, creation or radiation require matter or can it be accomplished by pure electric, magnetic, or electromagnetic means? This may require looking at high energy particle collisions and perhaps high energy cosmological events. For now, this is an experiment review topic with low probabilities of success.

Antennae (+ to $$$)

Do antennae at different temperatures, materials, bias charges or magnetic bias fields, behave as described by the quantum mechanics of the surfaces or do they behave differently. Is material (metal) skin depth relevant to antenna behavior?

- Null hypothesis: Between quantum mechanics and electromagnetics, nothing remains to be learned.
- Hyper-null hypothesis: Investigating these issues will provide no interesting techniques for small scale radiation or STM experiments or small scale technology.

Evanescent Fields Left by Photon Passage (+ to $$$ or x)

Can we measure the evanescent fields created by a single photon?

- Null Hypothesis: photons leave no trace. There is no such thing as evanescent fields.
- Model Hypothesis: photons create evanescent electromagnetic fields that do not have a net effect on the random field potential that exists in the vicinity of matter and are not conventionally measurable and not conventionally seen as energy.

Can I invent a way to see those electromagnetic fields? Is subsequent passage of photons affected in subtle ways? Certainly, I do not expect support for this endeavor.

Vacuum Recruitment (+ to $$$)

From (2016/08/10 13:47) Can a varying magnetic or electromagnetic field without matter lead to diffraction and/or diffusion?

From (2016/09/26 13:14) Is the presence of matter necessary for photon generation?

- Null hypothesis: Quantum field theory rules.

Relativistic Optical Experiments {+ and $$$$$$$)

No experiments are likely to be available between armchair musings and impossible measurements. Thought experiments, such as diffraction experiment in a high speed frame or a relativistic double slit experiment at varying angles, can only be tested by finding some cosmological phenomena. Unlikely!

Preparation Required for Optical Experiments

The author would need enough preparation in quantum mechanics and quantum field theory to start predicting results. The author would need to collect background literature and a bibliography. The author would need to continue getting exposure to materials. Show, not just say.

Optical Experiments Conclusion

These questions are not all separate. For example, they may combine in understanding the behavior of half silvered mirrors. from (2014-03-21) could the changing EM fields that go through the half silvered mirror conjure a photon at a different phase or sign and only dissipate or cancel another further down the line in the multi-stage experiments?

Null hypothesis: again, let me restate, we know everything we need about diffusion, diffraction, and spin. More is not to be discovered. The investigation should have lead to a lot of learning. Enjoy.

Experimental Design (+)

Studying experimental design is expected of an experimentalist. Some of the author's proposed investigations require more than the usual level of care, making an almost forensic approach and understanding of experimental design appropriate.

Figuring out ways to measure while blind to the results. Automatic collection is of course the gold standard. Varying the inputs without the researcher's knowledge, only to reveal the inputs during analysis.

For example, with the room temperature decay or single collision experiments, the measuring apparatus, if an opaque hemisphere and small enough, can be rotated by a random amount by the controller, then the results viewed to make sure the device is operating properly. Only when the random rotation is taken out can we look at the directional results over a large collection of measurements.

The posts and appendices in the *mnp* Manual proposing a Registry for Design and Data and a Journal of Negative Results have not yielded change in the field of physics, but show my ongoing interests in experimental and communication methods. This post/chapter can be seen as a personal Registry of Design.

Academic work can be divided into three or four areas: note taking, results gathering and analysis, and publishing. Investigation of the transfer of notes to publishing has been interesting but not earthshaking. The author's program Scribe for formatting reports (from the teletype/hard copy days) has certainly not gone anywhere. The experiment (2022-01-24) transition to composing with Markdown which will be translated to Latex and HTML is ongoing. This post/chapter will be the first. Investigations of Electronic Lab Notebooks continues. None of this is a subject for graduate school. The tools are interesting and hopefully help foster the creation of new science.

Presentation: I was asked how to display results on a screen. On (2015-03-02) I wrote down an answer: color, pattern, change over time (careful to not be annoying), size length/area/volume, greater shading for depth?? shape (round line triangle square offers GH code for number [of -sides-] where round is 1 and a line segment is 2, a triangle 3, if we don't go to infinity on polygons. Management by exception allows sound: tone,timbre,chord, and/or vowel. When is sound used? On an event, failure, when mouse over (games used to do that a lot!). Sound bite: there was a time when the University of Michigan computing center, if the last job completed successfully and there was not another waiting, would play Hail to the Victors. Time to check the next card deck.

Display of 3-d tensors on a 2-d screen will be revisited. I promise. Similar is the display of probability density functions in 2-d over time or over changing conditions such as temperature. For some changes, presenting a movie perhaps at different paces, with a slider bar whose color represents temperature. Of if the image of probabilities is a scalar, changing the color of the entire image with temperature may be telling. Color can be used to gain attention, sometimes to the detriment of the science. Shout out to PJ for that!

Choosing instrumentation, beyond small computers, analog digital converters, and thermocouples, is not something I have a lot of experience with yet. I do remember, back in the early 80's, being asked how to computer square roots quickly on a high speed logic board. They were using MUCH faster calculators than I was with my Z-80 4MHz processor with software floating point, but needed even faster results. I heard myself ask "What are you doing with the square root. Comparing it?" The yes answer prompted "Then square what you are comparing to." I never heard back from that large project, but the take home message is

> Think about what you need to measure and what you need to calculate. Algorithms can offer faster or better results than more hard work.

Observation will be better, for example, if Machiavelli er the observer does not know when, for example, fields were supplied to the slit but is just measuring the level of diffusion, the results will be better. In quantum level experiments, we may need sample photons at times to check runs, even if that means reducing the number of successful runs. Observing and recording the results even for those "sampled" or "ruined" runs is a useful test of the observation if the observer does not know about the inputs. At an extreme, if thwarting Machiavelli is important, a known photon may need to be sent along in place of the unknown sampled out. Sending a false sample to a testing lab can be a useful technique; if the DNA lab always returns the desired match, they may not be following good testing procedures though business will be good for a while.

The difficulties measuring the speed of neutrinos back in 2011 inspired many thoughts on observation blinding. If a delay of 0 to 9 (nanoseconds?) is called for, start at the 56th digit of pi and use those numbers. Or send those numbers to a device AND have a collegue send (and record) numbers to be added to the first stream of numbers, so that neither sees the value submitted to the device.

Analysis itself can be somewhat blinded if taken in steps, without knowing where the input data came from or which experiment it refers to or which direction or orientation the suite of measurements was taken in. The computer science concept of unit testing or proof is useful. Again, algorithms and procedures can offer better or more reliable results.

Statistics are useful (from 2019/09/01 09:59) but biostatistician GM points out if a study does not have intra-ocular impact, it is not that significant. To translate to the vernacular, if it doesn't hit you between the eyes it isn't meaningful. Still, in some experiments, understanding the calculation and meaning of power will be useful, as will an understanding of Bayes inference and the role of false negative and positive. So the author is called to learn more statistics to augment that gathered from (mostly) experience with biostatistics.

Beyond Physics

The sketch of "How to Create a Terrestrial Flying Disk" requires materials science, computer science, and aerodynamics, but not much new physics so is "Interesting. But weird." Other than creating such a device for the sake of creation and bragging rights and perhaps using it as a reliable high altitude helicopter, there do not seem to be pressing reasons to press on.

End Words

(2018-11-14) Taking the Graduate Record Exam (GRE) to start a five year clock for preparing, taking the Physics GRE, and applying to graduate school has had a number of consequences. One of the questions raised by the "who do you want us to report these results to" is "what program are you applying to?"

Preparation Story

Humor: I imagine a munchkin asking "what kind of physics are you?" "You mean what kind of physicist?" "No, what kind of physics?" "Well, if you give me the ten choices, I'll have to say "physics." "Oh, so you are physics physics." "Since I can't say all of the above or most of the above, yes" "Can't you make up your mind?"

And to that question, the answer will be/is useful to me, but perhaps not to a graduate program. What kind of physics am I? Maybe theoretical physics some day, perhaps even mathematical. Hah. After over two years of undergraduate physics courses, that looks far less likely. For graduate school, putting together an experiment seems a better path. But what would be best or available?

In the Beginning

Six experiments dominated my early preparation for grad school. Stated in null hypothesis mode:

- Particle physics: Verify that the Wu experiment or similar spin experiments show left handed preference in the Southern Hemisphere and at the equator.
- Particle physics: Verify that collision and decay experiments do not have small quarks bigger than strange and shorter lived.
- Particle physics: Verify that there is no evidence from collision and decay experiments for neutral particles/quarks larger than up and down but smaller than Z and that there are not two more larger shorter lived flavours and there are not multiple families. (THAT was a hard hypothesis to put in null form!)
- Optics: Show that the material of a diffusion screen and the quantum behavior of the material around the slit(s) have no effect. Verify temperature independence and if possible frame independence.
- Condensed Matter: Verify the Casimir Effect results and fill in gaps.
- Relativity: Verify that aiming parameters for satellite radar from the far side of the sun and from away from the sun are exactly as General Relativity would predict.

Not so many months later (2018/11/07 08:50) the priority list was five, again in null hypothesis mode: left hand preference is universal, general relativity predicts the path of aimed beams from satellites, there are no small neutral particles, there is not a third form of up slightly more massive than strange and shorter lived neutrinos cannot be captured with the help of asymmetrical magnetic fields.

Why This and Why Now?

I was advised that with my background I could not get into grad school, so I might as well post about interesting experiments. Seeing them done by others would certainly not diminish my vanishingly small chances of getting into graduate school. A few of years of classes and expanding understanding of physics have added to the experiment list. And to understand how some might be easy, but some exceedingly difficult. Long enough for my respect for experimentalists to go up.

I am more interested in being clear about my interests and the *mnp* Model than I am in persuading. The wags suggest that is a good idea, since I will NOT be persuasive.

Conclusion

How this school endeavor is going to finish is not clear.

One of the benefits of putting the compilation of experiments together is the opportunity to gather all the thoughts from the various electronic files (not really deserving the title electronic lab notebook, this) and to think about them, categorize them, and see what patterns they form. Major pruning to make the list useful remains.

Thanks to the Giants.

Addendum - Extra Experiment Thoughts Found (2022 01 28)

While writing post 46, *M*editations o*N* ex*P*eriment, I had the feeling I was missing something. I covered all the experimental topics desired, but often wrote extemporaneously about issues I had thought about previously. Yesterday, I found 5 pages, 114 entries individual, 70 entries when multiple contemporaneous thoughts on the same topic joined each other. These thoughts were in the original materials but not the extracted notes on experiment I had used to write post 46. The result is three dense pages of markdown display, approximately five pages of pdf.

A background note on methods: I collect thoughts while reading or writing at the computer using a command line script that adds date and time to the thoughts. Every few years or when resuming blogging, I save the original, sort the thoughts by topic, save that with a date range and use topics as needed. I have now created, for this correction, a script (called thoughtprocess abbreviated tp if you must know) for processing the thought file(s). After processing, using a spreadsheet to sort by topic or subtopic is much easier and producing markdown tables simpler. More important, the process should be more reliable. Doing that in public may not be such a good idea; if I choose what to write about and what ideas are worth writing about, a lot of pruning makes for less publishing work.

Not every idea is a good one. With this update to post 46, *M*editations o*N* ex*P*eriment, much of the temporary Addendum has been incorporated. Much has been relegated to comments that pandoc will not include in the html or tex translations. Some has been relegated to the trash. You ARE welcome.

Appendix B

Ancillary Matter

Much of the superseded material from this chapter has been placed into the "Journal of Negative Results" page 247. By 2022-01-15, more has been relegated. The chapter organized into mentating on the *mnp* Model itself, ponderings on particles, considerations of cosmology, clues to calculations, and gyrations on gravity as illuminations of the effects of the *mnp* Thought Model.

Details on the Thought Experiment That Became the *mnp* Model

The concepts and suggestions here grew out of the thought experiment that became the *mnp* Model. "What if ALL interactions including gravity were local?" "What would it take for charge to work?", followed by "what would it take for a moving charge to create a magnetic field and an oscillating charge a photon?" Throw in "if all the units travel at the speed of light, how is it that photon parts do not wander" and "how would 'charge' units stay in one place instead of all flying off?" This last question is answered by a ring of one charge paired with a ring of another charge rotating the opposite direction to form neutrinos and string and by coils of one charge all rotating the same direction covering some closed surface similar to a sphere to form electrons, positrons, and quark units. Since charge can not "send out" charge and yet maintain its mass and existence, and since mass can not "send out" gravitons that have an effect on anything and yet maintain its own mass and existence, the concept of "recruiting" from something already existing "popped out of the ether."

The author does not contend that the *mnp* Model is complete. With 3 effects and 4 or 5 degrees of freedom in how each of those effects interact, the computational work is formidable before the *mnp* Model claims to model the real universe. Some of the proof of concept calculations are posited to involve only 2 effects, so modeling can proceed.

The author also does not claim to understand all the ramifications of the model, so some conjectures will be wrong. Further, the author does not claim to understand all (or even much) of the details of current experimental results, but looks forward to challenging the *mnp* Model with observed reality.

Thinking About the *mnp* Model

Basic Principle Inspiring the Development of the *mnp* Model

All the results the wonderful experimentalists have measured are true and all the particles and interactions are true. At least virtually all of them. Faster than light may be a challenge or an opportunity. Or a slow switch. The huge collection of knowledge that is modern physics is daunting, but like water when one swims, it has proved surprisingly supportive in unexpected ways.

Development of the *mnp* Model

Many conjectures, guesses, and speculations are provided here. They are offered to develop both the author's and reader's understanding of the *mnp* Model. Finding a few errors, needing to make many corrections may not invalidate the model but rather improve the understanding or details of the model.

For example, the surprising effects of Travel Alignment and invariant speed that allows fhotons, neutrinos, and stable matter in moving in space to act as "gravitons" over long distances seem shocking and may be proved wrong. The *mnp* Model does provide an economical and aesthetically interesting explanation for the real effects we measure and call gravity, including the bending of light, and the model avoids the need for magic or for what we call "space" to need to know about the mass distribution in the rest of "space"

Thinking in the *mnp* Mode

The reader is forgiven for having difficulty thinking in *mnp* Mode. The author sometimes has difficulty too.

Remember that all figments travel at c, have no other "momentum," that any figments unorganized and truly random are "not there" because their net effect is zero. Those unorganized figments can be recruited.

Fields are the organization of existing, moving figments. For example, a moving charge may not "emit" mediators, it merely redirects those that exist. The oriented *m*-figments that make up a photon do not emit electric and magnetic fields, they recruit the figments to be fields from the random surroundings.

The author finds the "neither created nor destroyed" and "neither slowed nor hurried in the delivery of its appointed effects" rather comforting, even though the computational result of the *mnp* Model is that gravitational calculations are a mess.

Extremely Counter-Intuitive Effects of the Three Effects

One of the ironies that results from seeing gravity as a local phenomena is that most forces have simple explanations, but gravity at the scale of the universe becomes extremely complicated.

Matter accelerates in space? A highly stochastic and even somewhat unreliable process causes what we see as the omnipresent gravity in our lives? A figment/"graviton" moving attracts other figments toward itself hence more toward the source, but that figment/"graviton" does not change direction at all unless there are more figments on one side of the very narrow path seen by the figment/graviton"? That some "gravitons" travel further than others? That stopping or changing direction is a magnetic process, that there is no "impact" "reflection" or "equal and opposite reaction" at the small scale of figments?" That at least one effect is intransitive? That two effects cause figments to travel faster than light in "space" since one component of the resulting velocity is the speed of light. That Newton's Laws and Relativity and the other consistent experiences of medium scale physics are obeyed by collections of figments, but not the figments themselves? That figments exist across the universe, but only have net effects on other figments when they are organized by spin and direction or are gathered to be organized? When random, figments are undetectable? That a universe of incomprehensible size now has squared the number of entities in existence? That if the intermediate scale constituents of a nucleus destroy each other, those colliding constituents attract each other once the container is breached? That light acts like "gravitons", that neutrinos and even protons traveling in space act like "gravitons" and magnetic fields are created by the same mediators that can act as "gravitons?" That a cataclysm appears far more massive than it is, because all the energy and matter sent out acts as "gravitons." A traveling proton proton in front of it, because it sees more *m*-figments sent back to it by the one in front?

Hard to imagine. Yet the universe is still here, the experimental results are accurate, the *mnp* Model is not yet complete. "But still, it moves."

Figments Are Not Necessarily the Same Size? (2012-11-26 and earlier)

Figments all the same size seem now to make sense and work well. There is still conceptual room for non-quantized figments, though the math would probably be more complicated.

Someday the math could handle figments being just stuff with no discrete identity (thoughts from 2011), at which point the "discrete" model will just be the deltaFig for preCalculus students.

This description of the *mnp* Model assumes that the figments are all the same influence/size/mass/energy. For development and discussion of new concepts this assumption makes the process easier.

For now, the basic entities of the *mnp* Model look more and more similar. With uniform length loops and uniform width of effect from the loop, we are close to needing uniform size entities/figments. At least width of effect must be constant no matter the size, width of Separation must be constant not matter the strenght of the effects, and the length stuff

needs to be proportionate to effects of Travel and Axis. For fields, we may be able to get away with strength of effect along the direction of travel as proportionate. Edge effects of figments in fields may be important.

Quark Charges

This material on conservation of quark charges has been improved and moved into the main document page 53. It also became blog 44.

Gamma Particles

From 11/05/11, another palindrommic date, Gamma particles from electron-positron destruction are seen as not just fhotons made up of *m*-figments the way fhotons are pictured in the *mnp* Model. They are not even particles with a given size. They definitely are mostly energy, the *m*figments as energy released by the reaction. They also contain *n* and *p* figments traveling at the speed of light. Those charge material figments are currently seen (2022) as staying organized in the quantized filament loops that provided the structure for the original particles. The *mnp* Model does not see the loops as being broken up by high energy reactions. All *n*, *p*, and loop filaments n and p do not have the ability to travel the very long distances that real fhotons do. Charge material will scatter faster.

If coils DO break up in high energy collisions, the individual figments will be hard to recruit into loops and thus would be seen as adding to dark matter in the current universe. Since the *mnp* Model sees black holes as retaining only figment count, momentum, and quantized charge material loops, this would also lead to loss of a significant portion of the only information retained in black holes. So perhaps the author's preference for the persistence of figment loops has an inherent bias toward existence.

The *mnp* and Constituent Models see weak interactions as the exchange of quantized charge materials between particles leading to different particles and the strong force as quarks attempting to exchange charge material but being prevented by the contention of another quark for the same quantized charge material.

Cosmology in the *mnp* Model

Cosmology - A New Spin

If the change of Axis direction is ever so slightly later or earlier than the change in Travel (figment direction), maybe the Axis directions became orthogonal to travel direction early in the universe. Things have been stable for figments and usually particles since then. Except maybe in cataclysms. The *mnp* Model is beginning to suggest that "space" is a tabula rasa, a Cartesian mathematical construct. Time is just a "perceived" result of figments interacting. Figments rotating or bending is the only way to slow down enough to experience time.

Ageless Controversy (not related to *mnp* Model)

The early epochs of the universe should not be measured in time, but in size/radius. If there is an epoch when all the figments are moving at c in straight lines and not interacting, there will be no time. Less disturbing than seeing the sudden expansion with (log) time marching continuously. No need to go further back than the diameter of one figment, unless rotation is believed to "predate" the initial expansion.

Unfinished Business in the *mnp* Model

Many loose ends remain. The computational work to verify and validate is enormous, but can start in stages.

Computations for the *mnp* Model

The radius of influence is probably not a Plankian measure or even half that, but something smaller. Early calculations are likely to be "dimensionless." Coils are smaller than Plankian distances, the radius of influence will be half or less of the coil diameter so that entities are not influenced by those on the opposite side of the ring.

Choosing a model for influence between figments will eventually be important, but for some early computations it may not be important.

Calculating Quanta as Stable Multiples in the *mnp* Model

Much computational work remains to figure out what effects/sizes/distances result in stable configurations, but the basic principle is that the first quantum is the smallest stable size that can "heal" itself of "minor" changes or "injury" and usually one that "wants to create itself" The *mnp* Model may feel "Classical" the reader. The belief that all interactions happen over very short distances makes the mathematics "simple" but the effects of general relativity should be predictable, even though by acting locally all large scale phenomena become dice rolls rather than static predictions.

Musings on Gravity

Gravity is complicated in the *mnp* Model, neither just a 1/r potential or a $1/r^2$ acceleration or a deformation of space-time. Here are gathered various thoughts.

A Matter of Great Gravity

All figments act as "Gravitons," though over long distances *m* figments are the main influence due to their ability to travel. Travel Alignmentis the effect involved. This leads to the phrase "all gravity is local." And the suggestion that gravity acts at the speed of light so gravitational effects unfold over time. The recruitment and direction of incoming *m*figments

The *mnp* Model meets (some) of the requirements expected of gravitons. All figments are attracted to all other figments. Some of the figments in the *mnp* Model are not affected by encountering other figments (except to be bent in ways representing the gravitational effects on the encountered figments) and do not lose speed or effectiveness but keep going to act as gravity, thus being mediators of gravity over long distances.

The *mnp* Model suggests that a proton or neutron can accelerate to near the speed of light in deep space with no large objects. The space traveler has a velocity, so has more figments itself moving forward than backwards. As figments are encountered, they will be turned toward the figments in the traveler. The figments in the traveler will be pulled toward the wandering figment, speeding up. This acceleration may be slow at first, but as the traveler speeds up, more and more of the figments see only figments in the direction of travel.

Suggestion: gravity is never faster than light and neutrinos and the full effect takes time. The force on a body from another is an integral over time, from the time that body first appeared in the non-homogeneous universe up to the the time light or neutrinos leaving that body arrive at the influenced body. Most of the influence from that body is from the time arriving gravitons, neutrinos, and light left the influencing body. The body being influenced sees influence in proportion to its mass, and it absorbs influence from another body as in integral from the time light first arrives from that body to the end of the universe, and the force/influence from a body at a given location at a given time is an integral over time that approaches 0 at infinite time. Cosmologists might think of gravity as an influence that is sent out via (over LONG distances) *m*-figments only, that continues to influence the universe, and that an influenced object receives that influence over time, depending on how "massive" it is as a receiver.

Fhotons as Gravitons

For light to transmit "gravity" the Travel effect needs to operate only on figments seen by the attracting figment and perhaps moving toward the attracting figment. The integral of gravitational effects from light directing figments toward traveling back along its path might exceed the energy of the fhoton. Of course, once a fhoton encounters matter, its momentum will be transferred and the fhoton will cease to act as a graviton.

Computation of Heavy Matters

Attraction of figments is central to the *mnp* Model. That attraction is NOT in the familiar form of forces seen in physics but effects that combine with geometry of the figment arrangements. We should be able to ignore gravity for the early "what's stable" calculations. To later look at gravity as a local phenomenon aka Travel Alignment. The attraction of all figments based on being close can be done by sprinkling some number of (traveling as always) figments in a region and seeing how the figments move in the region. principles: figments move at constant speed. If 2 figments are "attracted" that means their direction of travel is turned slightly toward each other. "Attraction" is short range, computationally can be a "yes or no" random choice or a random range of responses. We should get a drift of figment directions to align with the concentrations of particles and a drift of figments toward the axis of large concentrations (and large concentrations drifting slightly toward other concentrations).

The mathematics for forces, momentum, and angular momentum at relativistic speeds may be relevant eventually, though it is not needed for early investigation of stability.

Ruminations on Cosmological Calculations of Gravity

Calculations of the effects of gravity in space become extremely difficult in the *mnp* Model. Free n and p figments attract and affect "local" objects, light, and all figments, but do not travel inter galactic distances until they are organized. A blast of light from a dying star would make the star appear heavy, since the sent out fhotons will direct some loose figments back toward the source.

Two consolations to human beings: 1) "The universe will still be there." 2) In case of difficulty with the universe slowing down or expanding infinitely or contracting or being swallowed by a black hole, see (1).

Gravity Experiments Corroborate Tiny Entity Quantization (2012-02-02)

Stars in a galaxy beyond a distance from the center at which the acceleration of gravity would be about $10^-10m/s^2$ do not see the gravitational effect reduce by r^2 but see an acceleration remaining around $10^-10m/s^2$, suggests the MOND data. That "minimum" gravitational attraction is called a_0. This may be the first "proof" of gravitons as (not measureable) quanta. In the *mnp* Model, gravity then does not like to be incoherent - when $a < 10^{-10}$ then the gravitons have spread out as much as their Separation would influence and if there is not a body beyond that limit to attract the gravitons they do start getting lost or even traveling back. If a body is out there, it will stimulate coherence to the minimum level, so the gravitons leaving the distant body attract the gravitons from spreading further, though the Separation affect will resist their coming closer together. The distant body, such as the star rotating in the outer parts of a galactic arm) will see attraction at that minimum level. There are hints that in cases where another gravitational attraction exists, the MOND results may not apply, but those possible exceptions have not been examined within the *mnp* Model. # Tank,H.K.," A new law emerging form the recurrences of critical acceleration of MOND ...." Astrophysics. and Space Sci. 330, DOI. 10.1007/s 10509-010-0449-0 (2010), 203-205.

Use r_{a_0} (ra0) for the radius at which the gravitation acceleration falls below a_0. When a body leaving the influence of the nearest big mass (as the Pioneer spacecraft are doing) must still see steady attraction when that body is beyond $R_{a_0}+r_{a_0}$ so that as the bodies move apart beyond their mutual "gravitational minimum" the gravitational fields of both are being redirected.

A theory of the critical acceleration of MOND seems to be compatible with *mnp* 's seeing entities as conserved and mass/potential energy plus kinetic energy being constant in Hasmukh Tank's wave theory of potential energy or gravitational potential energy and the energy of mass. Tank, H. K., "Wave-theoretical explanation for the newly-emerged-law of equality of potential-energy and energy-of-mass of reasonably independent systems of matter." Adv. Studies Theory. Phys., Vol. 5, 2011, no. 1, 45 - 55.

Earlier Gravitational Musings (2012-02-01)

The MOND finding is actually exciting. The *mnp* Model sees gravitons as pushing each other drifting apart by the Separation effect until they are far enough apart that the Separation effect has no more influence. at which point the gravitons stay the same distance apart if affected by a mass within some reasonable distance, causing the same minimal acceleration as long as they maintain coherence. That gravity seems to behave so regularly casts some doubt on the *mnp* Model's limit of 3 entities, though perhaps the gravitons at the limit of r^2 gravity are all m's. For discussions of gravity discussions

This discussion will use the term gravitons to indicate some doubt as to whether *mnp* 's are adequate to describe the operation of gravity. The difficulty is only the tension between n's and p's having charge and so being more likely to be "pulled away" from the stream/expanding shell of gravitons. If gravity really really does not decay or decohere until the acceleration is less than a0, then maybe n's and p's are not part of it. Or the Separation/speed of light effects are enough to keep the shell coherent. Or recruiting? Using italic g's for now (could use italic e's for generic entities or italic f for figments? o's are reserved for known no spin entities) gravitons for now.

Do gravitons in front of or behind a graviton but within some small distance affect other gravitons? Do they spread a little to make the field more homogeneous? Is the area (m^2 perhaps times that small distance) or the volume (M^3) more important?

Gravity is seen as a continuous direction of figments out from the mass. We can imagine, inaccurately, a shell of gravitons speeding away, some small distance thick, spreading as a sphere. The MOND finding leading to *mnp* 's conclusion of coherence (Separation) of gravitons would suggest that the front will tend to spread evenly. No guesses as to what speed the front might even out laterally or whether that appears to happen faster than light, but this suggests that any possible gravity waves will spread laterally from the disturbance as each "shell" expands.

Gravitational Potential and Time Dilation (2012-02-02)

Length contraction should probably go with time dilation in gravitational fields too as it does with time dilation due to velocity, thokugh it mmight not cause the same distortion to the coils of particles. Length contraction tests are currently not accurate enough. (Roberts) If length contraction does NOT occur, the *mnp* Model has a challenge in describing the "path" of figments in coils. Lengths should be shortened but "The prediction has never been tested." (D. Harrison `http://www.upscale.utoronto.ca/PVB/Harrison/GenRel/GenRel.html`)

Do Black Holes Move with Respect to the Universal Reference Frame? (2012-02-05)

In the *mnp* Model, yes, they can. The figments retain the "direction" they had on entering the "system", the black hole, as well as their identity (says the author). If other figments in the black hole redirect the new figments, they change their own direction to compensate. That is (almost) conservation of momentum and angular momentum. Mass/energy is conserved since the count of figments does not change. Other "information" is lost, such as count of electrons, count of photons, and spin.

This Appendix has been a collection of useful or interesting random topics and ideas not well enough formed to be in the main document. Currently (2022) it organizes itself in the *mnp* Model itself, some cosmology, some particles, and gravity. Sections of this document move around, like football clubs in English soccer leagues, some relegated to the JNR, some to this appendix, at times promoted back to the main document, and rarely promoted to the blog. The quarks section may well become a blog entry. To be continued.

Appendix C

Current Blog Articles

Post 46 - Meditations oN exPeriment - (2022-01-25)

Most of the experiments the author has thought about and is interested in doing or finding already done. Even if an experiment suggested here is found to yield interesting results, such results don't prove the *mnp* Model. The just provide motivation for further understanding and explanation.

This has become Appendix A, page 75

Post 45 - Registering Experimental Designs and Data Encouraged - (2022-01-23)

Saving designs before experiment and data before analysis and publishing and then (lightweight) publishing of negative or inconclusive results, are encouraged. A proposal for a lightweight registry of experimental designs and data may be more effort than it is worth, given current tools for timestamping and electronic lab notebooks.

Placed directly in the *mnp* JNR Appendix J page 247

Post 44 - *M*usings o*N* *P*articles - (2022-01-17)

The conservation of charge material pictured in the *mnp* and Constituent Models leads to a picture of quark interaction and particle creation and decay that is consistent but (of course, sigh) at odds with current models. Page 53.

Post 43 - A Tale of Two Models - (2022-01-10)

The dilemma posed by documenting two different, compatible and probably "gauge" models is discussed prior to introducing both Models. Page 12

*M*aybe *N*ot *P*robabilistic: On Grades - Post 42 (2022-01-09 from 2012-02-15)

Physics, learning, experiment, and discovery are fun. Humor can be part of that joy. Or not. Here, the author offers a not very serious consideration of probabilities:

Schrödinger's Transcript: A Meditation on Grades (2012-02-15)

Everyone was a high school student once, so perhaps can relate to this story of disappointment. Imagine you are taking a course in the field you want to study. The teacher knows the material, relays it well, but is an extremely difficult grader and not terribly computer savvy. The school has just gone to all computer grading. You know you are on the borderline

between an A and a B, have taken the final on which you knew most of the material, and are now waiting for grades to come out. The computer system is known to be difficult - moving the mouse over the wrong area brings up a different student when the teachers enter the grades. Your teacher has submitted the course grades and just gone on sabbatical to Switzerland for vacation and left all cell phones at home.

What is your grade? Since grades come in large quanta and are scalar, quantum mechanics would be the truest description of your situation. The wave function of your grade has the schematic form

$$\Psi_{grade} = \frac{1}{\sqrt{2}}(\Psi_A + \Psi_B)$$

Your grade is neither A nor B, but rather a linear combination of the two, until a measurement occurs. At that moment your observation forces the grade to "take a stand": A or B. And if you find it B, then it's really you who destroyed your chance to get into your program of choice.

So, dreading knowing, you hope your parents open the grades (this is high school, after all, and you were not yet 18 most of that time). Then you can blame them.

College students can relate, except that graduate school or a job is on the line, you have a professor, and if your scoundrel of a roomate opens the mail, you can blame someone else for the grade. Post-docs don't know if the paper is accepted or not, especially when others are known to be submitting on the same topic, so can relate through an analogous situation. Is it better to blame yourself for taking the measurement or to hope your partner is curious and takes that blame? Tough choice.

Thanks to David Griffiths, *Introduction to Quantum Mechanics 2nd edition* 2005, pages 430-431.

Actually (2022-01-09), the author (usually) prefers to see that Ψ_{grade} probability as just a representation, which has nothing to do with setting up the situation and has nothing to do with reality or the result. The unthoughtful experimenters who put Schrödinger's cat at risk deserve any and all unkind thoughts directed at them. And those who see humor in the author's mixed state of preference are welcome.

Post 41 - The Constituent Model Generalizes the *mnp* Model - (2019-12-27)

The short description of the Constituent Model has been included in the description of the Constituent Model. Page 24

Hints of Recent and Future Developments - Post 40 (ed. 2020-01-06)

The Near Past and Recent Future of the *mnp* Model

[Edited 2019-12-29]
[Edited 2020-01-06, MAJOR reconsiderations needed]

In this season of light, hope, birth, new opportunities, gathering, stress, excess, long nights, rain, snow, and shine, may all working to understand our universe continue to enjoy that study and the lengthening of the days. (Nugget hidden in the post)

Since the last blog post exactly a year ago, the *mnp* Model has undergone some development, as has the author. Undergrad courses to fill out a minor in Physics have challenged the Model and offered opportunities.

Rather to the author's surprise, the opportunities seem to outweigh the challenges. In quantum mechanics, the Rydberg formula denominators and the "allowed" transitions of electrons bound to atoms fit extremely well with the coiled picture of electron charge structure.

The understanding of Spin in the *mnp* Model has been improved. The equivalence of magnetism and electrostatic charge depending on reference frame "in the first order" is an opportunity to not explain the "nth" order right away. Exposure to ideas and education has expanded the list of experiments the author would like 1) to do or 2) inspire others to do or 3) find already done carefully.

[2020-01-06:] However, further introspection casts doubt on any easy explanation of the Rydberg denominators and has challenged one of the author's founding assumptions about charged particles. Apparently, an unbound electron must be

heavier than a bound electron since it has more energy. In the *mnp* Model, this means that the free electron, instead of being purely charge material, must attract some of the mediators m's that make up fhotons, neutrinos, fields, gluons, most of gouts of energy, and all of the relativistic portion of mass. The early calculations in the *mnp* Model of basic entity dimensions must be revised downwards. Good thing, since they seemed too big to spread far enough and evenly enough to reach necessary limits of gravity. [/2020-01-06]

Opportunities in Quantum Mechanics

One of the author's conclusions from two semesters of quantum mechanics is that angular momentum and spin are of the same process undergone by particles.

The *mnp* Model is reasonably compatible with quantum mechanics. Electron shells are seen as unitary, never completely separated, and approximate in that the constituents moving at c will change, oscillate, and vary much as wave functions do. The charge structure of electrons can pass through itself and other particles, rather like wave functions. The *mnp* Model sees the constituent loops making up elementary particles as limited in circumference and all movement and charge related information traveling at c, so the quantum mechanics "everything is entangled with everything" is limited in extent (three meters by the not so current estimate) and time (distance/c) in the *mnp* Model.

The author received presents on waking the 25th when he thought he could see electron shell quantum number n as explainable in the *mnp* Model, then saw the shell shape as explainable in the Model, and THEN saw that the preferred/ allowed/easy transitions between shell forms were ALSO explainable in the Model.

[2020-01-06:] Now the first insight seems more like an apophany. [/2020-01-06]

Electrons and Shells

Electrons are, in the *mnp* Model, six stranded quantized loops of negative charge material (n's). Linear sequences of charge material tend to coil on themselves, with the constituents having maximal effect and coiling at the minimum possible radius. The "linear sequences" formed loops in a Big Bang or thereabouts a long time ago and far away, and six loops stranded form an elementary particle. A free electron is tiny. Perhaps little more than 4 radii.

[2020-01-06:] Major rethinking will require major changes to the electron:shell relation, so some of the next three grayed out paragraphs are history. Bunk. For smooth transitions in energy and hence mass, free electrons must be heavier than bound electrons. The basic entities CAN curve more in a bound state than in the free state. There will still be a limit to that curvature, and there will be a lower bound of charge material that forms the basic structure and charge of an electron, but to expand into a shell the electron the coils of charge materials must be influenced by (and influence) the central electrostatic attraction of the nucleus and so be unable to attract as much mediators as the free electron does. Coil count is INCREASED as the shell number goes down to one. Perhaps the first shell represents the minimum radius for the coils that form the structure of the electron, so that bigger shells DO involve fewer coils as initially thought, but issues of different nuclei and the energy of the first 1s electron for a big nucleus need to be looked into.

[/2020-01-06] When expanded into a shell, the strand is unsprung a little. In the first shell 1s, only TWO coils are "popped open" which allows the strand to expand enough to approximately cover a sphere.

Note that since the constituents of the electron have a maximum ability to influence other constituents and will exert that influence if enough figments are available, there will be a $2 * (\text{total number of coils})^2/n^2$ addition to the energy or mass that the electron can attract, which will be the energy contained in the shell.

To form a 1s "shell," an electron needs to lose a pair of its (huge number of) coils. This leaves the strand making one less coil pair than normal (nc coils), so each coil opens up $2/nc$ of its minimum radius.

That means that it is traveling $cos(1/nc)$ of its normal coiled path, so is able to attract $1/(1 - cos(2/nc))$ of it's mass in mediators. [Edit 2019-12-29 start:] Since $2/nc$ is such a tiny number, the Taylor expansion would be $1/(1 - (1 - (2/nc)^2/2))$ or a proportional addition of energy in the form of mediators of $nc^2/(4 * n^2 * 2)$ or proportional to $1/n^2$. Shell 2s would require losing 2 coil pairs, so that the additional energy/mass of m's would be proportional to $1/2^2$.

Actually, things are nowhere near that simple. Coiling less does allow the charge material to attract mediators/energy in the form of m's and the amount attracted will be proportional to one less than the γ of special relativity if the greater than minimum radius is uniform. The single pair uncoiling DOES set a minimum for the 1s shell, since a given charge in the nucleus can only pull the electron in so much. To free the 1s electron requires re-coiling the pair, which usually requires adding enough energy to the electron to free it from the nucleus but may occur if another electron with the same spin is in the same shell. [/2019-12-29]

To form a $|2, 1, m_{\updownarrow} >$ shell, the electron must gain back one of those coil pairs but instead of shrinking and giving up energy, the two coils allow the requisite two foldings of the shell. Picture the constituents of the electron, traveling in a strand at the speed of light, passing from one lobe to the other and then traveling back from that lobe to the first to make a round trip. Side note: in the *mnp* Model, the fixed length of each of the 6 filaments that make up the strand require that the strand has rotated only 180 degrees in making a round trip.

Yes, this step is a weak argument, based somewhat on "needs to be," for why the amount of energy attracted by the electron changes only slightly when the two more coils are present in a $|2, 1, m_{\updownarrow\in} >$ electron than in the |1, 0, 0> electron.

If that picture of shell number n and geometric $\updownarrow$ numbers holds under closer inspection, the $|2, 1, m_{\updownarrow} >$ shell has the same number of coil untwists (2) as the 1s shell. This could well explain the preferred changes between $|2, 1, m_{\updownarrow\in} >$ and $|1, 0, 0 >$ as well as $|3, 2, m_{\updownarrow\ni} >$ and $|2, 1, m_{\updownarrow\in} >$ and the "allowable"/preferred/probable transitions from $|3, 1, m_{\updownarrow\ni} >$ to $|2, 0, 0 >$ and from $|3, 2, m_{\updownarrow\ni} >$ to $|4, 3, m_{\updownarrow\triangle} >$. But it does not so readily explain $|3, 2, m_{\updownarrow\ni} >$ to $|4, 1, m_{\updownarrow\triangle} >$ if going to and from a higher shell n number with a lower geometric $\updownarrow$ number is in fact a preferred transition. [2019-12-29:] If the transition from for example $|3, 0, 0 >$ to $|2, 1, m_{\updownarrow\in} >$ involves the same number of coil pairs unwound, but the unwindings of one pair are in the opposite direction as the other 3, followed shortly by two pairs of unwindings canceling themselves, then perhaps the "allowed in the direction of increasing $\updownarrow$ could be explained. The author would expect this process to take slightly longer than expected for $|3, 2 >$ to $|2, 1 >$ spontaneous emission (or might expect the subsequent $|2, 1 >$ to $|1, 0 >$ transition to occur faster when starting from $|3, 0 >$ than when starting from a $|3, 2 >$ state.[/2019-12-29]

The author has up to now pictured electrons in shells as being coils oriented with axis perpendicular to the line toward the nucleus, so that the outer half of each coil would be moving at c with minimum radius and slightly greater radius on the inner half, when the Axis of the electrostatic field would cause the basic entities to try to align with the electrostatic field of the nucleus. This may still apply, but introspection also suggests that if the coils are flat, with axis parallel to a line to the nucleus, then wobbling or misaligned coils will be pulled in and so back into alignment by the nucleus' electrostatic field.

Coil Topology

In some topological sense, those allowed/preferred/easy transitions in the *mnp* Model are as alike as the standard topological doughnut and handled mug. If "Coil topology" or "Stiff Coil Topology" or "Stiff Non-Physical Coil Topology" has not already been "done" it might be somebody else's dissertation. Or at least an interesting paper.

A search for Coil Topology produces much investigation on antenna, magnetic circuit, and power transfers where topology is used as a synonym for physical configuration. Some results emerge dealing with DNA and protein coiling, including notes about closed loop DNA which loops are also known as plasmids. Some of that vocabulary may be useful if coil topology is not well ensconced in mathematical literature. For example, supercoils from wikipedia DNA_supercoil speculates in the second sentence (!) on joining the DNA in a circle. The terms twist is used for the overall (first order) twist. Writhe produces lobal contortions. As a count of contortions, in circular DNA the sum of twist and writhe is constant and represents supercoiling. Written there as Lk = Tw + Wr.

A difference with *mnp* coils is that here, the coil length is stiff but the coils can cross over each other. So there may well be room for investigation. Another difference is that *mnp* coils are incapable of overcoiling.

one has to be young to learn physics

Changes in Spin Picture

Spin must have other origins and explanations beyond the need for the *mnp* Model's six stranded coils of electrons and quarks to be individually continuous and of fixed length. Up to now, the author thought the direction of coiling of the strand determines Spin direction. Spin orientation, at least at the Bloch sphere/undergraduate level, could be explained by an "impossible" orientation for this ineffable but measurable concept of spin. That something is immeasurable is sometimes seen in the *mnp* Model as a result of our measurement devices. Measuring devices and experiments are made of electrons and waves or photons. Devices and experiments are only capable of measuring as closely as the constituents of those electrons, waves, and photons are capable of turning. The *mnp* Model sees uncertainty as at least partially based in the "physical" realities of our experiments.

The author now sees a two-fold explanation of Spin as necessary in the *mnp* Model. The documented coils of charge material do establish a left hand and right hand turning as the strand makes forward progress, but the coils now need to be seen as having an imbalance centered spherically around an axis that coincides with the spin axis on a Bloch sphere. So a right hand coiling electron, in the same physical configuration with a left hand coiling electron both with imbalances at

the same orientation/direction will have opposite (aggregate) spins. This may allow two versions of chirality in addition to spin. Whether two chiralities, one small but much bigger than an even smaller one, are measurable is currently a mystery to the author. For reference, those chiralities are the direction of coiling of the strand and the (smaller in magnitude) direction of strands rotation within the strand of six loops, sometimes called "lay" when referring to rope.

Reassurance for the *mnp* Model

If movement of unbound particles in the continuum is NOT quantized, a whole realm of "quantum explanations" need not be entered. Or manufactured. Which is good for the Model.

The muon storage experiments seem solid, if not very well known. So a whole realm of explanations are not needed for how physical acceleration changes clocks and dimensions. In the Bailey 1977 CERN muon storage ring experiment, muons were subject to up to 1e18 g acceleration with no impact on time dilation. In 1980 at the Stanford Linear Accelerator, Roos exposed Sigma baryons to longitudinal acceleration from .5 to 5e15 g, with no variation from ordinary time dilation and decay. (Thank you, wikipedia.) This allows the author to continue to look at gravitational fields as separate from the acceleration due to gravitational fields in the *mnp* Model and allows philosophical space for the resolution of the twin paradox to be an absolute frame/two way speed of light model.

Challenges to the *mnp* Model

The *mnp* Model has not survived undergraduate quantum mechanics unscathed. The Aharanov-Bohm effect, in which an electrically charged particle is affected by the electromagnetic potential in regions believed to be free of magnetic and electrostatic fields, is a new challenge. Is it lack of truly infinite solenoids? Something like evanescent waves leaking out anyway? Lack of true balance in the current, which is proceeding up and around the solenoid? If a picture of potential (in addition to fields) can be shown to be created by the action of charged particles on the mediators (m's) in the *mnp* Model, Aharnov-Bohm effect might actually support models like *mnp* . Further, if the *mnp* Model can suggest ways to picture or create regions of zero electrical field with varying electrical potentials so that the equivalent electrical effect could be measured ... Ah, well, one can dream.

These issues are in the "having written down the problem, think hard about it" stage. Of course, "write a better description of the problem" may be part of the process.

Thoughts on Education

Undergraduate education is seldom affected by modern research. One of the few examples is how polarization in dielectric materials is pictured, no longer as discrete cells of polarization, but as an edge effect created by changes in the bulk. Very little of a model like *mnp* is expected to change undergraduate education. One possible exception, the current extant concept that free electrons CANNOT absorb complete photons, can be dealt with by postulating that such discussions have no place in undergraduate physics. Though the flip side offers opportunity, if impossibility has not been proved by experiment. Inventing an appropriate experiment to test absorption by free electrons may be difficult, but is on the author's short list of interesting experiments.

One of the effects of education is that I may sound slightly more like a physicist. For humorous example, describe the *mnp* Model in quantum postulate form: (The conceit of) The *mnp* Model (is that it) postulates that there exists a set of principles that can explain most of the experimental results in physics. In a conceptual space, called for lack of a better term, a Hauser space denoted by a script $\mathcal{H}$ there exists a small set of functions with a small set of operators that act in manners that mimics the observed behavior of energy and matter, though not necessarily the theorized behavior of energy and matter.

Those functions are figments denoted as m's, n's, and p's. The operators are conceptual interactions called Travel and Axis and perhaps Overlap.

Changing (or turning on a) paradigm to functional notation, yields three operands and two or three operators. We might call m's, n's, and p's operands and Travel and Axis operators. So that, having invented a theoretical space, all further development might be classed as discoveries.

Hints of the Future of *mnp* Model Posts

The author has identified eight interesting experiments, some of which may have been done already but some of which may only have been done half heartedly. To post:

Discussion of the experiments the author is interested in doing.

The extreme care that is required to do experiments with possibly surprising results when the experimenter is hoping for surprise,

The essentially forensic nature of such experiments as conducted in a public realm.

The issues of funding and motivation for the research.

Unfortunately for the author, the eight experiments on the author's short list fit into no one category, which may motivate application to Universities with varied research foci.

Further explication of magnetism and reference frames is (long) overdue. Mathematics tying movement and mass using principles of minimal action are needed as part of continued investigation of the Lorenz Transformation.

To be continued...

Time Dilation at Velocity Explained - Post 39 (2018-12-26)

Musings on the *mnp* Model and the Constituent Model

Time dilation as a function of velocity has a clearer explanation due to recent advances in the general Constituent Model and the more specific *mnp* Model. This explanation joins the explanation of relativistic mass and momentum that emerges from both Models: titled Constituent Models - Useful Supersets of the *mnp* Model).

The author recently (2018-07-17) realized that if the electrical/magnetic basis called Axis spreads at c in all directions rather than just along the line of Travel of the basic entities carrying the Axis information, then many explanations in the *mnp* Model become easier and more consistent with experience and experiment. Improved explanation and understanding of gravitation's lack of charge effects in spite of individual graviton's Axis information, magnetism itself, and the guide waves that lead to diffraction and "interference" by electrons at surfaces or edges or edges of slits are all advantages for the recent understanding/development of the *mnp* Model. The blog on uniform spread of electrical/ magnetic polarity information awaits better pictures of magnetism and the frame. Perhaps the biggest advantage of Axis/polarity information spreading at c is that concomitant explanations in the Constituent Model become easier.

Yes, both Models are absolute frame models, dependent on an absolute frame, so a certain dare I say relative amount of belief suspension is called for

Time in. The words movement and moving refer to particles. Travel and traveling applies to the constituents or basic entities, which are seen as always traveling at c in a flat Minkowski space101 in these absolute frame models.101

This post will demonstrate a generalized Constituent approach to measured time.[(1)]101 If time is measured by the oscillation of electron shells or nuclei, round-trip time for information or constituents themselves is involved. Since charge/polarity information spreads at c and constituents themselves travel at c, the time to cross a nucleus or shell when that nucleus or shell is moving can be examined as a proxy for oscillation. The easiest situation is when the information or constituents are traveling across the particle.

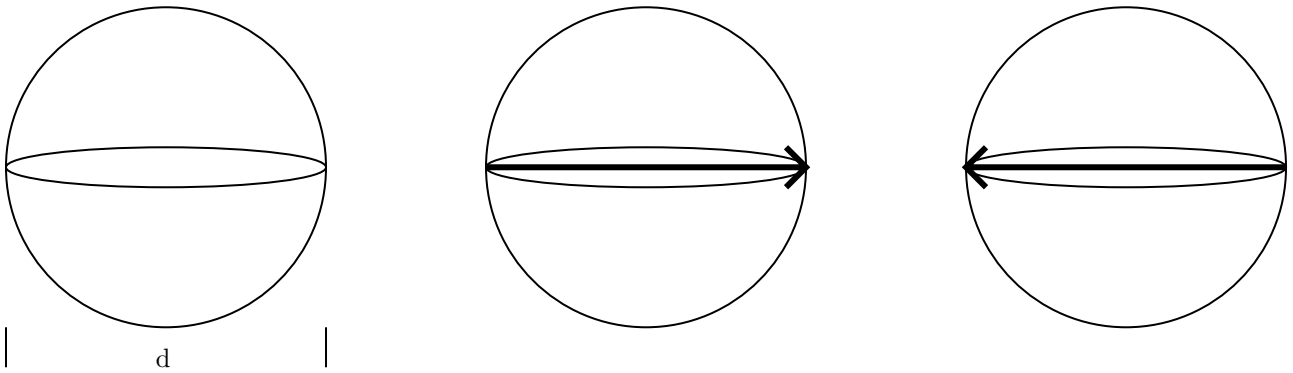


Figure C.1: Figures 1 to 3) Oscillation, v = 0

At v=0, with particle width d_t, the time across is d_t/c and the time to return is d_t/c for a round trip of $2d_t/c$. If the oscillation is around the ellipsoidal or circular surface of the particle, the round trip will be $\pi d_t/c$.

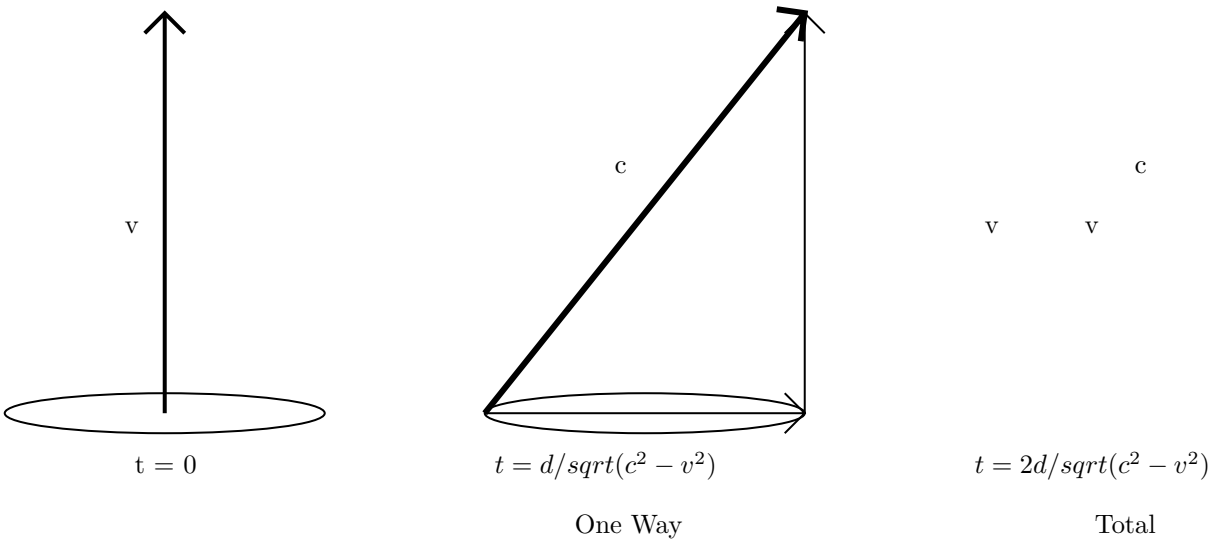


Figure C.2: Figures 4 to 6) Transverse Oscillation, v >0

If the particle is moving at v, information or constituents can be seen as traveling c on a diagonal, v on the longitudinal direction, and at a rate of $\sqrt{c^2 - v^2}$ in the lateral/transverse direction. So the time for the constituent(s) or wave information to cross the particle $d_t/\sqrt{c^2 - v^2}$, and the ratio of traversal time at rest to traversal time in motion is $(2d_t/c)/(2d_t/\sqrt{c^2 - v^2})$ or $c/\sqrt{c^2 - v^2}$. The frequency of the oscillations or the ticks of a "clock" in a moving particle compared to one at rest is $\sqrt{c^2 - v^2}/c$, a familiar time dilation expression. If the path is not across but around the surface of a spheroid or ellipsoidal shell, the distance traveled is πd_t at $v = 0$ and the time to make a circuit is $\pi d/c$. When the particle is moving, the time is $\pi d_t/\sqrt{c^2 - v^2}$. The ratios are the same.

Examining the time taken to make a forward and backward circuit in a rest or moving particle is important and appears to involve different expressions. When the particle is at rest, the formulae for oscillation time is the same, $2d/c$. When moving, the forward and backward times are different. Forward, $d/(c-v)$, which takes longer. Backwards, since the back end of the particle is catching up with the returning information or constituents, the time is $d/(c+v)$, shorter than the forward traversal. The total round trip is $d_l(c-v)+d_l(c+v)/(c^2-v^2)$ or $2d_lc/(c^2-v^2)$ which looks and is very different from the convenient expression when the information or constituents are traveling transverse to particle movement.

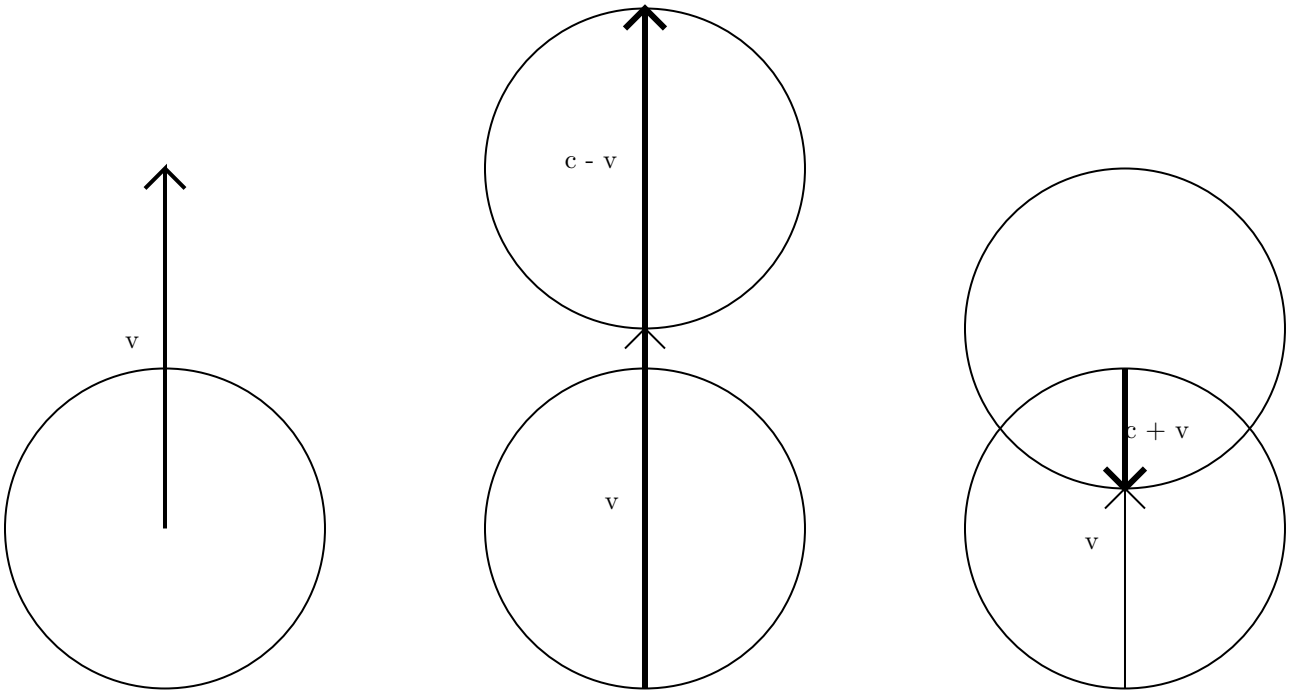
But note that the classic formula for length compression has a factor of $\sqrt{c^2 - v^2}/c$, so if d_l is $d\sqrt{c^2 - v^2}/c$, then the total round trip time is $2d/\sqrt{c^2 - v^2}$ and the ratio of absolute time taken for an oscillation for moving compared to rest particles is exactly the same as the time to make a round trip perpendicular to the direction of movement: $c/\sqrt{c^2 - v^2}$. The ratio of oscillations or clock ticks is the inverse or $\sqrt{c^2 - v^2}/c$, also the same ratio as with oscillation transverse to the direction of movement. As expected, oscillations and clock ticks are slower for the moving particle.

Length compression actually saves the discussion of time slowing with movement, just as it saved discussions of the two way speed of light in absolute frame models early in the development of the *mnp* Model!

IF (and only if) length contraction occurs by the Lorentz or special relativity formulae, then time dilation by the classic formula is seen as real and equal across all diameters and circumferences of the particle.

Status of Length Contraction in the *mnp* and Constituent Models.

The author does not consider the length contraction formula entirely proven within the *mnp* Model to the degree that relativistic mass increase has been proven to be essential for motion. Length contraction has been shown as likely in the *mnp* Model, given that coils must flatten for movement to take place. Since the basic charge entities that are constituents of the *mnp* Model are traveling in coils, on average each coil must flatten so that the axis is no more than $\cos^{-1}(\sqrt{c^2 - v^2}/c)$ from the longitudinal axis. The average longitudinal dimension of those coils must not exceed $\sqrt{c^2 - v^2}/c$. In general, the author feels the coils should have a fairly even distribution from axis parallel to movement to the "maximum" orientation to minimize internal changes of direction, internal rotations, and internal or surface variations in density. This suggests but does not yet prove that the longitudinal dimension of the particle is reduced by a similar factor.



Particle in Motion Path from "Back" of Particle to "Front" Path from "Front" of Particle to "Back"

Figure C.3: Figures 7 to 9) Longitudinal Oscillation, v >0

Length compression seems to be real in Constituent Models, but the author feels that the exact value for length compression needs at some point to be proved. A few embryonic thoughts toward proving length compression in the Constituent Model follow. The constituents traveling at c that make up particles must be curving in some fashion, so that the particle remains more or less a unit. The "surface" of the particle does not disintegrate with movement.

Embryonic Thoughts Regarding Particle Shape and Movement

The forward surface will remain intact, so that the range of velocities/directions in a dV portion near the front surface will have a limit on the directions available. In like manner, a dV portion of the back surface will limit the directions to NOT backward from that surface. Integration across that surface may show that the surface itself needs to change from a perfect sphere?? The particle will remain intact, perhaps the surface will remain smooth, though this may be an over simplification.

Developmental thoughts: At the perimeter transverse to movement, constituents cannot be traveling forward at c in direction of moving, but must be skewed to side so that forward progress is less than or equal to [remember rest condition, where it can move forward at c as long as the curvature keeps the constituent within the particle. Actually, must be tangent?? and curving in. Can be a maximum of v forward or less. Or actually exactly v forward if I allow no oscillation of the shape at all. No, just have to travel forward and away from the edge faster than being caught up with, since v 0 can be any direction as long as curvature radius less than or equal to radius of particle. At high speeds, must pull back from the surface if going backward-ish faster than particle surface is catching up.. Back from the edge, can be different. Could this lead to a curvature that represents an ellipse?? A diagram will clarify, for the author as well:

This diagram shows four extreme points - the center front, center back, and two of the lateral midpoints. At the front, forward progress for the constituent must be strictly less than v, at the rear strictly more than v, and at the lateral midpoints strictly more than 0 and less than c. Within, perhaps, some variation that does not affect the integrity of the particle. On further thought, if the particle is not moving at all, the lateral midpoints may be moving at c in any direction, as long as they are curving inward. So the limits on forward or backward progress at the lateral circumference may be more like $\sqrt{c^2 - v^2}$ and curving inward.

Actually, must be tangent?? and curving in. Can be a maximum of v forward or less. Or actually exactly v forward if I allow no oscillation of the shape at all. No, just have to travel forward and away from the edge faster than being caught up with, since v 0 can be any direction as long as the curvature radius is less than or equal to radius of particle. At high

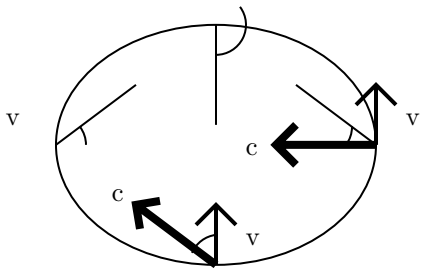


Figure C.4: Figure 10) Constituent Travel at "Surface" of Particle

speeds, must pull back from the surface if going backward-ish faster than particle surface is catching up.. Back from the edge, can be different. Could this lead to a curvature that represents an ellipse??

The particle should remain symmetrical around the axis of movement (since it continues in that direction), the momentum will be consistent radially around that axis.

Acceleration must average 0 at all times for a stationary or non-accelerating particle, so the third derivative and above will also be 0. That acceleration averaging 0 would applies in all planes and axes of symmetry.

The more plausible rules the better, to limit the freedom internally. Acceleration may be limited compared to momentum/ mass, which would limit the radius of turning.

At a given point within the particle, the direction amount is a 3d tensor, the magnitude in any direction representing how much constituent is going each way. At the surface, there are of course limits. If we assume no effect on each other, the change through time can be whatever it is. The integral over 3 dimensions of mv will give total mv. Change over time of the tensors should be radially symmetrical about the line of movement. Change over time at any point on the surface should be the velocity of movement. Conditions of continuity might apply, for example, a minimum radius of change might prove useful or necessary for the modeling.

Rotation within the particle around the axis of movement is not expected, but "no rotation" would be better emerging from the math than needing to be imposed.

Consistent density throughout the particle or across the surface would be better emerging from the math than needing to be imposed. Would it be provable??

Conclusion

Time dilation is explained in the Constituent and *mnp* Models. Length contraction with movement is demonstrated in both Models. However, since a fully convincing proof of time dilation relies on length contraction, the formula for time dilation remains unproved until the formula for length contraction is proved.

Footnotes:

1) Both *mnp* and Constituent Models are absolute frame models, so some readers may need to suspend disbelief for a while. The lack of time dilation with physical acceleration, as shown by the muon storage experiment, and the absence of Twin Paradox from the GPS satellite system may make such suspension a little easier.

2) Insuring that travel applies to basic entities and constituents and that movement and moving applies to particles, so that clarity of reference is maintained, has proved surprisingly difficult. The words were almost randomly distributed in the early drafts of this post. So information should spread. NB 2022-01-30: the *mnp* Model no longer uses the term "propagate" for in-Model phenomena, to maintain clarity.

Charge/Time CT Symmetry Emerges - Post 38 (2018-11-03)

mnp : Model Negative on Parity

The *mnp* Model, a model of everything based on three tiny basic entities with two types of interaction, happens to demonstrate charge/time symmetry in the first and probably second order. This is considered an interesting accident by the author,

Like mass, rest mass and relativistic mass, CT symmetry just emerges from the interactions of the basic entities that comprise the Model. For those who just wandered in to the discussion of the *mnp* Model, this may be far as you want to venture into the explanation. The author remains assured that "no one is thinking like this," so this short note will remain a very abstract abstract to most readers.

In the *mnp* Model, the three basic entities, *m*, *n*, and *p*, are very small and have a very small range of influence. The mediators, *m*'s, have a travel direction and an axis related to polarization/charge perpendicular to that travel direction. The basic entities of negative charge, *n*'s, have a travel direction and the axis is oriented to the reverse of travel direction. The basic entities of positive charge have a travel direction and the axis of polarity/charge is the same as travel direction. All entities are seen as traveling at c. If time were to be reversed, the axes would be unchanged. The direction of travel for all the basic entities would be reversed.

The two interactions of the entities can be summarized quickly, even if understanding the ramifications of such simple interactions is an ongoing project and is still being developed. The Travel effect is the attempt by basic entities to travel in the same direction or in the opposite direction. Entities traveling at 90 degrees to each other have no effect on each others travel direction. The Axis effect is the attempt by basic entities to have their axes line up exactly. At 90 degrees, the axes of two entities would still try to align, eventually at the average of their axes. At 180 degrees, the effect of Axis alignment is negligible.

With time reversal and hence travel direction reversed, mediators, *m*'s, would still behave like mediators, since the polarity/charge axis remains perpendicular to the new travel direction. Negative and Positive switch roles, so what was a *p* now has a polarity/charge axis the reverse of travel and the *n*'s now have an axis pointing the same direction as travel. The Travel effect, the attraction between basic entities to travel in the same or in opposite directions, is the basis of gravity, the cohesion of the 1/6th of charge in quarks and most of the cohesion of the 1/6th of charge in electrons and positrons, the attraction of mediators to contribute to mass in moving particles and to the actively moving 1/6ths of charge in the quarks making up nucleons. So the mediators are seen as the basic entities that play many of the roles assigned by modern physics: gravitons, fhotons, neutrinos, the extra mass of quarks compared to electrons and positrons, gluons attracted by the quarks as they fight over each others charge structure, the extra mass in muons, taus, and the larger quarks, the additions to mass called relativistic, and most of the energy in gamma rays.

The Travel effect in the *mnp* Model is bidirectional, so a reversal of time with a reversal of travel direction leaves the attractions of basic entities to travel in the same or opposite directions intact. Gravity is unchanged. At the fhoton level, electromagnetism and light are unchanged except for traveling in an "opposite" direction. The Axis effect is NOT bidirectional. Axes try to line up exactly, so that two basic entities with axes in any different direction (except 180 degrees difference) will attempt to align their axes. What had been *p*'s now have their axis anti-parallel to travel (as the *n*'s did in the time forward universe) and *n*'s now have their axis parallel to travel (as the *p*'s did in the time non-reversed universe). If the thought experiment were applied to an atom, the former electron shells would be positron shells and the nucleus would now be made up of anti-quark, behaving as we might expect atoms to behave but with opposite charges.

Whether the *mnp* Model contains within itself the root to subtle time non-symmetry that would chase differences in decay times for kaons and anti-kaons as seen at CERN in 1993 is not an issue at present. Tweaking the *mnp* Model to accommodate one experimental result is currently (no pun intended) not attractive. The *mnp* Model has far more difficult experiments to explain, like magnetism.

Conclusion

The author sees the CT symmetry thought experiment as interesting. Since the *mnp* Model intends to provide mechanism and explanation for all experiments, it may be an entrant in the "first to explain CT symmetry" race. Yuck. Because the *mnp* Model posits a one way direction to time, the movement of ALL the constituents occurring at c, and an abject physicality at the level of the basic entities, with measured space being a result of interaction between particles and gravitons, he sees this thought experiment as not very convincing. But the possibility that the *mnp* Model will be a gauge model for other theories someday has not been precluded, and mathematical conveniences like time reversal in quantum electrodynamics and quantum field theory are at least not prohibited.

Notes

This consideration of CT symmetry is inspired by Martin Gardner's *The New Ambidextrous Universe*, Dover 2005 with a new preface and new notes for the reprinted 1990 3rd edition. The history of the loss of parity (P) symmetry in "weak" interactions from the later 1950's prompts the author to shrug with an "of course." Spin in the *mnp* Model is the result of the geometrical structure of fermions, with six quantized loops in a strand, coiled. The imbalance of the coiling of

the closed loops leads to spins of 1/2 and the loss to two coils to absorb energy and the gaining of two coils to release a quantum of energy changes the sign of the spin (or increases the magnitude by 1). Fhotons and neutrinos are not seen as containing any spin themselves, but of causing its appearance in electron shells and nucleons when energy is absorbed or released. So from the *mnp* Model's point of view, P conservation should not be expected in "weak" interactions. The author sees no way to rescue parity and put it back into a symmetry relation. On the other hand, CT is symmetrical. Just not realistic.

Good writers in the field tell me that writing about physics to be understood by the lay person is terribly hard. Staying true to the science in its details is impossible. Yet Martin Gardner consistently created readable, understandable explanations of various phenomena, both mathematical and physical. He seems to have had unparalleled access to scientists and mathematicians and an unparalleled access to quotes from those inside and outside his fields of investigation. Rather a Forrest Gump of science popularizers. Miss you, Gardner, but I also have benefited from many who have you as a model to emulate and to which to aspire.

Humor

Perhaps some will find an explanation of "Why CT Symmetry?" engauging. A singular thought.

The First Lecture - Post 37 (2018-05-05)

Constituent Models and the *mnp* Model
The First Lecture
Transcript and Notes of the Not Yet Given

An introduction to Constituent Models or the *mnp* Model can be very short to very long. Here are a few, from 4 seconds to 40 minutes.

Table of Contents

Elevator Speech: (30 seconds)

Imagine the speed of light is a speed limit because everything in the universe is made up of tiny constituents moving at c. I suggest this leads to another picture of spin, chirality, and the interaction of gravity with particles, makes quantum

mechanics approachable and understandable, and just might inspire new thinking. Sound like fun? (24 seconds) Stay tuned. Or at least tune in occasionally.

Personal Introduction: (15 seconds)

Me? I want to do something useful. I am not ready to retire. I would like to stimulate the educational economy

by going back to graduate school. Then I'd like to contribute and to teach. Physics.

The Egg Timer Speech: (3 minutes)

Here's a thought experiment: if everything is made up of stuff/constituents moving at c, the minimum number of types of constituent is three and the minimum number of interactions between constituents is two. Mass and energy become emergent concepts. From that simple basis, a great deal of complexity also emerges, but very little extra complexity. (35 seconds)

Particles gain mass as they move faster. The charge structure of particles is six quantized loops, stranded, in a huge odd number of tight coils. Removing two coils changes the angular momentum stored in the particle by the Planck constant. Electrons do not rotate in shells; coiled closed six-stranded loops with constituents moving at c change shell when coil pairs straighten out, so electrons appear not at an orbiting point but all around the nucleus. (33 seconds)

The time for particle rearrangement 1e-8 seconds represents the length of the loops, which trade places when particles rearrange in "weak" interactions. The three quarks in a proton or neutron attempt to rearrange their charge structure but cannot complete to process due to competition between the matching quarks. The generations of elementary particles gets rearranged; strange and another share the same family as down. (40 seconds)

A single type of mediator has charge information perpendicular to travel. Polarized collections of mediators make fhotons. Unpolarized collections make neutrinos, and gamma rays consist of neutrinos and or fhotons plus the unstranded charge structure loops of the annihilated particles. Mediators traveling perpendicular to the surface of the charge, with charge information pointing the opposite of the charge, form electro-static fields. Gravity is mediators of random charge information moving away from or toward the mass. Magnetism is mediators traveling at all directions in a plane, with charge information pointing in the plane. Particles recruit fields. Diffraction and diffusion arise from redirection of photons by coils of electrons influenced by the fields from previous photons. (64 seconds)

The Egg Timer speech should be followed by Predictions.

Predictions: (38 seconds)

Cobalt 60 decay would show a preference for right-handed chirality if it were rotating counter to the earth's rotation for a while (as in a centrifuge at the pole or a plane flying west near the poles. Careful laser tests across the sun will show that lasers must be aimed more away from the sun than we currently expect. Having a photon travel across a diffusion or diffraction experiment will tend to randomize diffraction/diffusion results.

Lunacy: (29 seconds)

Crazy is doing the same thing expecting a different result. Physicists aren't crazy. But we have been thinking more or less the same way, expecting a Theory of Everything to emerge. Maybe the unification of gravity and quantum mechanics requires thinking at a different scale, with energies AND dimensions smaller than Planck units. (24 seconds) Let's see what craziness THAT unfolds.

Probabilities: (22 seconds)

What are the chances of something interesting coming out of today, this 24 hours? Zero? Vanishingly small? Just very very small? What are the chances of something interesting coming out of our discussion today. Somewhat smaller, eh? Well, if I prove nothing else, I hope to prove THAT wrong.

Why would a thought experiment call the objects of its discussion figments?

Desperate Attempt to Cram Everything Into an Introduction to a Model of Everything (60 seconds)

Three space, one forward time dimension, three basic building blocks, 2 interactions, 1 non-interaction. We get c, particles, fields, Lorentz transforms where movement DEPENDS on contraction and dilation of measured time, gravity, time effects of gravity, length changes under gravity (but not as expected), an explanation of anti-matter and its rarity, maybe left handed preference, suggestions for what and where all the dark energy and dark matter are, why galaxy arms are spiral, why bucky balls diffract. We lose spooky action at a distance. And we get a number of unanswered questions. (11 more sec) So if we have a little more time, I suggest we start the way I started, asking: What is the bedrock of physics? I propose c, h, and backwards E ∃.

So let's start over with The First Talk, a forty minute introduction to a Model that will certainly not change the world or the world of physics. This year.

Introduction to Constituent Models, With Occasional Reference to a Specific Structural Model (40 Minutes)

Thank you for inviting me/reading my blog today. I'm hoping we can have some fun here.

Perhaps by seeing a completely different way to think. Or by seeing where that thinking could lead. Or maybe by realizing the ridiculous places that thinking leads. Maybe just by seeing someone else make a fool of himself trying to invent and explain too much at once. Maybe you will find subtitles like "Toward a Theory of Everything" humorous in themselves. What's the point of listening to the joke when the punch line is the second part of the title? Which is why I didn't put it there. Is calling our destination a MOE or Model of Everything any funnier?

I have no illusions, in fact no intention today of being persuasive. If I AM persuasive, I'm in big trouble for a number of reasons. [Some of the trouble persuasion would lead to? 1 All (four or four thousand) of the dissertations will be written before I get accepted to grad school. 2 David Deutsch points out the the originators of ideas don't understand those ideas, that only the subsequent holders/users of those ideas really know what to do with them]

Let's start by choosing some foundations of physics. First? (pause/drum roll) How about the speed of light c. Next? we exist. This is not an antropic or even carbon centered existence in my mind, but just that we appear to exist in our universe and that physics experiments exist and produce results that can be compared. Our shared experience seems to be quite/fairly consistent, What other foundations would you choose? Well, I'll pick h which seems to show up many places. [Oh, warping of space/time, the structure of space, special relativity... will go over here ... we'll hope to derive or emerge those from a Constituent Model] [e i pi 1 and 0 and -1 are useful mathematically, but do not themselves tell us anything about physics.]

Logo

Figure C.5: Logo - It Exists

If we mispronounce this logo as "Chay" and then think of it as Italian, we get "there is." And some insight into my warped (but definitely slower than c - clearly subluminal) sense of humor. Thank you for noticing subliminal.

I am not going to take you through all my historical development based on these three foundations. I will skip most of the dead ends and most of the specific structural thinking that initiated my developments of the last six and a half years, and will try to present an interesting set of ideas to give you a view of "this kind of thinking."

Language is essentially linear, thought is often non-linear, design MUST be non-linear in that it must account for multiple issues at once. The universe definitely has multiple dimensions. I'd like to expose you to two complementary ways of thinking about models using c, existence, and h as a basis. But until we've built up a quantum of understanding, that

process of understanding might be challenging. I have every confidence that your ability and speed of understanding will exceed my ability and speed of speech. :-)

The topic here is decidedly not physics; there are severely limited abilities to shut up and calculate. I do not want to scare away understanding by mentioning predictions or understanding that derives or arises until after I have presented a basis for thinking, though I want to keep your interest through the introductions.]

If you HAVE to blurt out a concern, I'll put it over here on the board. If I add a smiley face, that will indicate I won't have much of/a complete answer.

Ready? What if the speed of light is such a foundation because everything that is anything is moving at c? Influences, Fields, Energy, even the particles that make up matter? How could matter stay in one place while moving at c? By going in circles in some fashion. I propose that geometry becomes an important branch of mathematics again.

First Look at Particles

Let's look first at particles made up of stuff traveling at c, both stationary and in motion. We could resort to hidden dimensions, but if we don't have to that it will make things simpler.

The generalized formulation I call a Constituent Model. A generalized model lets us treat some interesting issues, and postpone dealing with others. So if all particles/everything is made up of stuff moving at c, movement becomes interesting. At "rest" a particle's constituents move at c, so for a net 0 movement in each direction the total momentum in any direction must be 0. The integral of the momentum squared for the particle constituents will be m^2c^2.

Momentum and Relativistic Momentum

Note to Undergraduates: complex numbers do an extraordinarily good job of describing rotation or movement in a circle with some net effect or result. They are quite useful to calculation of spatial motion compared to internal movement in a particle. The real part of a differential volume is the net movement, the imaginary part is the "circling" movement of that *dVOL*. So if you don't love complex numbers yet, let me say you should. Correction, you WILL love them.

How do we add momentum to stationary particles? If the constituents of the stationary particle do not change, momentum changes perhaps by adding more constituents moving at c. Moving particles do not gain charge, so the additions must be constituents without charge. Note we are using ∃ (∃xistence aka ∃xperiment) as the basis for this conclusion.

Hidden Dimensions Not Needed

What if the charge constituents have a minimum radius at which they can change direction or rotate? A tiny radius would be hard to see. I suggest this may obviate the need for hidden spatial dimensions that string theory seems to want. That same tiny radius would be involved in ALL matter and involved whenever photons are generated or absorbed, so measuring anything smaller would be difficult. A wavelength shorter than twice that radius would be impossible to generate or even to measure.

That tiny radius may lead to a maximum angular momentum for the constituents at rest, with the Planck constant related to an increase in the radius of circling by an decrease in the count of "circles" made by the constituents. Your first hint that h has units of angular momentum for a reason.

The quantum mechanics concept of a location measurement would simply be a location at which the circling constituents happen to be measured or averaged or appear to be localized around a given time; the constituents would continue to travel at c, and depending on the measurement might be no more localized after than before the measurement.

Charge Constituent Proportions

An electron contains a fixed amount of charge material. So do positrons and, apparently, quarks. Charge seems to come in weird quantized amounts, -1 -2/3, -1/3, 1/3, 2/3, and 1. What could produce that? Ah, elementary fractions. Six sixths added and subtracted would combine that way. If that charge materials comes in sixths, so that six quantized portions of negative makes an electron, six portions of positive make a positron, then different combinations of negative and positive can form exactly the charges we see in quarks. And no (well one) others. Clearly the sixths themselves would not be divisible. Here we are using ∃ - both for what we see ∃xperimentally and what we DON'T see ∃xperimentally. You'd think models that posit 1/6th indivisible charges are hexed.

Electrons Don't Orbit

Electrons in a "shell" would not be orbiting but the constituents would be moving at c, actually forming a shell though not fixed in a single pattern. Leading to no limit on the number of shells electrons could adapt. The "circling" constituents would actually form something approximately like a shell. The Psi function of an electron would not be exactly the distribution of constituents, since the constituents would not extend to infinity, but a weighted probability of where constituents might be found, again with certain dimensional limits.

Particle collisions and annihilations conserve charge material and non-charge consituents. Whether muons can decay to 2 electrons and one positron from materials in the muon itself is seen as doubtful; extra charge material would lead to decay giving off gamma rays as ionizing as electron/positron annihilation. I suspect that charge material must be present near the specific collision or decay to allow such a rare result, as it would usually be in a collider. I might expect results to vary with ∃xperiment design or particle/collision density.

Black holes can be seen as recruiting gravitons which then travel away from the black hole at, you guessed it, c. Neutrinos could transit black holes. The constituents inside black holes still move at c, so no singularity would exist inside. The 1/6 charge constituents might remain, but the particles ripped apart on entrance to the black hole might or might not re-form. If/since they do not reform in a black hole, fhotons would not be generated. Black holes conserve charge material and non-charge constituents and momentum and angular momentum. Not necessarily particle count. Or Spin. Or Chirality. Or Strangeness. Or Tauness.

Gravity As A Field

General Relativity, except for the lack of time dilation due to physical acceleration, has been a useful theory, but I'd like to examine how gravity might work if it is made up of constituents moving at c. Clearly, the constituents cannot speed up or slow down in our c based model.

Gravitational fields cannot be generated by mass in a Constituent Model; the field must be recruited from some potential constituents. These constituents must be available, so it appears that constituents of gravitational fields should attract each other to travel along the same direction. Gravitons in a simple model can only attract along their length, they have no moment arm or ability to exert torque in themselves. When constituents recruited by neighboring masses encounter each other, it seems that they should to a degree attract each other to retrace the influencing or oncoming graviton's path, to be recruited by the other mass in turn. Gravitons recruited and traveling from a single mass would be random enough not to clump together, since they are diverging fairly uniformly. Gravity becomes a two-way, historical process based on where a mass is now and where the rest of the universe was when it sent out the gravitons. Acceleration of masses is a complicated effect on the circling constituents of the mass, leading to a net imbalance of constituent movement based on the divergence of the gravitons [Drawing needed.]

Based on constituents attracting each other based on their direction of travel, let me introduce another concept, related to deBroglie wavelength. I suggest deBroglie wavelength is a somewhat meaningful dimension and represents the way the random non-charge constituents respond to the passage of matter, neutrinos, and yes, even fhotons. Not quite the "real" status of matter-waves in deBroglie-Bohm theory, nor a "internal periodic movement" nor a pilot wave that guides the particle, but a real side effect of the movement of the particle. However, the nearly instantaneous response of the random constituents and the continuous movement of the particle mean that a wave is a subtle reorientation of the random field potential, slightly more axial to the line of travel but with no change in the random symmetry forward or backward along the line of travel and with no change in axial distribution looking along the line of travel. [Drawing needed.]

Beyond gravity, fields get complicated in a Constituent Model and discussion the constituents themselves will be fruitful.

Let me mention that generalized Constituent Model discussed here took me an embarrassing number of months before I even started on it. Some of the generalizations mentioned here come from a basis that took me an embarrassing number of minutes to formulate and an embarrassing number of years to get to its currently incomplete stage.

So let's step back and look more at constituents. This will help in discussing fields, electron shell changes, and quark interaction.

Number of Constituent Types

Consider a minimum number of types of constituent/"stuff?" It seems that negative charge and positive charge differ. No, that's not one type with a different attribute. Different sign makes them different constituents, since they behaves differently. Then there is everything else: non charge constituents, energy, fields, gravitational fields, gluons. So there

must be at least 3 different constituents of a c based constituent model. Might we only need three types? I hope. Maybe. Though possibly more.

Parameters of Constituent Interaction

How do the constituents interact? Charge material and those constituents form "everything else" that provide mass and allow movement of particles do not significantly interfere with the constituents on the other side of "circling," which suggests that the influences may be acting only over short distances or attentuate very quickly with distance.

The influences that keep the charge constituents of matter going in circles but allow neutrinos to travel in essentially straight lines would need to operate over short distances or attentuate quickly over spatial dimensions [travel plus a skewed influence one way - awkward]

Constituents do not collide and may cross paths with other constituents, though they may not overlap indefinitely.

Neutrinos travel in straight lines unless influenced by the presence of mass, so must be made of non-charge constituents. Neutrinos have no electrical polarity, so must be non-polar non-charge constituents or random polarity-bearing non-charge constituents. Careful and expensive ∃xperiments allowing neutrinos to pass through long asymmetrical magnetic fields, then travel a distance through a vacuum, then be trapped (or not) by a piece of paper or reflected (or not) by a mirror would indicate whether neutrinos can be converted to light.

I've spoken as much as I can while dealing with constituent generalities.

To continue talking about fields, quark interaction, Casimir effects, requires further development of constituent properties. And at this point, we reach a watershed. Such detail currently requires that I veer into a specific Constituent Model that has occupied much of my free time and mind share over the last six years.

Constituent Influences

I've mentioned gravity constituents attracting each other to travel more along their paths, either forward or backward, with no other influence/torque/spin/hidden effects. Field constituents could do anything, but I'm searching for simplicity of understanding as well as action.

What other kinds of influences could be involved? Not what is possible, but what minimal set is required.

So lets see if c and short distances can explain fields, since if we allow long distance influences we need to explain THOSE based on everything that is anything moving at c. [Yes, we will get to spooky action at a distance]

Charge or polarity seems to be essential to a model. By ∃ (∃xperience/∃xperiment) From the *mnp* Model investigations, let me offer a spoiler. It seems that "charge information" or "polarity information" seems to work if positive constituents have charge information pointing along the direction of travel, negative constituents have charge information pointing opposite the direction of travel, if non-charge constituents have "charge" or "polarity" information different from positive and negative directions. Perpendicular to the direction of travel is as far as we can get from axially, and if like polarity attracts and opposite polarity repels. So polarity is a directional effect that attracts and repels, rather than the bidirectional attraction that is the basis of gravity. For non-charge constituents, attracting and repelling may affect primarily or initially the charge/polarity direction rather than the direction of travel. Or not. If the deBroglie wavelength of a fhoton is the same as the electro-magnetic wavelength, then direction of travel is affected at the same time as polarity direction.

Since quarks exist, with fractional but quantized charge, the opposite charge constituents must repel each other less than the fellow traveling effect, which is what keeps them together. So the constituent effect that leads to gravity looks to be stronger than charge effects!

Fields - Electrostatic

Charge information must be separate from gravitational information. Either charge field constituents are different from gravitational constituents, increasing our number of basic constituents by at least 2, OR we can draw electro-static fields using the proposed non-charge constituent model with polarity information perpendicular to travel. It looks strange; the spread at c direction is perpendicular to the line toward the charge! Further, the polarity information is opposite of the charge. Recruitment of non-charge field constituents into that geometry requires a "surface," not a point, and details of what that "surface" is doing would be a distraction right now.

tangential to surface/sphere- can show field.

Fields - Magnetic

Charge information - can show field. How field gets that way easy to show.

How moving matter responds to fields requires digging into the *mnp* Model. The forward component of charge constituent movement is involved in creating and responding to magnetic fields. *** The forward component of all constituents would skew the created gravitational field and affect the response to gravitational fields. *** (And I'm not entirely comfortable with my explanation right now!)

Fields - Electro-Magnetic

One of the difficulties with all constituents moving at c is that Maxwell's equations need to be descriptive of light rather than causative. The fhoton passing generates changing electrical and magnetic fields if enough mediator constituents are present, but those mediators and fields are not needed for fhotons or neutrinos to travel in deep space.

End with number of types of matter

I'll talk soon about a specific constituent Model, the *mnp* Model, but

so eventually I will skip ahead to a basis that took me an embarrassing number of minutes to formulate. But first, a generalization that took an embarrassing number of months before I even started on it.

The black typography is the first draft of an introductory talk. The gray text is notes, optional inclusions, comments, and distractions.

Of course, other standard measures can be seen as emergent properties in simple systems. For example, three dimensional space can be seen as emergent in Constituent Models. With Minkowski time and all constituents moving at c, dimension is "created" by the movement of the constituents. Three seems to be the minimum number of spatial dimensions that are interesting.

Before I run out of time, I want to mention that much of this Constituent Model arose first in a specific, more structural model called the *mnp* Model, where the 1/6 charge constituents actually form a loop, which strand with five other constituent loops to form a lepton (electron, positron, or quark). The strands coil quite tightly; not so tightly when mixed charges form quarks, so that the coils are able to attract more non-charge constituents and the lepton has a higher mass. This model meets one of the criterion for the electron, specifically; electrons and muons have been looked at quite closely by ∃xperiment and do not seem to have any measureable internal structure. They are essentially uniform throughout. So by ∃, our model should (and the *mnp* Model does) reflect that measured uniformity.

Mass - An Emergent Property

So for the Constituent Model, we used a concept of mass. Using a specific structural model, the *mnp* Model, let me show how mass is an emergent concept rather than a fundamental one.

The basis of the *mnp* Model has evolved into tiny basic entities of 3 types, with 2 interactions, and 1 effect of non-interaction. The basic entities can pass through each other, they only attract and repel, and do not bounce. If the constituents are tiny, numerable, with fixed dimensions of interaction, fixed amount of interaction, and fixed amount of influence that can be received, then "mass" is just a placeholder concept for "how much is there that can be influenced or that can influence." So in a = F/m, the m just represents how much there is there. The author posits that "how much is there that can be influenced" is the same as "how much is there that can influence."

Quick Intro to the *mnp* Model

I'd like to introduce the names I've chosen to avoid conflict with existing nomenclature. No more phrases like basic entities and constituents. We'll call the basic entities figments. Three types: *n*'s are negative charge, *p*'s are positive charge, *m*'s are the mediators whose "charge" information is perpendicular to their direction of travel. *n*'s have "charge" information in the opposite to their direction of travel. *p*'s have "charge" information parallel to their direction of travel. I call that "charge" information Axis. I call the travel direction Travel, and those two names are the basis for the two effects. Figments (in our thought ∃xperiment) attact by direction of Travel and both attract and repel by direction of Axis, over short distances. Figments can go "through" each other's region of influence. If figments happen to be traveling the same direction and essentially coincide, one of them is not influenced (or influences are essentially random?) so that it continues to travel in a straight line. Oh, did I mention that all travel at c. Oh, did I mention that since space and

time and particles are assumed NOT to have PhDs in Physics. The figments will, I hope, behave in manners from which time dilation and length contraction emerge. You are welcome to join my grandmother in a signature "Ha."

Mass emerges as the description and mathematical description of what embodies influence and what responds to influence. An electron has charge based on how many negative figments, n's, are in it. Those figments can each have a maximum effect on other figments and can absorb a similar amount of effect in a given time. The ability to influence, to be influenced, and to resist influence is based on the number of figments and their configuration, whether they are circling in particles or traveling freely at c as fhotons, neutrinos, field potential, or fields. Rest mass is just the resistance of particles to change, the m in a = F/m.

Maybe I have time to mention some of the advantages of the stranded/coiled/six loop model for Dirac fermions. Then maybe I don't.

Do we have time or interest for a discussion of my early struggles and failures?

Early Struggles

Gravity sends information only with no energy or mass? Then where does the energy and mass come from for the acceleration when space "informs" mass where to move and mass "informs" space how to shape? The effect of gravity seems not to diminish over long periods of time. If mass recruits its gravitational messengers rather than sending them, then it must have something to recruit. If the messengers just keep going until they encounter mass or the surface of a mass, very few of the messengers will be returned (in a finite but large distribution of mass) so there would be fewer messengers over billions of years. What if the messengers recruit oncoming messengers back toward a mass? How? The simplest model seems to be that the gravitational messengers attract other messengers to align with themselves, even if going the opposite direction. Make that align with each other. Oh, and never repel at any angle.

Model Failures - Early Attempts

Matter consists of constituents that circle in some fashion. Rings would be simple. If the ring moves by redirecting the circular motion to include a component perpendicular to the plane of the ring, the forward motion is v, the motion remaining around the circle is $\sqrt(1 - v^2/c^2)$, the effort to deflect the constituents in the ring can be seen as related to the cosine of the deflection, which at low speeds approximates to the first term of the Taylor series, $v^2/2$. Look, we have time dilation on movement as well as a hint of kinetic energy. Are neutrinos single rings? Particles jointly attracting rings? If attracting rings then flatten as they move, with progress around the rings slowed by γ, we might even get length contraction.

But with that early promise, a number of problems emerge. We need constant angular rotation for the effects to hold. Rings wouldn't want to flatten and might not stay that way. Rings wouldn't hang together. Rings wouldn't move well Well, it took me an embarrassing number of days to realize that mutually attracting rings cannot move and would be hard to quantize. I admitted all that, then realized I was thinking like an architect in 2 or 2.5 dimensions. I still do.

Coils WOULD hang together. A loop could be posited to be fixed length and hence quantized and would remain consistent, especially if the attracting effects were the strongest effects around. Coiled loops. Some consider that objectionable, but ∃xperiment suggests the electron mass and charge seems to be fixed. Not many object to THAT. Movement, when a ring is moving along its axis, is very easy to picture. Coils are more difficult. Which is part of the motivation for a more general Constituent Model - we sweep some of the problems under the rug with a mathematical model. Uh, maybe I'm not alone in that.

When all orientations of specific coils are possible, picturing movement requires change in the random orientation of coils. An investigation of movement using a "constituent" model where the particle is modeled mathematically as mass moving at c shows mass increase consistent with special relativity. Time dilation and length contraction do not emerge as clearly.

The persistent bad news: a c based constituent model of any kind requires that we work with a Minkowski coordinate system and then account for why various effects (but not ALL) occur.

The two way speed of light is consistent with a constituent model, though the one way speed in a moving frame will differ.

Excitement and Disappointment During *mnp* Model Development

A couple of opportunities to explain ∃xperiment got away during the development of the *mnp* Model.

Pioneer's excess deceleration looked like a good example of gravitational fields remaining attracted to each other beyond limits where gravitons would cease to "see" each other. That deceleration is seen as thermal radiation aka recoil force. Though the integrity of galactic arms still calls for explanation.

Neutrinos still travel at c, now that the timers have been calibrated. So the possibility of neurtinos recruiting at their leading edge is no longer needed. Though neutrinos are still seen as recruiting as a function of their size and the amount of mass, hence as the square of the mass traversed. Neutrinos are seen as calving and losing mass as well.

So how am I doing? In 2006

Lee Smolin listed "Five Great Problems in Theoretical Physics"

1 quantum gravity - combine

2 foundations of quantum mechanics

3 unify particles and forces

4 tuning - why values of free constants

5 dark matter and energy.

Did I touch on each of these? Maybe not explicitly. Some of these? Do we see any hope here? Well, I hope I haven't been TOO persuasive, but you might understand why I'm still interested in physics.

Conclusion

I hope I've been clear enough in presenting a different way of thinking. The important ideas, if any, are:

All constituents move at c.

Matter has charge material "circling" and must add mediators to move.

Matter recruits and shapes fields from available mediator/constituents.

"Fields" result from imbalances in the random potential of the available mediator/constituents.

Matter responds to the imbalances that form "fields."

Matter must absorb or release enough mediators to change the internal angular momentum by h when changing shape or shell.

Polarized mediators traveling together form fhotons. Unpolarized mediators traveling together form neutrinos.

But:

Constituent Models cannot calculate much yet.

Constituent Models have serious challenges in explaining diffusion, diffraction, how gravity actually works.

Constituent Models' explanations for the two way speed of light sound rather like a conspiracy of light, a challenge all "preferred frame" models share.

The *mnp* Model seems to challenge almost everything; the Standard Model particle heirarchy, the nature of the Higgs, name it.

Heresies

The author entertains further heresies, not out of orneriness, but because they seem to arise from the *mnp* Model. Since each heresy is a barrier to acceptance, the author is also burdened by these and their corollaries. If shown as part of a slide supported presentation, these would be on ONE slide, with type small enough so all fit.

Fhotons are bundles of polarized mediators, so they might red shift on their own as they pass anything.

Gravitational "locking" may account for galactic dynamics, obviating the need for dark matter. Yet the *mnp* Model provides a few pictures of matter that would be dark.

Can fhoton energy loss explain the "expanding universe?"

Gravity is messy complicated, two way, reinforcing at the extremes.

Neutrinos are quantized only in the creation and detection, but recruit in proportion to their mass/energy and the "linear" density of the mass they pass through.

Gravity waves from colliding black holes are mostly neutrinos sent from matter pulled apart in the collision.

Spin is a physical property of matter, not of fhotons or neutrinos. W+, W-, and Z are virtual but z is the equivalent of quarks but with 3/6 of each charge and hence electrically neutral. A neutron must encounter a z or the equivalent to decay to an electron and a proton. Two z's encountering each other may create an electron and a positron.

Antimatter didn't disappear in the early universe. Constituent charge material was recruited differentially to be electrons and protons. Electrons may be slightly better at creating electostatic fields (and magnetic fields?) than positrons, especially at high speeds, and may have been able to escape the soup before the positive material did.

The unity and divisions between electromagnetism, the "weak" interaction, and the "strong" interaction do not lie where they are currently thought to be. Weak interactions are the most powerful in released energy, when charge material is restructured. Strong interactions are a "surface" phenomenon that allow, for example, nuclei to hold together. Since electrostatic fields require some distance to get organized, ES may not even work at some almost measureable dimensions. The author seems to encounter two different definitions of the strong nuclear force. Perhaps he needs to come up with different terms. Electrostatic and magnetic seem fairly safe, electromagnetic waves to refer only to the results of fhoton movement,

The constituent interaction that leads to gravity is the strongest interaction of the basic effects. It is also the interaction that allows the charge constituents of quarks to stay together. It also the effect that allows protons and neutrons to stay together in a nucleus. The electromagnetic fields associated with light and other radiation are results and guides, not causes.

Time never flows backwards; just because we don't measure something until time t doesn't mean that it or its constituents weren't there at t-ϵ

Charge material is neither created nor destroyed, so gamma rays have charge material as well as mediators.

Rest mass is what particles have, mass is what everything has. Do I have to invent or adapt words not used in physics for this difference?

QCD is dead. Long live QCD.

Strange is an ally and relative of down, with a different strand cross section. There is another, shorter lived relative out there in the $\exists$xperimentation.

Black holes do not have singularities at their center, and can partially evaporate by neutrino emission.

The Higgs is a meson of one or more relative(s) of bottom.

The strong nuclear force is a "surface" phenomenon related to the attraction of charge structure to like charge structure (and the tolerance of opposite charge structure to be colinear with charge structure).

Electro static fields depend not on point charge but the surface of the charge (even of a free electron) and the paradoxical reversal of the charge information in the field.

Constituents have a minimum turning radius, so a minimum wavelength exists.

Quantum mechanics is explained neither by the Copenhagen interpretation nor the many-worlds nor the DeBroglie-Bohm nor quantum decoherence nor the realist position nor the agnostic refusal to answer. Wild (or somewhat orderly) coils of quantized loops or charged material behave rather in a Ψ squared fashion. The coils are spread in nearby space.

Measurements are done in labs made of ordinary matter made of ordinary constituents, by ordinary capture of fhotons, by ordinary electrons whose internal angular momentum changes only in a quantized fashion.

Measurements have their limits, as does our knowledge of where the lab is and where it is going. Constituent Models and the *mnp* Model are hidden variable theories, hence highly ontic in a metaphysical sense. Puns about ontic and my own ontics discouraged.

The muon storage ∃xperiment punches a big hole in S pecial Relativity and General Relativity that is not fully appreciated.

Conclusion, Concluded

So, as I mentioned at the beginning, I hope you received a very mixed message. I would very much like to explain my modes of thinking about the foundations of physics. And I would very much like for you to understand those modes of thinking. And I would VERY much like for you to decide that those modes of thinking do not offer enough promise. So I can have this line of inquiry to myself for a while.

Finally, I hope you enjoyed our time together. I did. And I do hope I still have the field to myself.

Oh, I haven't forgotten my non-disclosure agreement, my vow of secrecy. If none of you use these speculations, this meeting never happened. I'm willing to take names or emails for further private conversation. We don't need a pair of fringe models flirting with lunacy out in public.

Afterword

Since this talk hasn't yet been given to a knowledgable audience, the author has no idea if it completes to an empty room, a chorus of raspberries, or a clamor of questions.

Invented or Discovered?

Are the Constituent Models and the *mnp* Model inventions? For now, the answer must be yes. Over the last six and a half years, many of the developments and "coincidences" have felt to the author like discoveries. For now, even those discoveries must be listed as mathematical or geometrical discoveries, since they are not accepted as models of our shared reality of the universe and the shared reality of physics. The author can say at most "in this model, we find..."

Humor

In keeping with the *mnp* blog traditions, attempts at humor are included. Here. So where was the four second introduction?

Four Seconds:

"Oh, you wouldn't like that." With two seconds to spare for audience response.

Shorter (1.4 seconds)

"I'm having fun."

Shortest (1 second)

"Save your time."

Nobody (10 seconds)

I've presented my ideas about physics to a few people. I've been assured "nobody is thinking this way." Hi, I'm nobody.

Hi, I'm nobody.

My Theory of the Electron (80 seconds)

I understand that professional physicists are exposed to a different amateur theory of the electron every day. Well, if it hasn't occurred already, here is your dose for today:

An electron needs to rotate 720 degrees to get back to its initial condition. That's due to its odd number of coils. And the six strands that make a 180 degree rotation in one complete path. The coils can progress right or left, offering spin that allows two electrons to inhabit one shell without interfering with each other. The strand of six loops can rotate left or right, which offers chirality. Oh, and the six loops are (usually) quantized, which offers charge and mass quantization.

There, you don't have to go looking for your daily electron theory today. (5 seconds)

On Realism and Mechanism

Sherlock Holmes tells Watson that when the impossible is eliminated, whatever remains, however unlikely, is the answer. Richard Feynman has one word of advice: "Renormalize." That Arthur Conan Doyle channels Richard Feynman, 61 years in the future, just proves that the search for mechanism is futile.

Many theorists ascribe to a model-dependent realism, some philosophers suggest its all a dream, some philosophers of science accept that the consistency we experience and measure suggest consistent laws, even though we encounter surprises at many different scales of experience and measure and do not yet understand all our measurements. Many physicists have given up on realism if realism must be an understandable, intuitive description of how and why ∃xperiment shows what it does. Some are perfectly happy just measuring what is and figuring out how to measure more phenomena, though the author suggests they often use models to decide the next interesting step.

More Humor

If a Model of Everything is a MOE, where's Curly Larry and Shemp? How weird would that be?

The nutty thing about constituent models and the *mnp* Model are how small the kernels are.

Those who think physics can be explained by a small kernel of ideas are nuts.

People who are paid to work are professionals. People who work for free are volunteers. People who pay to work are scouters. People who pay a lot to sit and do nothing are board members.

Since I'm clearly not in a physics program anywhere, I must be unable to recognize good ideas from bad.

I used to say that the funniest things about race jokes are the people who tell them. If this talk has been somewhat entertaining, maybe the funniest thing about alternate models (or figment theory) is the people who tout them. Anyway, I hope you get some enjoyment or benefit from this (half) hour.

Have I thought of everything? No, I don't know everything known to physics ∃xperiment, so I can't have an explanation for everything. But I'm crazy enough to be willing to try. I have the great good fortune that many young innovators have of not knowing enough to know what I'm trying to do is impossible. That shared property, of course, doesn't make me young. Or necessarily an innovator. Which leads to more pure introspection:

Introspection

I went back to Emergency Medical Technician school to learn something useful that can improve people's health and that allows me to teach young people in the field of health care. I went to story time training to learn something useful about exposing pre-schoolers to the joy of reading. I've taken a lot of training in Scouting to make myself a better teacher of scouts and adult scouters. I'm doing all that to be useful. It's fun. Now I want to do something REALLY fun and learn more physics. Maybe stir up physics. And teach physics. And be useful.

I'm looking for an omega of 1 and a lambda of 0; entrance into a graduate program what won't stifle investigation of Constituent Models completely, but to be ignored enough that I can write my own thesis without having it written for me. Or before me.

I am a concrete kind of guy, which has nothing to do with my architecture degree. Reinforced by a certain amount of steel - but that is a work in progress, too.

I feel confident that I've got something here. Or maybe I've grabbed a tiger by the tail and might not be able to crawl up on its back and hang on until it gets tired.

But just because the author has Constituent Models and the *mnp* Model as tools and wants to see what they can do, not everything may be a nut. Or a nail to be driven home. He might even be wrong, in detail or in the large.

Amateur theoreticians seem to hang on very tightly to the ownership of their theories. As proved by Monty Python's "My Theory" riff. I suppose I should be flattered if someone wants to take some basic ideas and see how far they can run with it. I even suppose I should be flattered if someone wants credit for aspects or thoughts related to Constituent or *mnp* Models. Little chance of THAT!

I call the circling charge material "structure" and consider the *mnp* Model and even Constituent Models to be structural. I know physics sees the mathematics as the structure and reserves sub-structure for the deprecated explanations for things like spin coherence of remote particles. I suppose I will lose that argument, and may even be ex-communicated for it, but can be quoted as maintaining "still, they have structure."

First Paragraphs

Over the years, a number of different approaches to talking about Constituent Models and specific models have been considered by the author. Here, a bit of history.

From 2013-11-03: To introduce the *mnp* Model, one might list the basic principles of our model of the physical world known as physics. 1) The speed of light is constant 2) Variation, jitter, and probability are fundamental/exist and lead to 3) particles and behaviors are discrete and consistent and 4) we and the universe exist. See Realism above.

From 2014-10-20: Is it possible to discover why charge quanta come in thirds, the four momentum works so well, and string theory finds basic stability in ten dimensions? Sherlock Holmes tells Watson that when the impossible is eliminated, whatever remains, however unlikely, is the answer. Richard Feynman (1948) has one word of advice: "Renormalize." That Arthur Conan Doyle channels Richard Feynman, 61 years in the future, proves that the search for mechanism is futile. So where does that leave us? Hoping that hope will triumph over experience? –Pause–

Well, what WOULD we base a new model on?

> C
>
> Existence or ∃xistence as it would be written here.
>
> Things keep their nature but respond to influence.
>
> One image of the centrality of h based on Lewis diagrams:
>
> ```
>  ~ ~
> ~ h ~
> ~   ~
>  ~ ~
> ```

From 2014-10-23: A constituent theory (model actually) may be more amenable to mathematical approach and more acceptable to the community as a starting point for investigation. To quantum (loop) gravity I offer the sequel to preons. Quarks have 6 parts as basic charge constituents, plus glue. Might even be possible to create constituent model math for QCD. Posit that each one sixth part is unified, or can we "dispense with that hypothesis?" Probably not. Yet.

The model contains either 3 or 4 constituents, Negative constituents, positive constituents, and glue that is polarizable. The fourth might be glue that is not polarizable. I am trying to see that gravitational glue as glue with random polarization. May also be able to model Gravity as being related to the direction of the constituents at the surface and the mass, to get fields that skew and make gravity appear instantaneous for where the mass is "now." Will time dilation and length compression arise from constituent theories? If formulated a certain generic way? It would be interesting to have a developed constituent theory and THEN decide if *mnp* is a model that fits the theory.

Criteria For a Successful Model

How would we know when we had a successful model? I suspect that a successful model will not be redundant, that things will not be multiply determined, that there will be few or no types of matter that we haven't seen. And that there may be fewer particles and fields than we have hypothesized. That magnetic monopoles will be impossible. A successful model will be as simple as possible but no simpler.

I also suggest a successful new model probably has to be all or nothing. Maybe not quite all, but enough of all to be interesting and then persuasive. Spoiler - I will NOT be persuasive today. Nor complete.

Rebuttal to Issues That May Come Up

Constituent Models are preferred frame models. Therefore:

Special Relativity: Relativistic mass is a real phenomenon that emerges from the Models. Length change as well as time dilation are seen as emerging. The two way speed of light ∃xperiments are respected, with each direction a different speed. It emerges.

General Relativity: it is the author's hope that something like GR emerges from the Models. That emergence better be good, and as close or closer to ∃xperimental results as GR is. Some variation, especially over particle and universe history, are expected.

By not baking theories into the Models to start, though that approach worked well for String Theory, the author hopes the Models will have few tuning issues and so quicker tests and possible refutations. Talk of confirmation certainly is premature at this point.

Hope there are not TOO many holes.

Post 36 - Constituent Models - Useful Supersets of the *mnp* Model - (2017-06-24)

This longer description of the Constituent Model has been included in the description of the Constituent Model. Page 15

Principles of Movement - Post 35 (2015-10-38)

Abstract

The last year and a half of work and benign neglect on the *mnp* Model has yielded some minor understandings, some major roadblocks, some few conclusions based on those roadblocks, and to the author's continuing dismay, yet more explanations at odds with current models.

An investigation of the annihilation of electrons and positrons offers some understanding of gamma rays, though the suggestions that 3.4K radiation may result is currently not persuasive. The two photons given off by the expiring particles may give clues to the absolute velocities of the particles. A Principle of Equal Effect emerges from the introspection about electron movement and electron shells. The author finally admits that movement by the basic entities in coils requires redirection somewhat more than v/c.

Introduction

The *mnp* Model is an attempt to explain the universe from a small set of first principles. The most fundamental of those principles: that everything is made up of entities moving at c. The goal of the author is to develop and explain the Model. He has no illusions about being persuasive.

No blog posts in a year and a half of collecting ideas, thoughts, and thought fragments means that everything seems new, everything seems old, nothing has been written, and everything has been written. Readers, bots, silicon, and electrons please bear with me.

The Principle of Least Astonishment is a useful design guide. It has worked well for the author in architecture, in architecting computer programs and in documentation. Violations are warranted only when useful or, rarely, dramatic. Unfortunately, no comprehensive model of the universe will avoid astonishing physicists. A model such as *mnp* , that tries to get below the descriptive mathematics so effective in modeling and predicting in modern physics to posit an underlying simplicity, appears guaranteed to astonish even more. The author does suggest that the approach "what would it take for this simplicity to work and to explain" seems to offer promise as well as a tour through the process of natural philosophy.

The geometry of six stranded loops, coiled, that has emerged as the structure of electrons, positrons, and quarks in the *mnp* Model, allows a number of conceptual flexibilities consistent with quantum mechanics and observed reactions and offers a fundamental integration of gravity with the other forces. The electron can spread though not infinitely, can change shape, has a large scale coiling consistent with spin and a smaller scale twisting that may be consistent with chirality, is quantized with respect to charge and mass and energy and shell shape but not velocity. Leptons can be recombined with other leptons into charges of 0, +-1/3, +-2/3, and +-1 but no others. Mass is not a property of the basic entities but emerges from their influence and ability to be influenced.

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Changes From Previous *mnp* Model Conventions and Terminology

Notes for those few regular readers of the *mnp* Model blog: The author is choosing to consider and draw the "Axis" of basic entity *n*'s as opposite to the direction of "Travel" where the basic entity *p*'s that make up positively charged matter have the "Axis" positive with the direction of "Travel." This yields better consistency with the convention that electrons are negatively charged.

The author is looking for good phrases for coil "direction" and for strand twist. Since the coils and strands are made up of basic entities moving at c, coils and strands always have an underlying direction. Coils essentially form a (joined to self) helix. So helix geometry is a useful starting point, though the author specifically disavows the term chirality for coil direction as used for coiled springs and helixes. Spin also is disavowed as useful for talking about coil and strand

geometry and saved for discussions using the traditional mathematical meanings with respect to elementary particle behavior (though the *mnp* Model suggests that spin remains in ALL coordinate systems even after a determination about one axis has been made.) For consistency with helical geometry, coil direction can be right handed (thumb along the axis of direction of progress of the coil, with fingers along the progress of the coil itself) and left handed. Strand twist in like manner can be right handed or left handed, in keeping with rope and wire rope terminology. Terms lay and laid will not be used.

Side note: the "spin" ascribed to photons is only a measure of the effect the photons have on electron shells which by their coiled nature accept photons by uncoiling and hence changing spin. Just in case you, dear reader, were thinking about going along for the ride and hoping to finish a paragraph without controversy.

[Drawings of coiling and twist] [Lay of the rope]

Some basic "*mnp* Model think" will help examining the electron motion, shell, and other properties. Each tiny basic entity will exert (up to) maximum influence on the entities in its region of influence. Each tiny basic entity will receive (up to) the maximum influence on it, meaning that there is a tiny minimum radius for each entity's travel, meaning that there is a minimum radius for the coils of charge material that form the structure of matter. If those coils are larger than the minimum, the coils will influence mediators (or perhaps loose charge material basic entities for short periods of time) to join the coils, increasing their mass but not their charge.

Nascent thought regarding *mnp* Model geometry When two basic entities are "too close" or virtually coincident and traveling the same direction, *mnp* suggests that one of them receives no influence and so may continue straight for a while. When coils interfere too much with reach other, that may lead to lengthening just based on not receiving influence rather than on any "stiffness" heretofore hypothesized. So "stiffness" may just be a geometric result.

Magnetic fields, movement of particles, and the nature of muons has not yielded much to insight.

Electron-positron annihilation, movement, magnetic fields, and the nature of muons are discussed in this post, with few conclusions.

Reference Frames

The *mnp* Model shares with many Theories of Everything the need for a universal or cosmic reference frame. An investigation of that frame and the energies involved in movement will prove useful to a number of the discussions in this blog post.

Earth or satellite labs are rotating around the Earth's axis, around the sun, around the galactic core, may be moving compared to nearby galaxies, and might be moving compared to distant galaxies. This last is presumed to be negligible by modern cosmology. The table of speeds, fraction of the speed of light, and the $v^2/(2c^2)$ first term of the Taylor series of the dilation/compression factor shows how very low the rotation and solar orbit are compared to galactic rotation.

Table C.1: Earth Speeds as a Fraction of c and Corresponding Relativistic Factor

Motion	Speed (km/s)	Fraction of c	Dilation factor
Equatorial speed of Earth's spin	.4562	1.55x10$^-$6	1.2X10$^-$12
Average speed of Rotation around the Sun	29.78	9.9e-5	4.9e-9
Speed of Rotation around galactic core	220	7.3e-4	2.69e-7
Speed toward a galaxy or star in constellation Leo	378	1.24e-3	7.65e-7

Variations due to the speed of Earth's spin at a given spot on Earth is approximately proportional to the (absolute value of the) sin of the latitude. The Earth's rotation around the sun varies by 3.4% from closest to furthest for a relatively circular orbit. Both variations are small compared to galactic rotation.

Galactic rotation is by far the largest speed of the first three Calculations. Using the "co-moving cosmic frame of reference" with the Cosmic Microwave Background calculations seems to "work out". Daily or yearly variations are much less than those that unfold over 150 million years. Apparently current consensus in cosmology is that the galaxies are not rushing away from each other by movement, but by expansion of the underlying space. If movement between galaxies is ignored, there is essentially no variation in speed during galaxy rotation. If movement between galaxies is significant, then large but subtle variations in speed occur over the course of 150 million years and the author would suggest interesting differences in clocks, Earth magnetism, solar activity, climate, and asteroid behavior might result. Diurnal and seasonal variations are seen as insignificant in velocity. Angular momentum should be added to the table; highest will be that due to the Earth's rotation which is seen in the *mnp* Model as leading to particle preference for left handed spin.

Movement in the *mnp* Model

A discussion of movement in the *mnp* Model will provide background for the discussion or energy release from particle collision and annihilation.

A physical model of the twisting that must occur in same length loops is the effort needed to "fold" a round sun shade or baseball backstop into thirds. The flexible but stiff circle becomes 1/3 its size if twisted at the 4 o'clock and 8'o'clock positions. The *mnp* Model does not follow this demonstration exactly; energy as added to uncoil, since the coils are naturally at their smallest and change requires that they expand. Strands can pass through themselves.

The coiled strand structure of electrons provides an easy image of paired uncoiling as the mechanism for electron shell expansion, with h representing the change in coil angular momentum. Plank constant h/2 represents the intrinsic odd number of coils required to complete the loop, though the angular momentum is a reduction in the natural coiling of the constituents moving at c, subtracted rather than being added. The author has been assuming that movement/velocity also requires uncoiling and therefore movement would be quantized. He now considers that a mistake, that movement may involve redirection of the coils and the basic entities in the coils but does not change coil count.

One of the first drawings of the new *mnp* Model showed a ring moving at c in a plane perpendicular to the direction of travel. One of the first successes was seeing the basic entity direction in the ring as offset by v in the direction of travel, with the time required for a basic entity to get back to its original position offset by the particle motion as proportional to $1/\sqrt{1-v^2/c^2}$. The basic entities had $1/\sqrt{1-v^2/c^2}$ less influence on each other and might be available to recruit mediators in that proportion. This suggested that mass would increase for moving rings in a like proportion.

Figure C.6: Basic Entity Travel Around a Ring/Coil at "Low" Particle Velocity - From blog post On Movement

The very early attempt to see the basis for matter as rings that attracted each other did not travel well. Nothing hung together when it moved, hence the coil model.

Modeling movement as coils is simplified to collections of rings at different orientations, with a different perhaps sinusoidal or elliptical distribution of ring orientations. The modeling has not yet been satisfying. The author would like to see, for inertial movement, uniform orientation of the basic entities within the coils leading to inertial movement.

Enumerating the parameters or variations available to coiled loops may be useful.

Coil radius (or effective radius of the curvature of the strand making up the coil) hence number of coils.

More important than the absolute number of coils is the relative number of coils. Uncoiling by two to allow the folding and unfolding needed to keep travel distances the same. pitch of the coils,

Attack of the coils that is the relative "out of line" ness of the basic entities compared to the static coil center line,

Rotation of the coils themselves with respect to the static coil center line, rotation of the filaments in the strand. Variation may allow redirection of the next coil as in turning points in complicated shells.

Coil overlap leading to longer coil circumference due to straight line travel in areas of overlap single filament coil radius may be a little smaller than strand coils, allowing a filament separated from its strand to make a sharper turn or correction

Range of influence of the mediators attracted to strands and filaments; a suggestion of how much leeway strands coils and filaments have before recruited mediators leave the electron. The range of influence might be less than the radius of coil curvature.

Each of the six loops travels exactly the same distance in the time of one complete loop traversal. If not, the filament loops will be changing their relationship with each completion of the loop. Possible, just unattractive as a theory since difficulties of formation and differences between electrons would result.

Basic entities cannot change direction faster than some minimum radius, so variation is only possible above that radius.

Movement: if all angles are constant in each ring/coil then rings with axis parallel to the direction of travel will move quickly to the front of the whole quicker than coils/rings at any other orientation. As of 2017-04-28 0900: Actually, if a constant angle to the coil plane is applied, the particle as a whole MUST be moving slower, since the ring with axis parallel to velocity makes the MOST progress in a cycle.

Rings and coils with axis perpendicular to the line of travel make no forward progress and may be "selected" out of the whole almost entirely. Hence there WILL be differential movement. an electron will not be internally static. In fact, to the author's dismay, it appears that coil movement will be chaotic if the angle of movement is pretty much the same over the entire electron

Nearby coils at differing orientations may have mutual influence so that angles in each ring/coil can vary.

Much of the author's thinking is 2.5 dimensional. That may not be adequate to approach a useful result. Looking at movement issues in three dimensions will be necessary. May need to look at this in three dimensions.

As speed increases, the distribution of ring orientations change. Orientations that lead to basic entities moving backward become increasingly rare. The distribution may be sinusoidal or elliptical or ...

Some orientations with coils in the plane of travel are NOT good candidates for a given velocity, since the forward part of the coil will fall behind within the particle since it cannot travel faster than c. What reorientation is required? and What re-orientation is required to get a proper er sin distribution of the coils?

Could particles move essentially with mostly coils perpendicular to travel with a relatively few "course corrections," almost as a collection of connected columns? This would not behave well for electron shells in moving particles...

Movement - Path to Resolution?

As of 2017-04-28 at 2200 PDT, the author admits to embarrassment at how long he stuck with the v/c inclination of the basic entities in a coil. Since honest application of functional analysis or limit theory would have made it quite clear that a higher inclination is needed at low speeds, the chagrin is warranted though cognitive dissonance theory would suggest such behavior is human. Back from this digression into natural philosophy (the study of how humans organize themselves to experience, experiment, and understand the natural world) to limit checks. Approaching c will allow approaching inclination 90 degrees to the coils, so the math will approach the proper asymptote with all coils approaching perpendicular to travel and all basic entities approaching c in the limit. The author is not ready to concede that the expression for time dilation is not quite $1/\sqrt{1 - v^2/c^2}$ but reserves the right to come to that conclusion.

The author has found no simple geometric change that leads to organized patterns of the coils and is about to conclude that motion involves a somewhat chaotic movement of the coils rather than a smooth pattern that can be drawn. Coils affect adjacent coils as well as themselves, and at present the author is left with the rudiments of what he calls "constituent theory" and relativistic momentum. And the need to calculate. And acceptance that movement and inertia will not be as pretty as hoped.

Electron Movement Symmetry

Do moving electrons need to exhibit radial symmetry around the axis of movement or is quadrant symmetry going and coming enough? Can overall rotation of the electron be ignored? The author suspects regular rotation would be noticed and measurable, so for now the *mnp* Model and constituent models need practically radial symmetry or sector balance in coil geometry.

Mediator Behavior With Coils - Relativistic Mass

An enumeration of the possibilities for mediator behavior with the coils is useful. This list is incomplete.

Trying to catch up
Constant low level replenishment
Unevenness in the unfolding leading to a direction
Evenly distributed along the coil, with the mediators also attracting each other to stay integrated if small variations in coil influence occurs over short distances

Thoughts on Mediators Recruited By Moving Particles

Given the observed relativistic masses, the coils must be attracting mediators.

Could it be n's that are recruited for increased mass...no because the charge would get greater. Or does it in some small proportion?

Movement maintains itself - do the m's drag the n's? Seems to work the same no matter how spread the shell is

In moving does the electron need to replenish or does it truly bind the m's - in truly interstellar or intergalactic space it makes a difference

Travel in deep space is believed to be consistent, so the coils would not be losing mediators unless exposed to a force.

Notes on the Rejection of Quantized Movement

A number of questions lead to the demise of the "movement requires coil count change."

1) Expanding in shells holds much higher energy than some basic single quantum of movement energy; how does losing two coils in each case lead to such different results?

2) What direction do coils progress? Along the axis of the coil, or in the plane of the coil by overlap by which basic entities in the same location with the same direction receive only as much influence as possible in that region, leading one to continue essentially straight through that region. This planar movement seems fraught with variation.

3) Movement maintains itself. How?

4) Movement seems to work the same no matter how spread the shell is. Changing coil counts and evening out the movement would seem to take time and lead to jerky changes in velocity. Ideally the geometry of the change would be spread uniformly across the entire coil.

5) Does the recruitment of mediators (m's) drag in the free basic entities of charge (ns)? with the moving electron? The basic entity mnpitn's are needed for electrostatic fields, but moving electrons do not seem to increase in charge.

6) How and where does coil unwinding on movementalign with or explain Quantum Field Theory - Particles, particle shells, and particle interactions seem to be the focus of QFT shows where I am in understanding and experience with quantum field theory.

7) Might folding in and out lose spin direction?

Electron Shells

Electrons are not point particles that orbit but are coiled loops of basic entities continually moving around the nucleus in the *mnp* Model. The shell can be thought of as an approximate rather than a true surface. The continuous loop of coils is rather like the "powerful dishwashing metal scouring pads" available on-line and at grocery stores. Or a continuous end-joined slinky. Note that the basic entities can cross or go "through" each other.

The net movement of a basic entity across the shell is not at c but at c * pitch divided by 2 π times the radius of the coils of basic entities that provide the structure of the electron. Field effects are mediated /caused by basic entities called m's and perhaps by the basic entities of charge. Field effects may spread across the shell at c.

Thoughts: An electron in "a shell" around a nucleus has as uniform as possible a change in relative positions between basic entities in forming the appearance of a shell for the coil. [To be proven mathematically. That might be fun.] If a change in coil direction and entity orientation in the coil is sharp, mediators are expected to be emitted. In electron shells, that emission would be seen. Side note: in the *mnp* picture that replaces Quantum Chromodynamics, sharp changes in orientation or coil curvature is expected to free basic entities that would then be trapped in the larger nucleon. The "folding in 3-d" should be similar to the Hall Fractional Effect, with each logical folding actually a smooth effect. As with all quantum phenomena, the shell and folds will be probabilistic. The differences in what it takes to actually fold electron shells may lead to subtle differences in the energy of various shell configurations. Ideally, after the *mnp* Model is tuned, the resulting predictions about measured potentials will match experiment. The goal is that the *mnp* Model to NOT be an infinitely tunable system.

Spin is not the twist itself but the twist expressed in coils. Er, I better understand that.

Even if constant angle in coils does not work, the investigation will be useful. Electrostatic field potential from the nucleus as affecting and affecting the complicated shells will also be interesting, though the author is reluctant to see variation in mediator recruitment along the length of the stranded loops. Perhaps constant "angle of attack" with variation in pitch and perhaps radius might produce the shell shapes needed by experimental reality.

Check whether the shell energy translates back to a reasonable angle to basic entity to coil, as if all the energy available when the shell collapses is already in the shell and not nearby and recruit-able with enough time. Determine what pitch is needed with the coils in a shell to meet that energy storage.

Note that the electron in a shell is pushed out by the electrostatic field from the nucleus rather than moving independently on motion. Even from a single proton, the field may be stronger than required to keep the electron out in a shell, as long as the field is not strong enough to push the electron into the second shell.

If an electron is stripped from a shell, it must retain the energy/mass of m's that allow it to move. This seems like it will require careful tuning to separate the m's that take part in shell expansion from those that take part in its velocity

Hall Fractional Effect

Geometry and coiled loops help with possible explanations for the Hall Fractional Effect. The author, of course, would like to minimize the course corrections by the coils as needed to explain the fractional effect. The same issues as with electron shells apply. The author hopes to avoid losing mediators in one portion of the shell and gaining mediators in another unless required by the electrostatic and/or magnetic fields forming the Hall Effect shape. Therefore, kinks in the coils - even if evenly spaced - are deprecated unless the kinks are subtle reorientation or twist or skew of the strand similar to that which may be required in lobed electron shells. Geometry: if the denominator is 2, the electron is essentially planar and the two halves interfere with each other and the magnetic field, which is why Hall Fractional Effect denominators must be greater than two. If the changes in coil and strand direction are minimized, then the denominator may well need to be an integer. If the changes in coil and strand direction can be random, then there is no need for an integer number of divisions and an integer denominator. Experiment seems to rule out random variation.

Note that in the *mnp* Model and any Theory of Everything relying on a universal rest frame, the lab IS moving.

Spin Reversal

The easiest means of reversing the spin of an electron is to turn the electron shell inside out over a nucleus or for an electron to become free and then be captured by a nucleus so that it has a (less than?) 50Would be interesting if the energy to do that reversal were anything related to muon energies.

Casimir Effect

Two uncharged plates in a vacuum, a few nanometers apart, either attract or repulse depending on the physical configuration. The author suggests that the Casimir effect is the surface (but remember that a moving surface of coils is not in an exact location) attraction of electron's coils by alignment of Travel and Axis. At 10nm or 100 atoms the pressure is significant (1 atmosphere) The author has nothing to say about how and when the plates would repulse, though it appears that repulse effects are rare and require liquids or anisotropic electrical materials. Perhaps if the coils in electron shells spend more time moving outward (at an angle) than returning (more perpendicularly) to the surface, the repulsion would occur. Or the coils spend more time moving back after moving outward (more perpendicularly) to the surface.

Principle of Equal Effect

This collection of thoughts on electrons leads the author to enunciate a guiding principle in understanding coils. The charge material structure in the stranded loop of an electron exerts equal effect on the recruited mediators along the length of the loop, within necessary "error bars" in which the recruited mediators influence each other to remain with the stranded loop. A corollary is that the strand will influence itself equally along its length, again within the same error bars.

Electrons meet Positrons

The *mnp* Model pictures a stationary electron as 6 quantized loops of negative charge material. Movement recruits (and depends on) mediators in the proportion $1/\sqrt{1 - v^2/c^2}$, polarized with charge Axis toward the center of each coil. The twisting of the 6 loops may also recruit mediators. An electron meeting a positron of the opposite coiling direction at low

or parallel speeds may unravel the entire strands, with the twelve loops forming the ionizing portion of gamma rays. The mediators recruited by movement may be released as a polarized bundle of energy, called a fhoton in the *mnp* Model to distinguish from the multiple meanings of photon in current physics usage. Additional energy recruited by strand twist may be released with the movement energy. If the energy is released as an unpolarized bundle of energy in one direction, a neutrino results. If the mediators are released while still polarized before the coils of charge material unravel, classic photons result. If the energy is released in many directions during or after unraveling, disorganized and unquantized mediators are released as energy.

The single loose loops are expected to be unable to retain mediators and hence do not retain momentum and so after a short time are expected to become stationary in the universal frame. So the author expects ALL energy of movement to be released. The loops might soon essentially disappear except gravitationally. The mass/energy released will be that held by the velocity of the particles and perhaps a small amount of energy bound with the twisting of the loops. Telling those three types of energy and potential apart seems difficult experimentally.

If the interaction is at high speed, since ALL the mass/energy recruited by the coils is released, the fhotons released may be quite energetic. When a proton and anti-proton meet, all the extra energy/mass/mediator recruited by the proton and anti-proton will be released. That energy release represents most of the mass of the nucleons. The 36 coils of charge structure (6 per quark time 6 quarks) will disappear or become available for electron and positron formation. For an isolated annihilation of proton and anti-proton, 3 electrons and 3 positrons would be a maximum result. The *mnp* Model allows that, if 6 strands of negative material find each other then an electron would result, and if 6 strands of positive material find each other a positron would result. The *mnp* Model does not insist that electrons and positrons be created at the same time. The *mnp* Model suggests the appearance of the particle will occur (time)x 220 to 337 km/s away

This suggests that the *mnp* Model would see the center of the spontaneous generation of electron and positron as receding at least 220km/sec +- 30km/sec from the position of the annihilation. Or not if the forward movement of the participants biases the results similar to the gravitational bias on rotation

The details of how loose loops are influenced by static charge fields, gravity, and magnetism is not worked out. The author suspects that since matter has tight coils that are organized and balanced (modulo movement) with each coil being influenced by the divergence of the field, matter is much is more influenced by those three macro forces than loose loops are.

The author does not hold much hope that careful experimentation at different times of the day on earth, at different velocities, at different seasons, at different positions in the galactic orbit (taking 150 million years...) would yield different energies. Further speculation - if electron and positron formation differ spatially, that formation occurs/is centered where the lab frame was at the time of the interaction, giving a hint as to the lab frame absolute velocity. Mark this paragraph a wild speculation.

Musings on Cosmic Microwave Background Radiation

CMBR may represent the energy stored in a 6 strand so when positrons and electrons annihilate at low speeds they give off 2 fhotons of the expected energy. This is the most economical explanation of the CMBR phenomenon in the *mnp* Model. Variation due to distant masses at the time the radiation passed them is reasonable, since annihilation was probably more common in the early universe. Annihilation continues, so somewhat greater uniformity would be expected.

Magnitude checks are appropriate.

Table C.2: Electron Properties

Quantity	Value	Units
electron energy	0.511	MeV/c^2
electron energy (j) mc^2	8.199E-14	Kg m^2 /s^2
electron mass	9.11E-31	kg

Photons in the CMBR average one two hundredth the energy required for an electron to gain or lose 220 km/sec and one six hundredth the energy required for an electron to gain or lose 371 km/sec. Note - is that reversed (2022)? Therefore, a "CMBR results from positron-electron annihilation" explanation requires some assumptions;

1) The energy of twisting is released in polarized form.

Table C.3: Electron Properties When Moving

Co-Moving frame speed	371	km/second
Energy in comoving frame	3.90747953771253E-07	MeV/c^2
	6.26955474084823E-20	Kg m^2/s^2
Relativistic mass added by comoving	6.96617193414397E-37	kg
Energy in relativistic mass	6.26955474072958E-20	eVs
Wavelength c/f	3.17059359741879E-06	m
Frequency E=hf	9.46E+13	per second
Galactic Rotation Frame speed	220	km/sec
Energy in galactic rotation frame	1.37402277666787E-07	MeV/c^2
	2.20462088930249E-20	eVs
Relativistic mass added by galactic rotation	2.44957876468627E-37	kg
Energy in relativistic mass	2.20462088821765E-20	eVs
Wavelength c/f	9.01661152557124E-06	m
Frequency E=hf	3.33E+13	per second

Wavelength	.001818	m
Frequency	1.65e+11	1/sec
Energy	1.09333e-22	Jsec or Kg m^2/s^2
Energy	6.82e-4	eVs

Table C.4: CMBR Peak Radiation

- And -, to account for the very close to blackbody radiation spectrum of the CMBR, either

2a) The extra energy of motion released with twisting energy applies only to the energy of twisting. The energy of motion of the loops of charge material themselves is released separately.

- Or -

2b) most of the electron positron annihilation that contributes to the Cosmic Microwave Radiation Background occurs at low speed in free space, where radiation will not be absorbed. The energy of motion of the loops may still need to be released separately.

Even the author does not see the this CMBR hypothesis as convincing.

Muons in the *mnp* Model

Muons are heavy electrons, uniform in structure to the degree we can determine experimentally, and not made of any other parts. They behave like electrons, and can "orbit" a positive nucleus albeit closer to that nucleus.

The *mnp* Model has a number of possible descriptions of muons that correspond. The author seeks the simplest explanation.

1) A muon is just an electron with an extra full twist to the half twist of the six electron strands. This makes the 6-strand "stiffer" so that it does not curve so tightly, which leads to recruitment of *m*'s hence additional mass. This would mean that, in empty space, a muon will almost NEVER decay to an electron plus an electron positron pair since there will not often be 12 loose loops to recruit. In a soup of destroyed particles as in a collider, the probability of 3 particle results increases greatly but still requires recruitment of loops. If a muon has some measured or mathematical symmetry at 240 degrees (as an electron has a symmetry at 720 degrees) this explanation becomes more likely. If tau's have some measured or mathematical symmetry at 144 degrees, this suggests that they have 2 and a half twists of the basic charge material. The half twist of the strand in electrons is due to equal travel distance for each of the six filaments/loops in the twisted strand. One of the sources of muon instability in suggestion 1 is expected to be the extra twist, and the two extra twists with compensatory separation is expected to be an even greater source of tau instability.

2) Er, the electron has one full twist so the muon needs two or is it three. A full twist in the electron is not seen as consistent with the need for travel distance in each of the six loops to be the same.

3) Er, one twist one way and two twists the other

4) Muons have extra loops of charge material, either 9 negative and 3 positive or 12 negative and 6 positive. This would STILL require recruitment of loose loops in the 2 electron 1 positron result. The extra strands should make the muon coils MUCH stiffer than a quark, so that the author would expect a particle with 12 strands to be VERY massive.

5) Muons have 12 negative and 6 positive loops. The author would expect this configuration to be WAY more massive than the simple quarks, and the 2 electron 1 positron result more common in all situations than observed in colliders.

6) The six stranded loops are twisted in both directions at various portions of the loop length. Harder to picture, with all cross-section and recruitment difficulties of the first alternative.

7) More than one extra twist is needed, based on some aspect of spherical geometry, Bernoulli numbers, or other magic.

The author is still speculating on what anomaly might be seen in the high speed collision of muons at 90 degrees. His best guess so far is that at high (near c) speeds, the charge material in each muon (or electron) would see essentially no attraction either by charge Axis or Travel direction so they would simply pass each other. Contrary to the 0 magnetic attraction between the muons, the author would expect to see particles near c widen and flatten less than predicted by relativistic length contraction and so interact more than expected. If the mediators/mass/m's somehow get polarized or organized with their charge axis perpendicular to the coils away from the expected "toward the center of their coil" then mass may be pulled off of each muon, leading to earlier decay. How the Axis of the mediators arranges in electrons in motion or electrons in shells is not determined beyond the "toward or away from the plane of the coils"

Question for experiment: Does the cross sections of collisions depend on a minimal density of other stuff or constituents and loops around, so that in more sparse environments collisions of muons never create 2 electrons and a positron? Other than citing past experiments with varying particle densities, this will not be easy to resolve. Providing an oblate testing and measurement chamber, with careful monitoring of season and time of day and location on Earth, might suffice.

Tau in the *mnp* Model

Taus are extremely heavy electrons, very short lived, and apparently uniform in structure to the degree we can determine experimentally, and not made of any other parts.

The *mnp* Model's descriptions of taus follow the posibilities for muons. The explanation for tau can wait for better understanding of muons.

1) A tau is just an electron with two extra full twists to the half twist of the six electron strands. This makes the 6-strand much "stiffer" so that it does not curve so tightly, which leads to recruitment of m's hence additional mass. This recruitment may not be linear, but may increase with increased recruitment, that is, the basic entities recruited may influence the charge structure to even more opening of the coils of the tau. If tau's have some measured or mathematical symmetry at 144 degrees, this suggests that they have 2 and a half twists in the basic charge material.

2) Five full twists to go with 1 for electrons and 3 for muons.

3) Er, five twists, alternating in direction

4) Taus have even more extra loops of charge material, a total of 12 negative and 6 positive or 15 negative and 9 positive.

5) Taus have 18 negative and 12 positive loops. The author would expect this configuration to be WAY more massive than the simple quarks, and the 2 electron 1 positron result more common in all situations than observed in colliders.

6) The six stranded loops are twisted in both directions multiple times at various portions of the loop length. Harder to picture, with all cross-section and recruitment difficulties of the first alternative.

7) More than two or four extra twists are needed, based on some aspect of spherical geometry, Bernoulli numbers, or other magic.

Electro-Magnetism

The *mnp* Model still has not explained diffraction and interference. One line of experimental thought is to determine what coherence is needed for current experiments. Indeed, the *mnp* Model needs to decide what coherence IS. If photons can be generated or disturbed to be out of phase with previous photons, do the same experimental results apply? Is the disturbance absolute yes/no or probabilistic? Is an in-phase photon with 1/3 or 3 times the energy of the photons creating the field also diffracted albeit less? If photons out of phase or sending a photon across the diffraction or interference region between photons disturbs diffraction and interference effects, that argues in favor of "guide field" models like *mnp*. The author is aware that greater minds have been unable to use guide fields to explain current diffraction/interference experiments.

Background on the Energy in Photons

The *mnp* Model sees electro-magnetic radiation as made up of gatherings of mediators, all with the same polarity (called Axis orientation), with the electric and magnetic fields the result of that energy moving through the random potential of mediators and negative and positive basic entities. These fields are seen as attenuating after the passage of the energy, called a fhoton in the *mnp* Model. The name is based on figments, the alternate name for the basic entities in the *mnp* Model, forming a photon.

Recruiting Photons

Since the *mnp* Model sees the constituents of everything as traveling at c, the author sees getting enough energy concentrated in one location moving in one direction to form a fhoton under the influence of changing magnetic or electric fields as unlikely. That fhotons of all sizes and directions are available to be recruited seems highly unlikely. The fhoton does not arise from the changing magnetic field away from the electrons along the conductor, but must be released full size by the moving/changing electrons or by positrons or nucleons in a tailored experiment. Normally, the basic entity mediators, the *m*'s, are released by an electron dropping energies, which energy had been trapped by the moving electron. Release, direction and guidance of the resulting fhoton will be a stochastic process [be stochastic] The *mnp* Model does not have an adequate description of how guide waves work in this and in diffraction/interference situations. [and will be informed by the future description of guide waves.] That description of electron shape and travel will need to include why the fhoton is sized to the wavelength of the changing electric/magnetic field. That sending off a fhoton in a given direction would mean an inverse influence on the forming field is required; the conservation of momentum by particles but not necessarily fields will be involved in that discussion. The constituent model supports this "opposite reaction/reverse EMF."

Optics

Diffraction itself is posited to be mostly or entirely a phenomenon of change of direction mediated by the electrons of the boundary, which themselves are affected by the existing coherence of the electric and magnetic fields. If fhotons going through a slit that has been "set up" by a coherent field, electrons or portions of electrons may be oscillating in that coherent field. Still, if a fhoton encounters part of an electron, the author would expect that coil or coils to straighten somewhat and then eventually let the fhoton continue with the resultant direction being entirely random.

Antennae

Undergraduate questions: Are free electrons needed to form an antenna or can moving fields along a logical surface without free electrons act as an antenna? Does the nature of the surface of an antenna change it's properties radically? Does electricity flow along the surface of a greedy non-conductor? Would EM radiation be reduced if there are no electrons free enough to vibrate well? Is radiation improved if electrons spread along the conductor but are not usually free to actually separate from their atoms?

Since electric fields propagate along a wire at near light speeds (rather than never or seldom exceeding c/pi speeds), the mediators of that field must be affected by electrons but must be fundamentally separate from the electrons for the *mnp* Model to be consistent. As released *m*'s released from electrons or as pure potential fields?

Speculative questions: Could we have non-emitter lengths tuned magnetically or chemically or some other manner, so that the emitter lengths are tuned to the frequency to be emitted. Could that tuning be fast enough to enable FM tuned emission? Could tuning at least allow for temperature adjustments? How to achieve that tuning?

Could a carbon based structure have free or free-enough electrons on its surface that would allow it to be an antenna?

Magnetism

Magnetism redirects rather than accelerates or decelerates in the direction of movement. The concepts of relativistic mass and relativistic shortening and relativistic momentum are easy to handle in a constituent model. Magnetic redirection is not quite as convenient. Magnetism requires thinking of an axis in the direction of travel. The classic "magnetic lines of force" are actually the lines of no force, since magnetic force spreads in the plane perpendicular to the "line of force" and exerts its effect in the plane perpendicular to the line of no force. The author currently sees the spread of the magnetic field as statistical, averaging in the plane through the line of current, but NOT uniform in all directions as the recruited mediators move. The author suggests that the reason magnetic force is equal at all equal particle movement angles around the magnetic line of no force is a result of radial symmetry in the particle about the line of travel rather than any radial symmetry in the plane of the magnetic field.

The transfer of influence from the field to a moving charged particle may well be akin to gravitational attraction in that it requires divergence in the field (in two dimensions with gravity and one dimension the magnetism from the convenient straight wire.) and requires the complete loop nature of particles with coiled structure to even out and to the receive the influences of the fields.

Moving charge creates magnetic fields precisely because the net direction of charge is in the direction of travel, and moving charged particles receive influence because more of the constituent circulation at c is forward, rather than being perfectly balanced as in stationary particles.

A moving charge in a magnetic field is affected BECAUSE it is shortened in the direction of travel? Not exactly, though possibly contributing. It is affected because there is a net forward component to the charge's constituent basic entities. The component of the constituents perpendicular to travel is radially symmetrical so magnetic effects etc will balance out.

The picture of how magnetic fields affect coils is not complete. To get a net effect, there must be a result either way on spin-rotation of the coil.

Magnetic fields cannot be shown just with a section perpendicular to the magnetic line of zero force, since the net force in all cases is perpendicular to the motion of the particle/ Apparently, magnetic effects must be different either in direction of field spread in divergence of the field which is spreading as the field constituents moves away from current that is the origin. Fields stimulate basic entities to spread inward as well. Question to be investigated: Is travel in line with spread or against likely to lead to more more fresh influence?

Conclusion

This blog post has collected most of the author's thoughts since mid 2015. While development of the *mnp* Model has slowed over the years, the author is not ready to conclude it has reached asymptotic progress short of its potential. To be continued.

Addenda

Disparate thoughts, small ideas, and notes to self of the last year and a half are collected here. Some repetition can be noted. Chipping away, trying to carve a simple explanation of physics, sometimes requires multiple approaches or attacks on the same area that seem repetitious, though the author finds phrasing questions and possible answers in different ways sometimes leads to understanding or illumination.

Witness the recent admission that, yes, at low speed movement the basic entities need to be angled MORE than v/c for a three dimensional particle to move at v. That realization took the slow witted author years of talking about the issue of movement.

Thoughts Inspired by the Dirac Lectures of Feynman and Weiner

The difference between the basic entities in the *mnp* Model that lead to positive charged and negative charged particles is that mnpitp's have the Axis parallel to the direction of Travel while mnpitn's have the Axis anti parallel to the direction of Travel. The Travel effect is symmetrical about the perpendicular to travel, so the Travel effect is equal for entities traveling in the opposite direction. Therefore, an n traveling on one direction has the same effect on its surroundings as a p traveling in the opposite direction. If we conceptually reverse the direction of time, the p has an Axis opposite the direction of travel and the n Axis is parallel the direction of travel if time is moving backwards.So mnpitn's and mnpitp's

would have reversed roles. But the coils of the loops that make up matter are in opposite directions if the direction of movement is reversed. The twisting of the strands is also the opposite direction.

The *mnp* Model suggests that coiling leads to Spin and twisting may lead to chirality, so in a conceptual time reversal, the *mnp* Model would see spin and chirality reversing.

Strands as the Strings Seen When Trying to Separate Quarks

Coils or charge structure material, since they are joined by a combination of Travel and Axis effects and are tightly bound, exhibit the strongest coherent force that the universe can provide. This suggests durability. Left to their own devices, the coils will be as tight as possible. Quarks are not quite as tightly bound, since the filaments are of differing charge material, but since the Travel effect is stronger than the Axis effect and the Axis effect is 0 at 180 degrees, the strands in quarks are also quite strong. As the coils are straightened, the basic entities are able to recruit more m's as long as more mediators are available or passing through as part of gravitation or other fields, leading a what might become a visible thickening (almost without limit?)

Quark Tripling

A proton may need both up quarks to be fighting over the SAME filament/loop of positive charge material in the down quark for the binding to be stable and long lived. In the early universe or a quark gluon plasma, if the up quarks happen to be pulling at different filaments in the down quark, they will quickly become two positrons and an electron. Background: the *mnp* Model sees up quarks as containing 5 loops of positive charge material and one of negative, while a down has 2 loops of positive and 4 of negative charge material. coils of like charge material attract each other slightly more than between coils made up of opposite charge material, though the larger effect is of "fellow traveling."

Thoughts Inspired by David Deutsch's Hidden Reality

Hidden Reality spurs enumeration of the variables in my cosmological scheme:

Ratio of axis to travel effect,
Sphere of influence,
Function of influence

Thoughts on Statistical and Quantum Mechanics

Electrons are fungible. Unlike dollar bills, which are also fungible unless one plays liars poker, they do not have serial numbers. They do have spin, which the *mnp* Model sees as resulting from the charge material structure of the electron and the direction of coil progression. If in a system an experimenter gets hold of one by a coil, she cannot be sure which one she got except for spin.

In quantum mechanics enumeration of possibilities to determine the denominator of probabilities, when one of the two or more fungible objects/particles enters a reaction, there may be only one place for the other or others to go. So when any of the fungible make a determination, the others are determined too, as long as that is the only physical possibility once the first determination is made.

The *mnp* Model sees limits that may be hard to translate into quantum mechanics - Psi function moves at most c and for particles is usually much slower. The psi function does not proceed with non-zero values to infinity. Converting to Fourier series is not as easy or accurate with limited Psi. Does another set of perpendicular functions handle that attenuation better as a basis for approximation (with accurate modeling in the infinite series)? Sines and cosines are VERY convenient for calculation, differentiation, and integration.

The *mnp* Model sees recalibration needed (frequently) when the approximation that is the math diverges. Divergence will be minimal if the particles stay in the same region but will increase as the particle moves.

Thoughts on Strand Geometry

Strand geometry will bear close scrutiny at some point in the development of the *mnp* Model.

Questions include How much jostling from a perfect circle is needed to form perfect strand? r then call distance between loops sigma.

The strand helix might be reasonably tight, with adjacent coils attracting each other too. If curvature of the strand stays pretty close, maybe differences in adjacent filament travel is significant. What keeps a strand close but not crossing over completely randomly? This raises the old *mnp* question: is a certain amount of repusion needed at very very small distances?

Knot theory may help with geometry of coiled strands, though *mnp* s assumption of passing through makes escape and change possible

Approaches to Computation

Creating a model that is easy to compute is appealing, but natural philosophers should not focus on coming up with a system that is easy to compute. Create a Model that works conceptually, then figure easy ways to compute it. GPUs may be WAY more efficient at computing massively parallel effects - gather influence then distribute influence. This sounds rather like radiative transfer, with which the author has some experience. Accuracy of pure simulation will be an issue, since the basic entities are so tiny and in a few cases such as electro static fields, surface effects with the edges of the coils are expected to be important. The author suspects careful geometric analysis will be needed to extract symmetries and simplifications so that floating roundoff does not eat the results entirely.

Fourier series have been useful in modeling particles, changes, perturbations, and fields. The author suggests that Quantum Field Theory has an infinity of oscillators as a result of the success and familiarity with Fourier analysis. Will the author find that electrons that have a finite extent have Fourier series that behave badly at the _falloff_ zone and so behave in a fundamentally different manner than having the probability drop smoothly to infinity? Will it be possible to find orthogonal functions that naturally fall off as a basis for modeling quantum phenomena? Will that basis have two dimensions (phase and spread) to handle phase issues better than basic quantum mechanics?

GPUs may be WAY more efficient at computing massively parallel simulations. Over a tiny time and distance, gather influence. Normalize. Distribute that influence. (Normalize) Repeat.

Some notes on computation:

> A given ring/coil has to be oriented SOMEHOW so initial position can be arbitrary. Simulation variables include number of divisions, angle to use -sin- can handle radius outside with display or AVG (average?)
>
> Modeling rings, do we need to renormalize directions after some rotation? that would suggest change on movement. Weird if the change related exactly to additional mass or energy needed. Or not weird.
>
> Modeling the geometry of coiled loops: start with 2**20 segments. For a bare circle only change in direction in plane of circle is needed.
>
> A stranded loop takes a tiny bit of skew from the plane of overall loop. Work on multiple loop non stranded first.
>
> Three coils per loop takes a little skew from the direction of path
>
> Start out with a straight filament with a slight bend at the front. Where does it go?
>
> Start out with a straight strand with a slight bend at the front. See where it goes in a simulation. How does it bend? To start? To steadyish state? How does it twist? How long does it take to reach a steady state?
>
> Calculation: for perfect strand twisted 3 times how much imperfection is required, apropos muons.
>
> Regarding coil geometry - does twist need to be related to opening of coils, now that spiral60 seems to work
>
> Is a balance of radius and twist necessary or sufficient to close the coil when twisted?
>
> Geometric computations were trying to draw 3 and 5 coil pictures, so try to get those to close first.

Musings on Scaling the Figment Model

The *mnp* Model currently posits two active effects (attraction to Travel direction and attraction/repulsion to Axis direction) and one passive effect (overlapping basic entities receive less of the two effects). If there is another effect, a slight push laterally, that might help gravitons stay spaced and help with the initial growth from a big bang. Gravitons may not need any help staying space: straight travel uninfluenced by balanced field potentials may be a satisfactory explanation.

Or not. If gravitons just stay more or less spaced that may be good enough in the probabilistic averaging that particles provide.

If gravitons are not big enough to stay separated for the measured distances and if the 10m loop dimension derived from weak interaction times

is instead measured across the loops rather than along them, then

the figment count is WAY higher than previous blogs have suggested.

The author considers this suggestion unlikely. Ten meters across the coils applies only if adjacent coils are in similar distances in all particles that have similar reaction times.

Mediators might exert much less influence and accept much less influence than mnpitn's and mnpitp's but over the same range, then they may be able to separate more than current back of envelope calculations suggest. Having all basic entities exert the same influences is an attractive simplicity, but weaker and more numerous *m*'s would not change any other aspects of the *mnp* Model.

Musings on General Relativity

The *mnp* Model suggests there is nothing apparent or virtual about time dilation, relativistic mass, and relativistic shortening with movement in an inertial frame. Effects in a gravitational field are more complicated but are seen as real as well, affecting matter and fields. The *mnp* Model sees labs as changing with movement and gravitational fields. An external observer would see the rulers change length as they rotate.

The muon storage experiment showed that physical acceleration did NOT slow clocks, so general relativity's equivalence principle may prove worth examination. Or at least call for detailed understanding. The author needs to think more about the Michelson-Morley experiment perpendicular to travel and acceleration in an accelerating frame due to movement vs gravity.

Clocks would seem to NOT be equivalent, so movement in the time light takes to travel across should be different. May be no further askew, but the time to travel the round trip perpendicular to travel should be greater in the accelerating in gravity elevator compared to the round trip in the physically accelerating elevator. The *mnp* Model suggests that length shortening in a gravitational field may be accompanied by widening, but nothing conclusive is posited at this time. Widening in the frame in a gravitational field would make the suggested discrepancy even greater. A conspiracy of gravitation is not expected any more than a conspiracy of light is expected.

Musings on Cosmology

The formation of quantized loops in the early universe is still a matter of speculation. The formation of coils is "settled" in the author's estimation. The author considers it unlikely that an explanation for the speed of light and the speed of all basic entities will be based on an early repulsion of those basic entities, since variation would be expected in a spherical expansion. This despite the Model's interest in explaining by geometry and recruitment.

Musings on Gravity

The strength of gravitational fields is posited to influence time, length (and width) as experienced by matter in the field. Photons are seen as being influenced differently. Gravitational acceleration depends on field strength AND divergence, which is a different issue. The individual basic entity interactions probably not vary with direction since the attraction to Travel direction that is the *mnp* Model basis for gravity is a bi-directional effect.

Musings on Methods

Is the *mnp* Model being created or being discovered? For now, since there is absolutely no assurance of success at predicting nor of acceptance, the Model is being created. At times, the journey has seemed one of discovery to the author, when one idea or explanation seems to apply to different topics.

Sometimes creation can be willed, sometimes ideas arrive spontaneously, sometimes they just seem to hide. The process of enumeration is the author's way of trying both to create ideas and to see if the range of possibilities has been covered. Reviewing those ideas, testing them against experiment, current explanations and theory, and even against intuition (see Useful, Wrong, and Untutored) then often leads to further ideas. Listing or admitting failures is useful for keeping the

author modest, keeping a record of what has been examined to others don't need to navigate the same shoals of difficulty, and providing a basis to come back for review and further development as understanding changes.

The process of documentation allows the writer or designer to review the topic. If an idea or process is difficult to document, either the understanding or motivation needs to be reviewed or the design itself needs to change. The author has found that process useful in the design of buildings, computer programs, documentation itself, and now physics. Never easy, often a challenge to honesty, that commitment to reviewing and changing the design when documentation is difficult has always been rewarded by improved design.

If philosophy is the conscious examination of the way humans do things, then the author is attempting natural philosophy: the conscious examination of the approach to understanding and explaining nature.

The author would be perfectly happy to be told, some decade in the future, that he in fact invented nothing and designed nothing but merely discovered explanation that has been there all along. We should all be so lucky.

Interesting Ideas

Formed on surface? Unlikely

Five issues on the author's long short list of interesting ideas:

> Neutrino capture or shielding (Possibly only for well specified directions, with crafted magnetic fields that would turn neutrinos into fhotons),
>
> Loose coil capture or shielding (Electron shells seem to shield protons from loose positive coils of appropriate high velocities that could turn an up quark into a positron),
>
> Shielding from loose balanced particles of no charge nicknamed z's in the *mnp* Model (farfetched of course),
>
> Gravitational field shielding or shaping (Unlikely and maybe),
>
> Is there a saturation limit for fields that can be tested, for example, in space? (Unlikely)

Humor

Twenty first century physics is echoing the real estate dictum: Computation, computation, computation. Better then repeating three times quickly "circumlocution."

I've got a lot to be modest about.

So soon old and so late smart; why did it take to long to see v/c or 1-v^2/c^2 as a limit for coils, not as the average.

Figments Forming a Photon will get an F in many circles... But then I'm going in circles. What can I say? Phooey?

The long title of this post might be Principles of Movement in the *mnp* Model and Minimal Movement by the Principle. What Moves the Principal? Exhortations include: Move, Principle and Principal, Move and What Moved the Principal This Time? On Movement? Moving On... Movement on Principles...

OK, OK. I admit that the dog didn't eat my homework. Floating roundoff did.

Reflections

The famous line "I have no need of that hypothesis" will apply to the *mnp* Model for a long time or until the author gives up trying to do better than create the equivalent to the benzene ring that will explain the nature of organic chemistry AND the universe. Toss off lines may be entertaining but definitely not persuasive.

> "The six sided strand is the DNA of the universe."
>
> "Even if the author THINKS he knows why quantum mechanics works, he doesn't KNOW why it works."
>
> "A long time ago, in a galaxy from away, Marshall McLuhan suggested that 'anything that works is obsolete."' Or something like that.
>
> "The *mnp* Model sounds like a Just So Story." True: many aspects need to fall into place for the *mnp* Model to be viable.

Even if coherence is needed for diffraction experiments to work, the *mnp* Model has a lot of heavy lifting yet to be done.

The author is attempting natural philosophy; asking questions about natural processes and about his own conceptualizing and approach to the topic and adjusting the approaches as needed.

The author hopes that someday he may be able to say of many branches of physics "I have no need of that distinction" if integration proceeds... Recent personality tests suggests the author is even more an Integrator than Pioneer and Guardian. The *mnp* Model might need a Driver too...

Side note: Modeling mistakes and misunderstandings can be a disaster. Chasing illusions and chimera is a waste of time.

Science Fiction Finds the *mnp* Model Disappointing

To retain simplicity, consistency, and intergity, the *mnp* Model must offer explanations that disappoint physicists. Even worse is the disappointment offered science fiction fans.

No magic, other than possible influence at a very low energy level from non-quantized loops. DNA, life, and intelligence are the only levers for influence. Butterfly wings may effect hurricanes but planning that influence is impossible.
No travel faster than light.
No time travel.
No wormholes in space.
No point singularities or black holes offering travel, shelter, or new starts.
No big crunch.
No do overs.
No folding or unfolding of dimensions.
The universe seems too big and too detailed to be simulated accurately.

Of course, the *mnp* Model does not repeal Goedel's Theorem. Issues beyond the Model are inaccessible to the Model.

Final Speculation

The constituent model may be the most durable of the *mnp* Model's suggestions. It may be the most acceptable as well. The coiled loop model may outlast any of the posited letters; it is a specific type of constituent model.

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Foreward to the *mnp* Model - Post 34 (2015-10-26)

Post 34 is now incorporated in the forward to the *mnp* Model document, page 3.

On Neutrinos - Post 33 (2015-03-27)

The previous post titled On Neutrinos: Thoughts From An Alternate Conceptual Universe includes the claim that "charged" hybrid neutrinos in the *mnp* Model behave like neutrinos in our universe. Since experiments show neutrinos are not affected by magnetic fields, why would magnetic fields not affect neutrinos in the *mnp* Model of "charged" neutrinos? The author will attempt the short answer to this serious question, despite the absence of the planned post on magnetic fields in the *mnp* Model.

Background on Magnetic Fields

The *mnp* Model sees mediators as tiny entities traveling at c with Axis perpendicular to the direction of travel. The Axis can be thought of as the polarization of the basic entity. In gravitational fields, the Axis is random. In a fhoton, the Axis of all the basic entities are aligned. Magnetic fields are seen in the *mnp* Model as mediators *m*'s spreading at c perpendicular to the line of zero force, with each mediator's Axis also in the plane perpendicular to the line of zero force.

Magnetic fields affect charged particles moving at less than the speed of light. A moving charged particle with charge material forming its coiled loop structure will have its constituent basic entities net direction in the direction of particle movement proportional to the velocity of the particle. The Axis of the basic entities in the magnetic field affect the travel direction of the charge structure of the particle only to the degree that the charge structure of the particle causes the field mediators to deflect their travel direction which also causes the charge structure to change travel direction. The field mediators will just realign their Axis to match that of the moving particle if the influence is perpendicular to the Axis which is along the line of zero force. The influence on the Travel direction of the mediators making up the magnetic field can only be away from the plane of field spread.

Fermions' driving effects are from the charge loop structure. Except for electrons and positrons, all basic fermions have associated m's (mediatorsslash glue) but those mediators are seen in the *mnp* Model as depending on the coiled n's and p's to influence fields and receive effects from fields.

Charged Neutrinos

Neutrinos are seen as different in the *mnp* Model. The m's making up most of the neutrino have Axis perpendicular to travel, randomly oriented for essentially no resultant net Axis to influence or be influenced. So there will be no net effect by a magnetic field on the direction of the m's. The time of interaction with a neutrino is limited; in a particle, the field can interact with many parts of many coils. In a neutrino, once a part of the neutrino passes it is gone.

The basic entities n's and p's that also make up charged particles are seen as part of a hybrid neutrino. These n's or p's have Axis anti-parallel and parallel to the direction of Travel respectively and are the only part of the neutrino that will be attracted to align Axis with the magentic field. They will be deflected slightly by magnetic field, but are not connected into the entirety of the neutrino the way the loops in a fermion are. The deflected n or p will initially not affect the neutrino except by Travel attraction. Travel is seen in the *mnp* Model as the strongest single interaction, but other factors interfere in a neutrino.

The basic charge entities in neutrinos are seen as significantly outnumbered by the m's so the deflected charge entities will have very little effect on the neutrino's travel direction. The deflected single n's or p's, or small groups of n's or p's are seen as likely, after a small deflection, to be attracted to the Axis of the neutrino's m's in the direction of the deflection. The n's or p's are likely to leave the neutrino, and in doing so will redirect some of the neutrino's m's back the other way.

The author does not suggest that a conspiracy of neutrinos will EXACTLY balance out the resultant neutrino direction, but suggests change will be small and hard to detect.

The author suggests that neutrinos in the *mnp* Model can have charge entities but that magnetic fields tend to purify the neutrino rather than deflect it measurably. Though he suspects small influences may eventually be measured.

Appendix

Fermion's Charge Structure Seen As Unified

In contrast to neutrinos ability to lose charge material, in a basic fermion, a charge entity that is part of a structural coiled loop is part of a coil that the *mnp* Models sees bound by the strongest force in the universe: a co-linear combination of Travel and Axis attraction. So an influence to one or more coil members will average the influence with all the other influences on the stranded coils rather than cause the entity to leave.

Spin Seen As Relevant Only to Fermions

The *mnp* Model sees spin as not a conserved property and not a property of fhotons or neutrinos but only as a property of fermions that have a charged loop structure. The imbalance in the coils of the loop given the fixed length of each of the six loops that make up the strand that forms the basic structure of a fermion by coiling and twisting leads to spin, and the capture of fhotons and neutrinos will change that coiling and so change the spin of the fermion. Geometry rather than a conserved property leads in the *mnp* Model to Spin.

Neutrinos: Thoughts from an Alternate Conceptual Universe - Post 32 (2015-03-22)

Abstract

Continued attention to neutrinos yields interesting ideas in the *mnp* Model's conceptual universe. Experiment shows that one or two neutrinos are created in weak interactions rather than a shower of even smaller by-products. Those neutrinos have a preference for rejoining matter in a mirror reaction. Neutrinos might have an immeasurable charge, since anti-neutrinos exist. In the *mnp* Model, the stranded charge loops that provide structure for the basic fermions rearrange in weak interactions. There must be a way that neutrinos form as units when those "weak" rearrangements take place.

The *mnp* Model conceptual universe sees everything, including fields and gravity, as the result of three types of tiny entities interacting over a tiny influence distance while traveling at c. After creating a framework for explanation, the author has been trying to "discover" explanations for the results of modern and not-so-modern physics experiment.

A recent re-examination of neutrinos presents a plausible explanation for the small number of neutrinos from weak interactions and sheds light on possible explanations for strong interactions and the positive surface of neutrons as well as protons.

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Neutrinos With Charge

How has the author come to see charge as relevant to neutrinos? By the "see it when I believe it" corollary: "when an explanation is ready, the facts can be accepted" On trying to think of how neutrinos can have charge, the author first saw having some charge material as useful for the detection and trapping of neutrinos in weak interactions. Charge material assists capture when the coils of the quark recruit not just mediator m's but the included basic entities that form charge which are essential to electric fields. Negative would attract n's, positive would attract p's, and quarks which are loops of each would attract both. When the attracted free mediators are released in a weak interaction that creates a neutrino, the charge material would be released as well and would be oriented to travel with the mediators. The author suggests there might need to be a low limit on the amount of charge material that can be attracted, either due to geometry and the basic effects or by a limit on the amount of free charge potential available in the random field potential. The lightest quark, up, has more additional mass than in the basic charge loop structure of the simple quarks, and experiment does not see a noticeable let alone a doubling of quark charge.

Background: The basic quarks, electrons, and positrons are seen in the *mnp* Model as all having 6 quantized loops of either positive or negative charge material, each loop representing $.0851 MeV/c^2$ mass. Weak interactions are seen as exchange of loops, and quark triplets are seen as constantly attempting to exchange loops but being prevented from completing the process. The loops coil, electrons and positrons coiling as tightly as the basic entities can receive influence, and the quarks not so tightly so that they recruit as much mass as their "straightness" allows. Mass in the *mnp* Model is a derivative concept, based on how much influence a collection can exert or how much influence is required to redirect that collection. Mass and entity count are seen as interchangeable.

Experiment shows that the charge of an electron is constant within narrow error bars, so the *mnp* Model must either respect those error bars or explain why additional charge recruited by the coils is not involved in creating magnetic fields or responding to magnetic and electric fields. The author suspects that the explanation may lie in "the recruited entities are not acting on their own and so do not influence on their own, but are influenced by the coiled charge loop structure which, because of the tight connection between entities in the loop and the geometry of coiling provides the only external influence available." The author is not prepared to "show the numbers" at this point.

At about 1122 hours: Another issue is the "length" of neutrinos which is not explained in the *mnp* Model. the author suggests the nature of a given neutrino is determined by the interaction that produces it. He hoped (earlier today) for a multiple perhaps 1 of the coil circumference of the particle that produced the neutrino. The author sees (in steady states at least if such could be said to exist for quarks in a high energy interaction :-) relatively uniform distributions of recruited material, so would expect that material to be 9m long.

Why are neutrinos not the full length of the loop (3m, based on the time weak interactions take to complete) that produces it or why such a long neutrino could not be seen as captured until it had been entirely "coiled in" to the capturing particle/quark but then would be seen as a "point" is not yet explained. What would the ramifications of long neutrinos be? The *mnp* Model does not yet picture how coils recombine in weak interactions. 1) Do they unzip curvi-linearly, or 2) do the coils get involved in parallel so that entire sets of coils are changing at once or 3) is the need for matching spin and sets of coils overlapping the start of the interaction, which then completes by the recombination moving around the geometry of the coils at c. More zipping than unzipping. The author chooses number three for now; the interaction starts with coils overlapping, then finishes with linear recombination. So weak interactions will take something like 1e-8 seconds, but since the start is "overlapped" the timing varies.

In a weak interaction that creates a neutrino, if the massive stream of freed m's with interpolated n's and /or p's has some affinity to stay together and turn together, that could also account for the gluons in nucleons not escaping and could account for why protons and neutrons both seem to have positive exteriors. (Like charges attract by Travel and Axis when moving in the same direction and within the tiny influence distance. Only when electric fields are created and spread does the net Axis effect get reversed to form classical "opposite charges attract" electric forces.)

This picture has certain attractions; Once neutrinos are "caught" by a coil (a strand of 6 loops in basic fermions) traveling in the same direction, the entire neutrino may be then be "wound up" by the loop, while the loop absorbs the momentum of the neutrino. Neutrinos would be attracted to fermions with the same charge balance as their producing interaction, as long as charge material had not been lost in travel.

This picture has other attractions: If the stream has affinity, then the initially released coils of "nascent neutrino" may continue coiling somewhat until the entire neutrino is free from the creating loop and can then "choose" a travel direction. So multiple neutrinos would not be created piecemeal from a loop change. Whether the "front" of the resulting neutrino has more material than the tail is an open question, but the total momentum would be a function of the weak interaction, and provide that momentum to a "detection" interaction.

A New Twist On Chirality

While a neutrino will be more easily "guided" if the charge material is in the front (dimensions are so small, remember coil diameter, that the neutrino may appear as a point particle anyway) the author expects to see the neutrino as fairly uniform just as the particles from which it arises are fairly uniform.

The charge material may make them susceptible to moderate influence. If experiments (rather than mathematical models) show that right handed fermions (in our counter-rotating centrifuge at the Pole) detect neutrinos just as well then handed-ness is not important.

Counter thought: In the weak interaction in the *mnp* Model, the strand of glue may initially come off the coils with axis that had been oriented toward the center of the coils now in a helical pattern either left or right depending on how the coils were "laid like a stiff rope." Whether that is subtle (half a full rotation per circumference) or extremely subtle (the width of 3 filaments per circumference) is not clear to the author. To be continued. The author is hoping for neutrinos to prove even-handed, though an explanation or three is ready for handed-ness.

Until experiment shows a difference in absorption based on left hand and right hand preference by neutrinos and not just production of left-hand results when measured close to the source, the author will suggest that neutrinos are not left or right handed. Plenty to potential for the consumption of crow here.

Unlikely thought about charge distribution in the transverse dimension of the neutrino: The transverse distribution of charge particles as in n's and p's in the same strand orientation of the creating quark may possibly be relevant. Guiding m's from the front may be "easy" as in diffraction, to be decided. Look at the evidence for chirality in neutrinos, since if everything on Earth prefers left where possible, ... we may not be measuring right handed anyway.

Meditation on Mass and Majorana

Concepts such as mass, Majorana, and particulate are seen as not useful when applied to neutrinos.

Mass? No. Neutrinos are not mere lumps of unpolarized mediators as recently pictured by the author but may be conglomerates containing small amounts of charge materials. This allows for anti-neutrinos to exist, and for pure neutrinos as well as neutral neutrinos. The presence or absence of a small amount of charge material is important to the neutrino's chances of being captured by a particle with mass, but the author believes that avoiding "mass" in the description of neutrinos is an improvement. The terms Pure and Hybrid will do nicely. Past speculations and notes on the nature of neutrinos are quite incomplete and unpersuasive. The author has pictured various models of neutrinos over the last four years, including rings of charge material which he now deprecates. Elusive idea, neutrinos.

Majorana? No. Distilled to their essence, the author believes that neutrinos are light like. The basic entities in the *mnp* Model cannot be destroyed. The hybrid form of neutrinos, formed of the 3 basic entities in the *mnp* Model, cannot disappear but only be transformed or revert to the random field potential. Neutrinos do not interact enough to destroy each other, though they might affect each others charge material. If traveling in the same direction at essentially the same location at the same time, neutrinos might recruit each other to form a single, though this is unlikely enough as to be considered uninteresting. Neutrinos produced by the hypothetical z particle might have balanced charge material and so theoretically be Majorana, but since the probabilities of that encounter are seen as very low, Majorana neutrinos seems like a hypothesis of which we have no need.

Particles? No. Neutrinos are not usefully considered particles in the *mnp* Model. They cannot exist at rest except as captured by the charge loop structure of matter. In the *mnp* Model everything other than empty space is seen as made of the basic entities which travel at c, and calling all those basic entities particles would confuse all of us if the word particles were to refer to the constituents of fields (and the random field potential) as well as fermions.

Appendix

On Words and Wording

The author often writes to a vanishingly small cognoscenti: apologies to those starting at any given blog post. The author's writings about the *mnp* Model are intended to be consistent, though developing, and do not always step back to provide a complete basis for the posts to be understood in isolation. The author acknowledges that understanding the writings is more difficult than the writing, much as puns are easier to create than understand and perl is easier to code than to read.

The author has introduced a number of technical terms lately. A collection of recent and not so recent additions:

- basic fermion: One of the seven basic 6 loop structures of matter: an electron, one of the four small quarks (including the two less common "anti" quarks), the small elusive neutral particle z, or a positron.
- collection: any group of entities that a physicist can draw a boundary around. Given that fields spread at c, this might be difficult in some scenarios. Anything from a fhoton, a pure neutrino, to a complicated meson or nucleon. Anything we can draw a boundary around and say "this has mass and or this has energy."
- conglomerate: a lump with more than one type of basic entity. May not be useful now that neutrinos seem to be more nuanced.
- fhoton: A bundle of mediator *m*'s traveling together with Axis pointed the same direction that are considered the particle form of light in conventional physics. The electro magnetic fields that result from fhoton travel can guide that fhoton or others. Electro magnetic fields, as created by radio antennae, can also recruit *m*'s to be a fhoton. The bundle of energy that can be trapped by electron shells. Distinct from particle physics' amorphous mediator photon. Seen in the *mnp* Model as independent of electro-magnetic radiation in interstellar travel. Plenty of explanations remain! The concept of fhoton is important in the mnp Model.
- lump: a fhoton or neutrino, though recently the neutrino seems more nuanced than the polarized mediators that make up fhotons as long distance travelers.
- movement: slower than c location change by fermions
- particle: matter with mass. The author intends to avoid using particle for fhotons and neutrinos.
- thing: a collection with some semblance of unity useful for the discussion.
- travel: location change at c, shown by the 1) basic entities that make up fields, random potential, matter, and everything else encountered in the universe 2) fhotons and 3) neutrinos once they are freed and formed and leave

an interaction. The author intends to be consistent. The word movement always means less than c, travel always means at c.

The author tries to suggest words for useful new concepts in hopes that the words will not bring unhelpful associations and meanings from conventional physics. Words are going to change meanings as understanding changes. Vocabulary in physics will be dynamic. Parkinson's Law #n suggests - "when an organization creates the perfect headquarters, it is dead." So when we have a perfect vocabulary, the field is fossilized.

Experiment shows. Experimentalists do. Experimentalists don't tell unless they are doing theory or interpreting too hard. Theory tries to explain. Theory also guides experimentalists in deciding what would be fruitful. So as the author re-factors the way he respects experiment and the people who do them, a global search on xperimentalist to make sure it is used properly. Experimental results that cause a Model difficulties are not the fault of an experimentalist but the result of experiment, the ultimate if flawed arbiter.

Math and formulae don't cause effects, though it is convenient to write as if they do. For examples, the third term leads to ... causes ... the first term is ... requires knowing what "is" means in this case.

Of course the author needs to clean his own house. At some point rather thoroughly, to distinguish "probably causes" "might cause" "might lead to" and then the raft of reasons for various "conclusions" made in developing the foundation and then "discovering" the *mnp* Model.

Universes

The *mnp* Model and modern physics seem to exist in separate conceptual universes, with the author trying to see as many parallels as possible. Is the concept of "mass" in neutrinos equivalent to the author's seeing some charge material present? The attraction will be by Travel and Axis attraction, with like charge material attracting strongest when traveling in the same direction and unlike charge material attracting strongest when traveling in the opposite direction (Travel attracts by alignment both parallel and anti-parallel, but Axis attracts only toward parallel in the *mnp* Model) but of course this allows MUCH less time in proximity for the attraction to take effect. The author posits that very little charge material is needed to promote capture by matter, far less than the $1Ev/c^2$ proposed as a maximum "mass" for neutrinos. Measuring such small amounts of charge material will be very difficult, though the toroidal magnetic fields used in detection may do precisely that.

Welcome to an alternate universe, with some parallels to our own.

Experiments Would Refute the *mnp* Model, Not Prove It

The author has recently proposed a few experiments (centrifuges to create right-hand preference and neutrinos in almost parallel travel to beams of particles. Now if the experimenters can haul a neutrino detector and/or generator to the North or South Pole and put it on the track or centrifuge, they could determine whether the neutrino counts match those of a neutrino detector or generator with left-handed preference, which would provide an(other) answer to the question "do neutrinos really have handed-ness?"

Of course, these experiments would prove nothing in favor of the *mnp* Model since a universe of other explanations is available if experiment does happen to show that left-hand preference is a local phenomenon or that neutrinos are affected by fellow travelers or that neutrinos do (or do not) have a handed-ness. Should explanation be needed, the author suggests that portion of the conceptual universe that sees moving labs as truly undergoing Lorentz transformation will better explain local left-hand preference.

The author has few illusions that the experiments would be performed to shorten the Standard Model's Lagrangian. He has even fewer illusions that the experiments would be performed for the purposes of refuting the *mnp* Model.

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On Understanding Neutrinos - Post 31 (2015-03-19)

Abstract

A new understanding of neutrinos is proposed. "Pure" neutrinos consisting of only mediator basic entities m's are currently called "massless." "Hybrid" neutrinos consist of mediator basic entities m's with some of the charge basic entities that are also present in electric fields n's and p's. Hybrid neutrinos also have no mass since by themselves they

do not have enough charge material to form coils that are capable of remaining stationary. The author proposes that "Hybrid" is a better term than "massive."

Neutrinos are capable of shedding or recruiting any of the basic entities as they travel. Hybrid neutrinos will preferentially shed charge material traveling in near vacuum, so cosmic neutrinos might be expected to be almost pure. Whether a pure neutrino traversing an electric field can pick up enough charge materials to be detected as a muon or electron neutrino is not clear to the author.

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Introduction

The author has been preparing to model the "gravity" waves created by the travel of massless neutrinos as a way to determine the magnitude of the Travel Alignment Effect, using *mnp* Model's understanding of the deBroglie wavelength. In a parallel effort reading the article on the Higgs in Review of Particle Physics (Olive 2014), the author found Neutrinos immediately following, so continued reading.

Experiments show neutrinos have definite traits in addition to just energy that allow some to enter into interactions that others cannot. The traits can change even in a vacuum.

The author has recently written that the only difference between fhotons and neutrinos is the polarized nature of the fhoton. Attention to the experimentalists insistence that there ARE different kinds of neutrinos leads to useful suggestions. The *mnp* Model will need to produce a more nuanced picture of neutrinos than heretofore. Leading to a subtitle in *mnp* form:

Massive Neutrinos Prompt Re-Examination

Neutrinos in the basic *mnp* Model might be called unpolarized lumps of mediator *m*'s. Lump is a technical term, for non-structured entities in the *mnp* Model. Fhotons and neutrinos do not have the coiled loop structure that allow them to remain in one place or move slowly, so the author does not want to confuse them with "particles" or the traditional concept of having mass. The author sees "mass" as the collection of basic entities that can remain stationary and can move slowly but not achieve c. Light-like are those things (lumps) that move at the speed of light and cannot move any other speed. He sees no intermediate organizations of the basic entities. Neutrinos and fhotons move at the speed of light, so cannot have a coiled or loop structure. They can be "turned into" mass only by being captured by a coiled loop structure. So what does "massive" mean when applied to neutrinos? "Chirality?" "Left-handed?" "Majorana?"

Background

Two concepts important to the *mnp* Model are "Charge (loop) structure" and "(random) field potential." The *mnp* Model has no need for either ether or aether as a supporting concept. The random field potential is (mostly) free mediators called *m*'s.

Except that the random field potential does require free basic entities that also form the charge loop structure: *n*'s and *p*'s which are only needed for the spread of electric fields. Magnetic fields can spread without them, fhotons and neutrinos can move through the vacuum with no mediators or free "charge" entities.

Neutrinos have been seen as just lumps of m's with perhaps left and right being a matter of "slightly" polarized balance of Axis that can change as the neutrino travels. This concept of a little polarization but not so much that the entire lump gradually averages out the Axis direction and becomes polarized has always bothered the author.

Onward: Neutrinos

[2015-03-18] Regarding Neutrinos: massless and having mass are a little different. Massless means all the energy is in m's or non-structured n's and p's. In the electric fields within the shell, there will be/can be free n's and p's. They could get entrained in a fhoton or neutrino, though the polarization of the fhoton will tend to pull the charge one way so it will not continue to travel with the fhoton. A neutrino will have no such polarization preference, so can keep the n's and or p's longer. Still, some attrition will occur as the neutrino goes through mass or fields. This is beginning to sound a little like massless vs neutrinos with "mass" which to the author is the charge structure (potential) represented by individual n's and p's.

This model does behave properly. It provides for some spontaneous change in vacuum, does allow a differentiation of flavours while allowing neutrino energies to vary independently. Neutrinos "salted" with some charge may be more catchable. Especially because n's and p's have Axis pointing differently. Neutrinos are still not quantized, but are produced and captured by particles that are, as are fhotons.

A magnetic or charge field, with Axis pointing one way, will tend to attract n's and p's to turn opposite directions, not the same. Travel would attract the same direction. Could be one charge or the other with Axis forward or backward, leading to better absorption in LH nucleons?? If n's are in front of p's that would enhance starting one way, later going the other if the neutrino as at least one coil diameter in length. If the neutrino has length and n's and p's are positioned along that length in the pattern as they existed in the creation of that particular neutrino, that may lead to a tendency for that kind of neutrino to recombine in a like/mirrored manner.

Questions remain:

> What does chirality actually mean?
> Why would interactions create consistent or somewhat consistent portions of n's and or p's (from a fairly consistent field inside the shell or in the quark triplet?).
> How could one measure tiny charge differences?
> [2015-03-22] What would Majorana actually mean?

As the author re-reads these paragraphs after initially writing them as a stream, the implications seem more profound than they seemed on first writing. The explanation does feel tailored but most of the tailoring is in how neutrinos are created by specific interactions of leptons/quarks. None of the basic *mnp* Model need be adjusted or tuned. The image of neutrinos as having some basic charge entities does free the neutrino model from the need to be "slightly" polarized, which is good!

Pure Neutrinos and Hybrid Neutrinos

Free n's and p's now show up as an explanation for "massive" neutrinos, without themselves giving the neutrino rest mass.

So the author comes to understand "massive" as "having some of the properties of particles that can be at rest" which "properties allow them to interact preferentially with particles" rather than "large" "heavy" or "capable of hanging around to be put on a scale." The author would like to avoid the term "mass" as applied to neutrinos. He prefers "pure" neutrinos for that rarefied or well travelled case of the neutrino with no charge material n's or p's at all. The term "hybrid" neutrinos would apply for those with "charge structure material." The author understands the "pure" and "hybrid" may meet with even less acceptance than the *mnp* Model itself.

Neutrinos may well have length related to coil diameter or coil circumference. Since electrons are seen as 2 or more coil diameters in extent in the *mnp* Model but as points in particle physics, this is probably manageable. Early modelling of the neutrino "gravity wave" can use whichever image is convenient to start.

The author admits that his explanation of neutrinos is designed to model neutrino behaviour and traits observed in experiment and the wild, but the explanation does seem consistent with basic *mnp* principles. Nothing new needs to be adjusted. Exactly what the neutrino pattern IS from a given reaction is not known, but the author is comfortable with suggesting that neutrinos are never exactly alike, that they are created by interactions among particles whose basic charge structure is quantized but whose specific energies and directions will vary. So a type of interaction will give a

neutrino a certain pattern such as length or energy or pattern of charge material; since the interactions vary, neutrinos vary.

Neutrinos produced by a reaction, might in most cases participate in the reverse reaction though this is not assured since geometry is also involved and at times leads to asymmetries.

So another heading emerges in the author's favored *mnp* pattern:

Musings: Neutrino Polarity

What is chirality? The posting titled Left Handed Preference Is Local provides one tool for understanding chirality - preference is a local phenomenon resulting from the lepton's rotation in a frame. Chirality is surely related to the leptons creating the neutrino. Neutrinos will be more effectively captured by a coil moving in the same direction, perhaps with some n or p Axes matching as well to enhance the "contact" attraction. Remember that by contact as in weak interactions and strong interactions, like Axis attracts. Once a field is created by charge, the effective Axis direction is the opposite of the charge so unlike charges attract from a distance.

Ref: Olive 2014 Page 225. For neutrinos, both chirality and measurement comes from the producing quarks and the "measuring" or "detecting" quarks, so chirality is not universal but influenced by the local rotating frame. So the author would suggest "from a counter-rotating frame at the Earth's poles, the neutrinos produced would be right handed."

[2015-03-22] The author suggests that neutrinos do not have chirality once they have travelled some distance, though they may retain some influence from the orientation of the coils that produced them in the initial fractions of a second.

The author sees no point in trying to create rigid classes for neutrinos and especially in trying to fit all neutrinos into a fixed number of classes. He would prefer just understand that neutrinos change traits and to work toward understanding those traits. Catalogueing the interactions that produce neutrinos and that detect them is useful, but may be an open ended task.

Why No Massive Fhotons?

When first released from an electron shell or a weak nuclear interaction, the fhotons might have n's and p's travelling with the m's. But since the conglomerate er lump is polarized, with the Axis for all m's in one direction, the n's and p's will be attracted by Axis effect toward the Axis perpendicular to travel as well as in the direction of travel by Travel attraction, so will be unstable. The "resultant" influence at an angle to travel is probably a simplistic concept, but suggests that the n's and p's cannot remain a part of the fhoton.

Proposed (Unrealistic) Tests on Neutrinos [2015-02-14]

Date: Sat, 14 Feb 2015 17:12:44 -0800
Subject: mnp: Maybe Neutrinos Parallel to beam would be interesting

... been thinking about neutrinos. Swimmers might envy neutrinos their ability to not see water as a drag. But then they miss most all of the turns, never talk to each other, and never show up on the podium.

The dreaded questions of the week:

If a neutrino detector is aligned with a source but the path crosses a high speed particle beam at a small angle, the detector should see less when the beam is on than when it is off.

If the source is non-focused but almost in line with a beam, detectors almost aligned with the beam would see fewer neutrinos when the beam is on than when it is off.

Suggestion is that neutrinos will be more attracted to the direction (0 or 180 degrees) of a high speed mass almost aligned with their direction of travel than with a stationary mass or mass moving at a less acute angle to the neutrinos' travel. Of course "time in proximity" needs to be controlled for.

The author has no illusions that a neutrino detector fits on the back of a pickup truck, can be unloaded by two people, or that it can be lined up with a laser pointer.

Appendix

Notes on Neutrinos

The author's collected but unedited thoughts show a bit of evolution and a lot of loose ends.

[2015-03-22] Much commented out:

[2015-03-19] Do neutrinos from weak interactions accumulate at where the final separation of the last coil occurs, then fly off from there? Given that everything in the coil is moving at c, accumulation seems unlikely.

[2015-03-18] If muon neutrinos always produce muons when they interact, that may be useful/interesting as insight into what is a muon. Extra strands? Just twisted differently? A quantized amount of n's and p's mixed in? The author hopes not the latter.

Light from distant supernova arriving at the same time as the neutrinos suggest light and neutrinos take the exact same path, that the electromagnetic fields associated with light does not affect the path.

Is it possible to do Shapiro like ranging experiments with neutrinos. Unlikely given that shielding will likely be heavy.

Not likely be be able to send coded neutrinos through the sun from a spot on the other side of the orbit or even to sense them in a light enough package to sent IT out to the LaGrange point on the other side. The author feels neutrinos would travel at c, not slower, if they can get through the sun unscathed

Hints of Coming Distractions

Consideration of the mass of up and down, with consideration of the involvement of mediator m's in moving particles, with quantification of the Travel Alignment Effect from neutrino/wavelength investigations, may allow some headway in understanding particle masses.

The SM Higgs particle is predicted, 57% of the time, to decay into a $\bar{b}$ meson. Experiments find that such a decay is "messy" and hard to measure, so it is not seen that often. The *mnp* Model's suggestion that the Higgs is the meson of o (over the top) and $\bar{o}$ as the partner of $\bar{t}$ meson is now seen as unlikely, since the Higgs is only 2/3 as massive as t Top rather than being 2 to 4 times as massive. Instead, the author suggests the Higgs may be a meson $\bar{b}$, with the same underlying relation and structure that strange has to down. The same basic charge ratio of 4 negative loops to 2 positive loops, but the strand of 6 that has the positive loops on opposite sides of the hexagonal cross-section of 6 loops rather than adjacent.

Musing: if the author truly absorbed the PDG's "book," he'd be afraid to suggest ideas so foreign to the incredible amount of good work that has gone into experiment.

Ignorance makes action possible, sometimes.

Musings on Terminology: Structure: If the 6 strands of a basic quark/electron/positron/z are structure, is the cross sectional detail of strange sub structure? Is the salting of n's and/or p's in neutrinos called micro structure?

The author would like a good term for the basic units that can be stationary and have mass: electrons, positrons, quarks, and the neutral quark called a z in the *mnp* Model. Basic massive structures? Basic massive particles? Basic fermions.

Thought: When a voyager reaches a cliff, the only way to go on up may be to go down, perhaps even to the bottom to start over.

Left-Handed Preference Is Local - Post 30 (2015-03-23)

Abstract

The previous post on movement 142 introduced a testable hypothesis 145, that the left hand preference in nucleons is due to the rotation of the earth rather than a preference of the universe.

Testing Left-Handed Preference

Since the blog on movement, further reflection suggests testing in a counter-rotating centrifuge is not likely to be adequate, since the portion of time spent moving counter to the Earth's movement is probably too short for nucleons to adopt any measurable preference for right- handedness. Even "long" linear accelerators sending particles west would probably not see much right-handedness. A geo-circular track is hardly worth the effort to shorten the Lagrangian. Sending a plane westward faster than the earth is spinning may not be cost effective.

Experiments could be run in counter-rotating centrifuges at the North or South Pole as well as outer space. Cold comfort in having multiple (two) locations to confirm experimental results. Even without a centrifuge, the author might expect the preference for left-handedness to diminish over time at the poles. Though shivering in the cold waiting for [Edit 2015-03-22] cobalt-60 atoms to make up their minds does not sound like fun, knowing how long a preference takes to establish by watching the rate of change of the preference would be interesting.

Explanation

The handedness effect is seen in the *mnp* Model not as secondary to coils rotating in the rotating frame of reference of earth bound labs, but probably as a tertiary result of the extra/odd coil (which also leads to quantum spin) preferring to be on the outside of the rotation, and preferring to rotate clockwise looking in the direction of movement, rather than a secondary result of all coils preferring to rotate clockwise when they transition from moving forward with coil axis outside the tangent to movement while having coil axis inside the tangent.

Explanation Attempt #2: In the *mnp* Model, the basic structure of quarks, electrons, and positrons is seen as quantized loops that coil and twist. When rotating around a mass or charge, coils transition between orientation left and orientation right of the line of movement. The transition happens both ways (the same number of times) and involves a coil/ring needing to go through perpendicular to movement and hence "stop" forward movement at the instant of crossing. Both transitions from left to right and right to left lead to the coil itself slowing compared to the particle as a whole. See drawing 4 in 143 titled Movement. So the preference is seen as a real result of geometry dependent on rotation direction. Preference is still poorly understood and hence poorly explained.

Neutrino preference for left-handedness is also seen as a result of the preference shown by the leptons from which the neutrinos arise. Even in the sun, neutrino preference is seen as a local phenomenon resulting from rotation and not as a universal preference. To be continued.

Humor

The author is reminded of a phrase from childhood "Well, that was as clear as mud."

The author commends the LHC attitude "if we find something unexpected, then we'll need to come up with an explanation."

On Movement: aNother Picture - Post 29 (2015-03-16)

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Developments Over the Last Eleven Months

The last blog post was April 15, 2014 - titled On Information, Fields, Gravitons and Mediators which could have been titled "Toward a Constituent Field Theory." It was preceded by two posts which could have been titled On Energy and

h in the *mnp* Model

Since then, most of the unpublished notes fall into four categories: magnetism, Constituent Theory, movement, and musings on approaches and philosophy.

This post will address movement, since that contains a testable hypothesis, with musings on *mnp* in Concept Space 146 in the Appendix.

Movement in the *mnp* Model

Consider the first of the Hauser Criteria "can you show F=ma at least in some limit" and the underlying issue "What is movement." The *mnp* Model's intent is to answer why the experimental results, including conservation of momentum, beyond the very useful mathematically based "velocity in an inertial frame has a zero derivative with respect to time, therefore it must be conserved."

What is needed for a model of movement, if movement is to emerge rather than being posited mathematically? At any given velocity, inertia is maintained. A steady state for a free lepton /an electron or positron should, probably, represent a steady state for the basic entities in a Model like *mnp* that posits "substructure." The first image of movement, from 2011, in the mnp Model showed a ring with the effective orientation of travel for each of the basic entities in the ring angled at $asin(v/c)$ This suggested that a complete cycle of the ring would take $1/\sqrt{1-v^2/c^2}$ as much time for a complete cycle as for a stationary ring. The "linked rings" model was soon abandoned, replaced later by the coiled loop model, which moves and hangs together better. Going back and modeling coils as a set of rings may be a useful abstraction as a first order approximation to model movement, coil orientation, and distribution.

In this post, the author will try a model based on having all the basic entities in an electron or positron at the same angle to the coil, so that variation of the coil is absent or minimized. Based on "all tests of the electron and muon indicate that they are homogeneous." Choose an attack angle $asin(v/c)$.

[2015-03-16] Diagrams and explanatory text added:

The careful reader may note that the author has finally allowed the Axis to parallel Travel for p's, the reverse of all previous blogs and writings that considered the n entities that make up electrons to have Axis parallel to Travel. The new diagram, with n's Axis anti-parallel to Travel, is seen as more convenient for physicists to learn and for the mathematics to more easily follow current conventions of charge sign.

Figure C.7: Basic Entity Travel Around a Ring/Coil at "Low" Particle Velocity for n's and p's

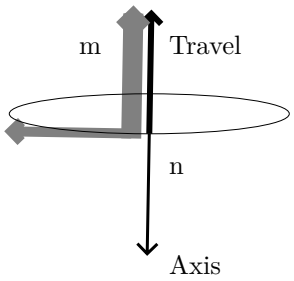

Figure C.8: Entity Travel at "Moderate" Particle Velocity

3) Basic Entity "Travel" Around a Ring/Coil at High Particle Velocity for n's

Notice that the net Travel influence along the tangent of the coil/ring is constant at all velocities if the net effect is proportional to the cosine of the angle between "fellow travelers." The author was excited to see that the net effect of

Axis would also be constant at all velocities, with the Axis of the m mediators balancing the reduction in Axis effect from the n's or p's traveling more in the direction of particle movement as velocity increases. On further review and introspection, this Axis effect is probably not likely in the current Model. In quarks, with a mix of n and p strands, the author finds it unlikely that equivalent portions of the m's would have diametrically opposed Axes. More likely is that all the Axis attraction effect for the m's would lead to the m's Axes pointing inward. Comment: the saving grace of this adjustment/correction is that the Axis attraction, while less than the Travel attraction, will tend to keep the coil and mediators locked together at high velocities.

End drawings added [2015-03-16]

The drawings show adding mediators m's in proportion to $1/\cos v/c$ with the "angle of attack" for each ring. Side comment: If mediator m's join the basic coil in proportion to $1/\sqrt{1-v^2/c^2}$, the resultant around the coil may be the same. It is not true momentum, so further development and understanding will be needed. The advantage of this sort of model is that the energy seem in high energy particle physics is carried with the particle as relativistic energy, without a need to recruit energy/mass in a collision.

The drawings show the Axis of recruited/entrained m's as perpendicular to the tilted plane of the ring. Actually, the Axis is more likely to be in toward the center of the ring since that is perpendicular to the movement but in the plane of the bend in the coil.

Ideally, one would like a distribution of rings that allows smooth consistent behavior of the constituent figments (no sharp turns …) Note that the stationary case will have "torque" in that there will be an odd number of coils, so quantum mechanic's spin is safe for now.

[2015-03-16] The variation in coil/ring orientation may be simply modeled as a sin distribution, with essentially no rings at the extremes of "possible" orientation since no coils will be actually perpendicular to movement. A few coils may transiently have orientation outside the "possible" orientations, with a portion of the coil moving backwards in the underlying Minkowski space, but that transient situation would theoretically not exist for electrons or positrons in pure steady state inertial movement.

[2015-03-16] Note: The coordinate system has θ ranging 0 to $\pi/2$ with a LR (or +-) "dimension" for rotation direction, which will be more convenient than seeing the coil orientations as two separate ranges angles because the numbers wind up in separate regions 0 to $\pi/2$ and $3\pi/2$ to 2π that are contiguous physically but not numerically.

This seems almost too neat - approaches the c limit properly, carries the mass along for interactions that the high energy experiments see, inertia possible as long as energy (m's) isn't taken. We need to see what shape the coils will take, but the travel direction changing smoothly to the c limit case of ring moving along its axis looks good.

At a given velocity of movement, answering the question "what is the distribution of ring orientations?" will be investigated in reverse. For a given angle to the ring, what is the distribution of ring orientations and the resultant average movement velocity for the particle/collection of rings.

[2015-03-16]

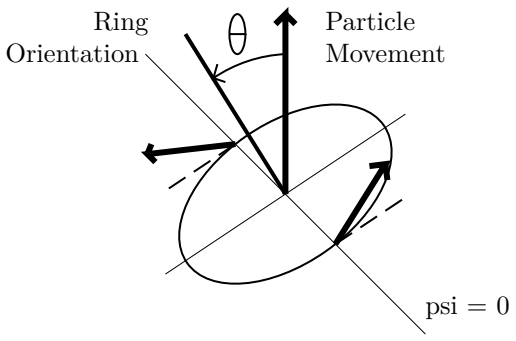

Figure C.9: Distribution of Ring Orientations

4) Geometry of Ring/Coil Oriented at Angle Theta to Direction or Particle Movement

If the ring axis aligns with the direction of particle movement, the effective movement will be at v. If the ring axis is perpendicular to the direction of movement, the net progress will be 0. Conveniently, the net effect on movement of a

ring tilted at θ is $vcos\theta$. So to move, the coil wants few or no rings perpendicular to movement. In a steady state, θ_{max} should be no more than $\pi/2 - asin(v/c)$.

If the distribution of ring orientations between $\theta = 0$ and $\theta = \pi/2 - asin(v/c)$ is a sin distribution $sin(\theta\pi/(\pi/2 - asin(v/c)))$ So the net movement, before renormalization, is $\int_0^{\pi/2-asin(v/c)} v\cos\theta\sin\theta\pi/(\pi/2 - \arcsin v/c)$. From Gradshteyn(1965) 2.533 #1 where b is 1 and a is $\pi/(\pi/2 - asin(v/c))$ is $-\cos a + b\theta/(2(a+b)) - \cos a - 1\theta/2(a-1$ where b is always greater than 1. The normalizing denominator for the probability distribution function is the $integral from 0 to \pi/2 - asin(v/c) of sin(\theta\pi/(\pi/2 - asin(v/c)))$.

v/c	net v factor	net v
0.0000	0.6667	0.0000
0.0872	0.6996	0.0610
0.1736	0.7313	0.1270
0.2588	0.7616	0.1971
0.3420	0.7906	0.2704
0.4226	0.8180	0.3457
0.5000	0.8438	0.4219
0.5736	0.8678	0.4978
0.6428	0.8901	0.5721
0.7071	0.9105	0.6438
0.7660	0.9289	0.7116
0.8192	0.9453	0.7744
0.8660	0.9597	0.8311
0.9063	0.9719	0.8808
0.9397	0.9820	0.9227
0.9659	0.9898	0.9561
0.9848	0.9955	0.9804
0.9962	0.9989	0.9951
1.0000	1.0000	1.0000

Table C.5: Table of Effective Average Velocity for Given "Velocity" Angle in Coils

Note that at lower velocities, the effective average velocity of movement is less by as much as 33 percent. At lower velocities, should we just increase the angle between stationary ring plane and the figment travel direction by up to 50% to compensate? The author is unwilling to make that leap, given his interest in finding something conforming to Lorentz transformations. The error bars appear to be, much too large to make a simple ring collection/set of coils a plausible slam-dunk of a concept.

Is there a distribution function that would allow the coil angle to match the net average velocity? Not with the simple geometry and distributions shown so far, unless every coil had axis at $\theta = 0$.

So for now, the author prefers to leave this investigation "incomplete" rather than resorting to "tuning."

A constituent theory would be compatible with this understanding (and maybe the math) since instead of needing to show a mechanism it could rely on "it just works" and "here' is the 'math' to prove it."

Rings and Coils and Direction of Rotation

The author had early on thought of making left rotating coils have θ angle $3\pi/2$ to π, but finds it easier to separate left from right coils by a "logical" dimension LR so that the θ angle range is compact. But that side trip lead to an appreciation for the need to have an equal or almost equal distribution of right and left rotating coils. Off by one is suggested by past *mnp* articles. And to an appreciation, at high velocities, for the difficulty coils have in "crossing over" to rotate the opposite direction, as would happen in large body rotation.

Testable Prediction: Nuclei Rotate on Earth and So Prefer a Spin

This qualitative picture of movement has implications for rotation as well. A lone unified particle will not rotate - thank you Boltzmann. But a particle rotating around another mass or charge will rotate itself, since at any velocity greater than 0 the individual coils will delay crossing over the $\theta = \pi/2$ orientation but then will "hurry back" leading, the author

guesses, to precession in the direction or rotation. Nuclei are freer to rotate inside the electron shell than is the shell itself, which is constrained by surrounding shells. The author suggests the odd coil (particles have an odd number of coils) will prefer to rotate in one direction in a rotating frame, though that preference may not establish itself immediately.

The author humbly suggests that a left-hand preference is not a universal phenomenon but an Earthbound (and counter-clockwise rotating frame) phenomenon. Given the current universal non-acceptance of the *mnp* Model, there is of course no need to reprint the Lagrangian t-shirts nor change typeface size on said resources.

Sending a cobalt decay experiment into space may be difficult. Running a centrifuge at 1000 to 1500 kph perpendicular to the Earth's axis but counter to the rotation of the earth may be possible. Trapping the emitted nucleons and measuring their spin might be rather difficult.

Appendix

Why the *mnp* Model? Why Now?

The *mnp* Model's conceit is that if a simple explanation for many phenomena is available, explanations for quantum and gravitational effects might be combined.

The author's effort feels strikingly similar to Watson,Crick, and Franklin's search for the structure of DNA, given the fuzzy pictures and incomplete but suggestive information available at the time. Hints in that endeavor included measurements of relative quantities of ACGT and the doubling behavior of the gene/chromosome. Both of which suggest a binary rather than ternary model. The attempt to decide how many pairs coded amino acids was an interesting effort. Since 20 amino acids were known to be present in life, each DNA pair could have 4 values, the conclusion that triples offered 64 possibilities, which was enough to produce 20 amino acids, some more than others, with punctuation thrown in. Enough, but not too much.

In like manner, the *mnp* Model seems to be fairly compact and fairly parsimonious - there isn't a lot of conceptual space for more stuff, but it seems like it could encompass that which is measured and therefore known in physics. Of course, that remains to be shown. Telling is not sufficient.

The *mnp* Model is attempting to predict 4 forces, 3+ fields, quark behavior, and the existence of particles by finding underlying first principle(s). The reader is welcome to pick one/pick all that apply to the effort: impossible, foolish, unlikely, dangerous, stupid, audacious, arrogant, insane, brave.

The *mnp* Model as Conceptually Compact

The author feels that the *mnp* Model is "compact" in the sense that concepts, forces, and particles are closely related, that for any given binary attribute, a different concept/particle/force occupies both positions along that attribute "dimension," and that all influences are highly local with long range effects produced by spreading fields interacting.

Particle types are limited in number:

> Basic quarks, electrons, and positrons differ only in the proportion of 6 quantized charge loops of either charge.
>
> Neutrinos and the particles of light called fhotons here differ only in that fhotons have a polarity and neutrinos' basic constituent entities have a random polarity. Positive and negative charges differ only in the direction of their "polarity" called Axis in *mnp* . Matter gets its concept of measured time and measured distance only from its constituent coiled loops and their distortion under movement and gravitational (and other) fields.
>
> The difference between "light like" and "particulate" is clear, and does lead to differences in response to fields including gravity. Not all conceptual division yield symmetry on both sides. Quantization arises from one attribute of the combination of the basic attributes. Due to geometry, the division between "light like" and "Particulate" is not symmetrical, in that "classes" of neutrinos have no automatic correspondence in particles other than a propensity of certain particles to react with certain size neutrinos and perhaps neutrinos of one of the two "inclinations"
>
> Within light like are "basic entities" "unaffiliated loops" "unaffiliated non-quantized loops" and 2 light like particles: fhotons and neutrinos.
>
> Wavelengths for moving particles, fhotons, and neutrinos are field disturbances in the random field potential of basic entities that are usually denser near matter. Electro-magnetic radiation results when fhotons, which are polarized, add polarization to the gravity wave.

Field types are limited in number:

gravitation (movement in and out of mediators),

charge (movement of mediators tangent to logical spheres around the charge, polarized to match the charge) charge figments - coming in with polarity matching outgoing direction of charge polarity, going out - opposite charge goes out at angle, same charge charges straight out. So recruiting works. If like charges attracted, would segregate charge pretty quickly. Not a very interesting universe.

magnetism (mediators moving perpendicular to the line of zero force with polarity perpendicular to travel and lined up with originating charge movement)

Limited by what can be created by matter.

Perhaps limited by the author's imagination of what other combinations might be possible

Concepts are limited in number:

Weak interactions are reorganization of the charge structure loops of leptons and quarks and electrically neutral "basic" particles the *mnp* Model calls *z*'s

QCD is replaced by compatible quarks attempting to achieve a simpler reorganization but prevented by their "compatibility" - all other combinations resulted in electrons and positrons or neutral "*z*'s" in the early universe, and when particles were dense, the *z*'s were close enough to encounter each other by chance and form positron/ electron pairs.

Strong interactions are a "surface" contact phenomenon.

Attributes aka "Dimensions" fundamental to the conceptual *mnp* Model do not form an orthogonal space, due mostly to differences in geometry and therefore the variations possible at each level in the hierarchy of conceptual dimensions. So the diagram looks more like an outline.

Basic entities

Free entities (3)

Potential field patterns that superimpose (to a limit)

Organized *m*'s (2 differing by polarized or not)

Fhotons - Axis aligned

Neutrinos - Axis random (or almost random and slightly left or right)

Quantized loops

Free as part of the field potential or as candidates for weak interactions - considered RARE

Matter as organized, six per quark, electron, positron, or *z*: 0:6 to 6:0 for 7 different charge variations with different cross sections for up, anti-up, and *z*)

Unquantized loops

Not required by the Model, but suggested as possible depending on the recruitment processes in the early universe.

Unquantized or mis-sized loops are very probably free

Might act like field potential

Could interfere with particles for limited times. For example, a long unquantized positive loop could turn a "free" up quark into a free negative charge loop plus a pseudo positron with a loop tail that would not be stable but be likely to break up in the presence of other free loops

The Structure of Space

The universe as truly flat may not be an accident. Maybe flatness doesn't emerge from a balance of gravitational forces, but from a different concept/mode of action of gravitational influence. The author, of course, nominates *mnp* as a Model for gravity emerging from interaction between mediators and matter, with (unfortunately for acceptance) a different interaction between mediators and fhotons and neutrinos.

Notes in no particular order

At above .707c, we may get width dilation due to more stuff present?

So close to c, the m's are traveling mostly in direction of path, with axis lined up with where/how the coils were/are, though the n or p will have its charge axis lined up with travel, so the structure is held at speed by the axis of the m's rather than the axis of the n's or p's as it is in electrons at rest.

Net effect will be the same as resting charge structure??? Depends on amount of m's or :) maybe there's a conspiracy. Very few at low speeds (with high angle of axis to movement for those figments), equal at .707c, huge near c, with little axis opposite the one n or p figment per "opposing" figment. This works near 0, near c, and at .707 c.

Quarks have charge axis pointing both ways. m's are attracted to the coil by Travel direction, not by Axis. The Axis of the m's attracts each other, and probably the [2015-03-16] resultant acts toward the center of the ring/coil.

Except in quark triplets, which get strung out more (pun accidental. Really.) and even separated. (Even here, could work with constituent theory, if the constituents come in sixths.) So quark triplets WILL movement with more backward movement for short periods of time.

Questions, in no particular order

Might m's be capable of crowding?
Might the limit only be on axis overlap?
Might m's be able to crowd more (those used to gluons and mesons and integral spin items being able to overlap might accept this, even though the mechanism is different.)
Possible that the coil does not have to be completely homogenous as long as it is close?
Still need to picture how the coils work and why the constant strand composition allows movement to proceed as we measure it aka as it must for the model to work/reflect reality/survive as a mental construct.
Can the mnp Model continue to the Axis getting skewed for n's or p's in moving coils/loops. The author hopes so, otherwise n's and p's would not be constant.

Roadmap of Future Blogs

Are protons moving at almost the speed of light plasma already?
If slowed would they retain their identity?
Quantum Mechanics - Why the math works and what it means
Magnetism, B, and Lines of Zero Force
Philosophy - covering and evolving a minimal conceptual space: the *mnp* Model in Concept Space
On Neutrinos - Do hot sensors with more variation in energy detect more? Do sensors moving in parallel with the neutrinos detect more?
Revisiting the Separation Effect

Humor

Most scientists have physics envy; they would like to know as much about their specialty as physics knows about the physical world with as much certainty. And they would like their specialty to be as complicated and mathematical.

As a barbarian laying siege to physics, not at the gates or low points in the wall but at some of the highest bastions, the author can cop to physics envy. He also suggests that most physicists share his mathematics envy. Mathematicians often work in a pure realm without benefit of reality checks or physical limitations or physical intuition.

The writings on *mnp* are recognized as non-persuasive by the author. When the drafts become descriptive and understandable, the author will declare victory and ... Well, maybe, the profession won't be so lucky as to have him go home.

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On Information, Fields, Gravitons, and Mediators - Post 28 (2014-04-15)

Abstract

Approaching the development of any model of fields generated by constituents such as strings, loops, gravitons and the like rather than by magic or mathematics leads to four useful questions and one important reality check:

How is information generated?
How does the information spread? (NB 2022-01-30 The *mnp* Model no longer uses the term "propagate" for in-Model phenomena)
What IS the information?
How is the information received?

How does the field information continue to be generated without diminishing?

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Discussion

Magnetic fields pose difficulties for the *mnp* Model, which aspires to an explanation for particles and forces with constituents operating only at a tiny scale. An honest look at magnetic fields leads the author to frame the general question: what issues are fundamental to the nature of fields and what issues arise in various model types. By asking the proper or useful questions, the author hopes to find useful answers.

Magnetism has two properties that gravity and static charge do not: 1) The reference line for force is an imaginary line of zero force, a vector perpendicular to the moving charge that creates the magnetism, with the force magnitude axially symmetric about that vector and 2) magnetism affects only moving particles and only by changing the direction of movement. It does not increase or decrease kinetic energy in traditional inertial frames.

In the *mnp* Model, gravity and static charge fields are purported to be understood, electrical fields from moving charges have been drawn but not well explained. Understanding how the field created by moving charge could lead to the influence on moving particles being symmetrical and directional about the line of zero force has so far eluded the author. Conceding defeat in this endeavor, the author feels a more general discussion is warranted. Therefore:

An information theory approach may be useful. What information is needed? What is the MINIMAL information needed? The author suspects that in physics and the universe, nothing is overdetermined. The approach, do all that is needed and no more, has served the author well in writing and programming. Don't program or say things twice. (For fear of self contradiction LoL.)

This discussion of information is the author's attempt to understand and refine his own development process. Recognizing that creating a single concept (such as frame independence or the equivalence principle) is not part of the intersection between his abilities and what a constituent model of fields needs to do, the author will muddle on.

The proto Model, *mnp* , so far offers glimpses of the possibilities. Information is received only by the redirection of basic constituents, is generated only by the redirection of the basic constituents of fields, and does not diminish over time because field constituents are, in the modern local universe, constantly replenished by recruitment.

The useful question emerges. What information do the (gravitons, magnetic field mediators, static field mediators) need to carry? Which quickly leads to the author's codification of Information Required by a Theory of Everything -or-

Information Requirements in a Constituent Field Theory

There are four important questions to be answered by a field theory that posits constituents such as strings, loops, gravitons, and the like. In chronological order:

How is information generated?
How does the information spread?
What IS the information?
How is the information received?

In order as understood and developed by the author:

What is the information?
How does the information spread?
How is the information received?
How is the information generated?

Reality checks on the process of field creation include:

How does the field information continue to be available?
How does the field information continue to be generated?

Conclusion

The author hopes that with four concepts and one or more reality checks, explanations for fields can be developed and checked.

Though the author joined mathematics with magic by a rhetorical alternation in the abstract, the growing acceptance that, for example, a particle IS its wavefunction or a field IS its function means that the four information questions might be profitably asked of the functional form of the field or particle.

Examples

Illustrations may be helpful. For gravity, the *mnp* Model sees the information needed as 1) How much effect from the mass remains at this point and 2) which direction is the mass. The reality check, how can gravitons continue without being diminished, led to the concept of recruitment, to gravitons being bi-directional. Amount of effect is the number or density of gravitons. Direction to the mass and the radius part of acceleration is encoded in the angular divergence of the gravitons (and perhaps the related divergence in density with tiny differences in distance from the mass). Gravity is the simplest of the fields in the *mnp* Model because it relies only on the mediators (called m's in the *mnp* Model) and assumes their Axis (polarization) averages to 0.

For static charge, the information needed is similar. But instead of inventing a different mediator, that points in a negative or positive charge direction, the author is attempting to use the three constituents of the *mnp* Model. The charge constituents move, if matching the charge, more axially away from the charge. Those opposite the charge move more tangentially to the surface of the charge and so may return sooner but do not spread. The third constituents, mediators, adopt the Axis alignment of the axial charge constituents and spread more tangentially to the surface of the logical sphere around the charge, themselves recruiting charge constituents.

For magnetic fields, the information is the direction of the +B vector and how much influence exists at the point of interest. Since spread is perpendicular to the information and since how the information is received and translated into changed motion with the influence being proportional only to the angle between receiver motion and +B vector direction, the author has much need for understanding and creativity. To be continued.

Appendix

This blog post, like many of late, has jumped out of order. Describing and modeling the fields created by motion is overdue. Explanations of why the 3-vector and 4-momentum formulations with complex numbers work well and images of the meaning of mixing angle in the *mnp* Model await. Development of the scale established for the constituents of the *mnp* Model, as developed in titled Energy and h in the *mnp* Model, including investigation of the $10^-10m/s^2$ limit for gravitational acceleration, is pending. Discussion of divergence and curl in the loops of particles can be postponed, as can the mundane topic with the dramatic title Gravitons' Return. A rewrite of the general *mnp* Model description is

called for, to reduce embarrassment at the many mistakes therein, even though the development and understanding of field structure will lead to further changes.

Field Constituent Theories - Classification

Field constituent theories can be seen as a spectrum (or an n-space) from truly baryonic to pure instantaneous information with no mass. Baryonic constituents probably have mass and might be able to transmit energy, torque, and direction. Constituents might be specific to the field type or types. Constituents might be limited to the speed of light. Constituents of the field might well be different from constituents of particles. Constituents might be spread across the universe, as if all were holographic projections from a boundary. Pure mass-less endless information theories require that the recipients must have the ability to respond to all information by themselves.

The *mnp* Model is just one point in the range of constituent theories and shares many attributes with other constituent theories. In the *mnp* Model, all constituents move at the speed of light, only three types exist and form particles as well as fields. They interact on two attributes, Travel direction and Axis direction, and cease to interact if packed too closely. The author is trying to develop the *mnp* Model as a minimal set that will cover the range of physical phenomena and measurements. Someday.

Constituent Scale in the *mnp* Model

For reference, a table of the scale for constituents as developed in titled Energy and h in the *mnp* Model is included. The influence distance is the most interesting number. The rest, including number of constituents in an electron and constituent mass, merely give a sense of scale.

	Torus	Cylinder	Units
Influence distance - maximum	1.56e-25		m
Number of coils	2.45e25		m
Separation distance	8.0e-50	5.1e-50	m
Constituents per electron	2.25e50	3.5e50	
Constituent mass	4.05e-81	2.6e-81	kg
Maximum density at separation distance (hexagonal packing)	9.1e66	2.25e67	kg/m^3
Compact electron size	5x5x1.6*10-25	1.6x1.6x3.2*10-25	m
Compact electron density	xxxe45	xxxe45	kg/m^3

This estimate is based on four measured quantities: the speed of light, the mass of the electron, h, and the time for weak nuclear interactions to occur. It is based on the observation of consistency for those quantities and on the quantized behavior of electrons. Using the classic formula for angular acceleration only, the units of energy and the constituents ability to redirect other constituents and the units of h have physical explanations in the *mnp* Model.

mnp Specific Thoughts

The "what information do mediators need to carry" was the turning point in the author's musing about magnetic fields. The question seems to support the Axis (reversed?) along the B lines, yet how does the Axis get oriented that way rather than 180, when the charge is moving one direction? This related to the production of information or the transformation of information.

This might be an interesting paper in its own right, though it will be easier to write when the fields are complete. LoL Like issues of understanding physics but personally needed a causal picture to be able to understand enough.

mnp Muddling - Leading to General Concepts

For reference, a glimpse of how the author talks to himself:

How could we model the zero force lines for magnetism - a) if the Axis were one way or another along the zero force vector then direction of B would be established and axial independence if spread direction is not needed. Need to figure how current would cause axis to be 90 degrees to current axis alignment. Though being affected at 90 degrees may be a reciprocal arrangement b) Zero force vector is perpendicular to both Axis and Travel, then Axis cross travel would give B direction. Need Travel and Axis to work out equal at all axial positions. Seems difficult to work out or at least hard

to make excuses c) if just axis parallel to negative current, not enough info to be axially symmetric about some other axis/coordinate line d) spread direction - does that have a wavelength and recruit similar? I'd think not - averaging out

Draw - electrons move vertical (current down) B equal force lines clockwise, Axis up. Not just equal force lines, but the zero force axis. In *mnp* , perpendicular to the spread of the magnetic field and perpendicular to the axis. Direction of the B (Could it be that Axis direction does not matter to a moving charge??)

Replenishment: eg. For static charge, the p's are sent out more tangentially, the n's sent out more axially, the balance of flow will need to be uniform. n's may be recruited and redirected from a distance, p's may seem to hang out closer but the net away must match the net toward if steady state is achieved. (I have at times thought that this might not be the case on a cosmological or long time scales, and have not entirely given up on this possibility.)

mnp Future Development

The fields created by particle movement, which the *mnp* Model calls deBroglie fields, will be important to understanding all fields from moving particles. Pull n's and p's more into parallel than the m's which then cause n's and p's to align with the movement, then cause m's to align more with the movement, so the zero force line represents the Axis. No, that would picture more axis parallel to the charge movement. But provides additional reason for Axis aligned with source. Wait - electron moving, n's oncoming pulled in less, n's parallel pulled in more. p's following pulled in less, p's oncoming pulled in more m's come in by deBroglie, try to align with the mid-line, cross past it, do they try to reverse Axis? Axis only works around the line of travel? - no it does redirect.

Causes for Optimism

Behavior of the constituents of a wave created solely by a particle or neturino or fhoton's movement, called here a deBroglie field, is counter-intuitive. Constituents recruited by the moving particle cross the mid-line and operate in a reverse fashion. Oncoming and "overtaken" constituents behave differently and interact with each other. The simulation and understanding of such fields, as posited in the *mnp* Model, will be useful. In addition to the investigation of the neutral (neutrino) moving particle and the polarized (fhoton) moving particle, it now becomes apparent that the charged (idealized electron or positron) moving particle and eventually the coiled/charged moving particle (electron and positron) will provide needed understanding of the fields created by movement.

Constituent Field Models and Structural Models of Everything may actually have a future, even if the author's approach in the *mnp* Model turns out to be merely interesting.

Post 27 - Momentum Energy and h - (2014-08-04)

This section, an almost standalone introduction to the *mnp* Model, has been included in the main description of the *mnp* Model. Page 26

Energy and h Explained - Post 26 (2014-03-30)

The conserved quantity energy and the constant h now have a firm and clear (at least to the author) explanation in the *mnp* Model's description of basic three different kinds of entities moving at c that make up all matter and fields.

The meaning and magnitude of the Planck constant h has meaning with respect to electron shell uncoiling, leading to spin and orbital angular momentum.

Momentum is, as explained before, the total of basic entities and their net movement compared to rotating at rest. It is conserved because entities cannot affect another's direction without an equivalent redirection of their own.

Energy causes the basic entities to change direction. Conceptually, matter at rest is made of basic entities rotating at c in loops and going nowhere. Motion requires that a lateral component be added to that inherent rotation, which takes away from the natural rotation. Neutrinos and photons move at c. To stop that motion requires a centripetal force integrated over $\pi/2$. So mc^2 comes from the centripetal force integrated over $\pi/2$ required to make a turn of 90 degrees, either from resting to moving at c or from c to resting. Radius cancels in the integration over angle. This justifies the conservation of energy and mc^2. Only so much redirection can go on (and investigation of fields shows it DOES go on for all motion even if we don't see it).

For the kinetic energy of motion, the coils have to be straightened enough to provide v. That is a fairly direct calculation. The angle for travel is arcsin(v/c), the shortening of the coils or amount of straightening from the natural coil radius is a centripetal force related to 1-cos(angle of travel). At very small angles, the arcsin and cos work out to $1/2mv^2$.

Even the awkward units for h, the Planck constant, make sense. Getting 2 coils from the loop forming an electron (or another fermion's charge loop structure) to uncoil is a 4π change in direction for the whole loop, repeated for a second. The units on the number of times the loop passes per second is seconds(!), so the units of h would be energy times seconds. The effort needs to continue through time, it is not just a one time redirection. Energy needs to be put in continually from somewhere to keep the natural coils opened up. The sources of energy to keep the electron shell from collapsing are the basic entities that will start a photon if the shell collapses and the field created by the nucleus.

Further exposition and diagrams are needed, but the math and physics concepts are simple.

This development grew from investigating the fields created by traveling neutrinos. Details at 11, date unspecified.

At present, the author understands the public reaction to Archimedes. "What is this naked man talking about?" Full report to follow.

Progress(?) Report on the *mnp* Model - Post 25 (2014-02-14)

Introduction

The development of *mnp* as a Model to explain the phenomena we know as physics has slowed, but continues.

Most of the effort in the *mnp* Model has been to determine whether the model based on three basic entities whose only difference is in one of the three methods of interaction is sufficient to explain the known electrical, magnetic, electromagnetic, and gravitational properties of matter, fields, time, and space as measured by physics, experience, and life. (2013-11-07) The opposite question, are three entities different in only one aspect MORE than needed will be taken up in an Appendix below. The short answer may be yes, as long as dimensions, hidden or not, can be used by one entity to form three but not more basic units. The longer answer is no, effectively three different entities are needed.

Much needs to be developed in the *mnp* Model. Part of the slow pace can be attributed to the author's repeated experience and dismay of discovering that the current explanations for measured phenomena need to be adjusted, that there is very little on the level of elementary particles and below that can remain untouched or even unscathed if a unified explanation is to result.

Table of Contents (abbreviated)

Thoughts since the June 2013 Blog Entry

Photon Spin (2013-11-02)

Photons affect the spin of particles. In the *mnp* Model, particles are based on strands with quantized (in the limit) tight coils. Adding energy requires two uncoilings, affecting intrinsic or orbital spin in the case of electrons. But photons do NOT have spin themselves, they merely affect the coils and the angular momentum bound in those coils.

Dirac Spin (2013-10-31 and 2013-11-03)

The author is still trying to think in three dimensions and time. The electron remains a loop of six quantized filament loops in a strand. Pictures of the electron have included a figure eight so that the six filament loops moving together at c can be the same length. Two other possibilities exist. The filaments may wobble enough that the lengths remain the same, that wobble showing up as angular momentum. Or if the the strand of six filament loops (circling at c) can be seen as a flat loop with the length of each loop is constant, the loop is not static but must turn over 180 degrees with

each revolution. This may help visualizing the Dirac equation of the electron, which indicates that a spin 1/2 particle must make a 720 revolution to return to an original condition. Single loop of strand is turning over 180 degrees with every revolution, so dynamic twist may obviate the need for a figure eight. In development.

Time Dilation in Gravitational Fields

Time dilation due to gravity is due not to the acceleration (or warping of space) but to the presence of mass(es) and their effects on gravitons returning and leaving the masses. For example, with two large masses there is a point between them at which the acceleration due to gravity (the warping of space along the axis of the masses' centers) goes to 0. The *mnp* Model suggests that at this point the time dilation is essentially the same as if the two masses were on one side of that point. With three masses, centers in a plane, the author suggests the time dilation is less than if the 3 masses were co-linear on one side, but far more than nothing.

The GPS system is a strong experimental proof that gravitational and Lorentzian time dilations occur. The analysis involves careful correction for speed and gravity, ignoring other accelerations. The author suggests that a similar careful analysis of the GPS satellites view of Earth clocks will show that GPS satellites see Earth clocks as slower due to the increased gravity but FASTER due to slower movement, not slower due to relative movement of the Earth clocks. Hints of that may be available in the tuning of command frequencies, though since earth transmitters can easily be made more powerful, inefficiencies in satellite reception are not as significant as the timing corrections required by the GPS measurement system.

The author suspects that since acceleration does not lead to time dilation, the Twin Paradox may be history.

Neutrinos

Neutrinos do not appear to be quantized, but recruit mass as they travel through matter. Their initial mass seems to depend on what interaction created them, but since quantized loops of charge material are basic to the *mnp* Model of particles, it seems that neutrinos would not include the basic entities of charge. The best description of neutrinos at the moment appears to be "made of the same *m*-figments that make up most gravitons and form fhotons (which have all *m*-figments aligned so they can be affected by magnetic and electric fields) but configured as balanced rings." This description leads to two "types" of neutrinos moving at c (axis in or axis out) which might respond differently to different nuclei or measurement techniques.

Approaching c (2013-09-16)

As particles approach the speed of light, they become increasingly difficult to accelerate further using magnetic or electromagnetic means. The author wonders, though, if the "back emf" from the accelerated particles goes up as well or if that has not been measured as being miniscule compared to the effort involved in maintaining the magnetic fields. To whom it may conCERN.

The author suggests that gravity is a far more efficient accelerator of particles, and that particles can achieve c in a large enough gravitational field. The author suggests that neutrinos might easily accelerate high speed particles, even if traveling in the same direction rather than the opposite direction. The experimental difficulty, of course, is taming enough neutrinos!

Gravity (2013-10-28)

Gravity has gotten no simpler in the *mnp* Model of gravitons moving both away from and toward mass. If the material universe is expanding, returning gravitons in a two-way model may WELL look just like gravity from a distant source once the gravitons have reached the boundary where they are separated by more than the Separation/Existence distance and start to return non-uniformly.

Permittivity and Permeability (2013-06-19)

Permittivity constant e_0 and permeability constant u_0 should be not a function of the density of the field potential in our labs but a function of how much influence can be transmitted per second.

Progress (2014-02-07)

In developing the mathematics of the *mnp* Model, it appears that the basic effect now called Separation (which keeps figments in a strand from occupying exactly the same location and direction) is not computationally important for many relevant aspects of physics. That is, we can defer the details of THAT third of the *mnp* Model to later. Though Separation may prove useful in describing the deflection of a fhoton by a field. And the (short) range of Separation will explain the anomalies in gravity at great distances, when the gravitons are further apart than their tendency to separate, and so are more strongly influenced by oncoming gravitons. [The author feels that the "progress" created by deferring a solution to some unspecified date in the future is more appropriate to politics than science. Prioritizing efforts is useful in science too, it is just not properly called progress.]

Wavelength is Inversely Proportional to Energy

The *mnp* Model still does not yet have a good explanation of why the fhoton (the basic instigator of electro-magnetic radiation) grows in area transversely as the square of the energy in the fhoton so that the length of the fhoton goes down as the inverse of the energy of the fhoton. At wavelengths greater than 1 meter it appears that the fhoton is not as dense as the Separation effect would allow, so this inverse relation must depend on an interaction other than the separation of figments. The *mnp* Model suggests the existence of a maximum wavelength, minimum energy for a fhoton. The *mnp* Model still does not have a convincing explanation of why the fhoton is redirected by the relatively weak fields created in, for example, diffraction experiments.

Infinities - There Are None (2013-10-07)

The *mnp* Model uses the time required by weak interactions (which change the strand structure of fermions in the *mnp* Model) of 10^{-8} seconds to suggest a length for the quantized loop that forms the structure of matter. This leads to the suggestion that the Standard Model's generations and Feynman propagations in interaction and Feynman diagrams have limits based on the time required for the possible interactions. The possibilities and regressions and oscillations can never become infinite.

Realism (2013-10-30)

Many theorists ascribe to a model-dependent realism, some philosophers suggest its all a dream, some philosophers of science accept that the consistency we experience and measure suggest consistent laws, even though we encounter surprises at many different scales of experience and measure and do not yet understand all our measurements. Many physicists have given up on realism if realism must be an understandable, intuitive description of how and why experiment shows what it does. Some are perfectly happy just measuring what is and figuring out how to measure more phenomena, though they use models to decide the next interesting step.

To the author, discussion and decision about how to understand and how best to proceed are, at large scale, philosophical questions. Recent authors' writings about physics (Greene, Deutsch, Hawking, Gribbin) should be recognized, appreciated, and respected as Natural Philosophy, even if they use phrases such as heterotic string theory and ask and try to answer questions about how it is that we know what we know. Most seem to feel that physicists have abandoned explanation entirely, that a few are seeking simpler mathematics but that most have gotten used to acceptance and utility in place of understanding. In these readings, this author hears a small Munchkin voice asking "Sir. What I want to know is if you are a good realist or a bad realist." Eventually, the author hopes to be a good realist with an understandable, intuitive description of how and why experiment shows what it does. But I repeat myself. Actually, *mnp* 's position has to be starkly realist - local variables, substructure, "single photon" diffraction, photon wavelengths, gravity as measured are all to be explained without magic, extra universes, wormholes, or singularities. "No one is thinking this way." So it seems cold, windy, and lonely on this mountaintop, which may be a peak or just a local maximum, but the author persists in thinking that incompatible understandings and explanations may well indicate that all sides of all incompatibilities need to be revisited and re-explained.

Stark Realism (2013-10-31 to 2013-11-03)

So what is stark realism? (Deep breath in) The speed of light IS constant. Particles are made up of constituents that do not travel faster than light. The variability of particle location and momentum is an inherent part of change in location and velocity just as the Lorentz transforms are an inherent part of movement. We cannot know both the nearly exact position and the nearly exact momentum below a certain limit. In fact, we cannot know a location exactly, despite

many texts positing just that. There are no "points." (This in concert with String Theories.) Electrons and muons are uniform in structure but can spread out in appropriate fields, do surround nuclei as a loop tightly coiled with constituents moving at the speed of light but do not orbit. Particles become foreshortened to a fuzzy limit at high velocities, and exist longer if they are moving. Moving particles create skewed fields as they move. "Space" is measured by matter and by light and by neutrinos. Time measured by matter compared to light may lead to different measurements, but we will never be able to measure the underlying Minkowski space-time except by inference. Wormholes won't be found. (2013-10-31) Black holes warp only matter's ability to measure distance and time by destroying matter. Black holes limit the theoretical ability to send out coherent signals by altering the paths taken by those theoretical signals. Black holes do not change the underlying non-structure of space. Black holes preserve mass/energy and charge and momentum but not particles or spin or orbital angular momentum. The universe has no access to other universes on its own. There are no extra dimensions. Measured space may not expanding if the underlying movement of all entities that make up matter energy and fields are slowing. (2013-08-19) Quantum Mechanics "just works" even though physicists don't care about the exact wave functions. The *mnp* Model suggests some limits at the extremities of Psi functions, but is realistic enough to recognize the inherent "rightness" of QM and Dirac's equations for the electron. Please, do not try to read this paragraph in one breath. Oh, too late.

Perhaps philosophers of science will someday have new vantage points to discuss how complex numbers, quantum mechanics and string theory got so much right. In the *mnp* Model, tight coils make a circuit and come back a slightly different location with a slightly different direction, which may have analogies in complex numbers making a revolution and returning to a pure "real" number.

(2013-10-10) Elementary string theory's need for 9 spatial dimensions plus one temporal dimension to make "the infinities go away" (Greene p.84) may be related to coils in three dimensions, with the 3 pairs of "imaginary" dimensions hiding in the coil's traverse of the other 2 physical dimensions before finishing a revolution with time simply marching on (or measured by the duration of a revolution.) Flattening with movement involves "hidden" rotating in the two dimensions perpendicular to movement. Maybe the hidden dimensions are hiding in plain sight.

Quantum Mechanics wave (Psi) function squared may be related to a coil's having one degree of non-freedom of movement (at c along the axis of movement) with freedom to move in 2 dimensions perpendicular to the movement along the coil.

There (2013-10-30)

Channeling Virginia Wolfe's pronouncement on the author's surrounding city Oakland, let me suggest "Space has no 'there'ness without matter, energy, and fields." So conceptual space may extend forever, but space measured by matter or fields is limited by the region visited by matter and fields.

Uncertainty (2013-10-30)

Greene (Fabric of the Cosmos 2004) discusses measuring EXACTLY. From what, I ask. Consider generating two entangled particles. Well, they come from an atom from some orbit(s) but I have no confidence they come from exactly the same point relative to the nucleus at exactly the same time and that we can even have any idea exactly where that "origin" is. Adiabatically, the center of the atom may be a useful origin if the atom does not jiggle or move afterward. In a crystal, it will vibrate. If not a crystal, what is holding it to some where? (Note some and where are separate words by choice.)

More rants on views of uncertainty (also 2013-10-30) "You may have measured v and p. Fine. That's what you think. Be assured you might even have been right. About both. You just can't KNOW you were right."

It gripes me that physicists talk about knowing exactly where something is and having NO IDEA what its momentum was. Dirac's delta is a useful convenience, NOT a description of reality or measurement.

So in spite of *mnp* 's attempt to explain much and the author's now calm confidence that thinking "this way" will be useful, much development remains.

Introduction to The First Talk, Not Yet Given (2013-11-03)

To introduce the *mnp* Model, one might list the basic principles of our model of the physical world known as physics. 1) The speed of light is constant 2) Variation, jitter, and probability are fundamental/exist and lead to 3) particles and behaviors are discrete and consistent and 4) we and the universe exist.

In any model, variability is required to create consistency and quanta are required for a non-homogeneous universe.

In the *mnp* Model, all (3) of the underlying constituents of matter and fields move at the speed of light and hence nothing real can travel faster than light. Variation is explained, as when an electron makes the transition from one energy state to another, or fails to make the transition and re-emits the exciting photon. Mechanisms are proposed for quantization. Time dilation and length contraction are required for movement and inertia. Quanta necessarily arise from the 3 basic and unchanging entities and the 3 basic and unchanging interactions. To be continued.

What's In a Name (2013-11-03)

"Never underestimate the power of a good name" might have been said by a physicist before the mantra was picked up by advertising executives and branding specialists.

Most of the *mnp* blogs have referred to the 3 basic constituents as "basic entities." In the absence of feedback, the author will be experimenting with reverting to the earlier term for the constituents. Seen as uniform in range and strength of the three influences or interactions, m's, with axis perpendicular to travel, n's with axis parallel to travel direction, and p's with axis anti-parallel to travel direction are together called figments. The interactions, a tendency to align Travel direction, a (weaker, apparently) tendency to align Axis, and a strong but extremely short range effect to separate heretofore called Existence. Separation is, as of today, seen as a better choice. Together, these three interactions are called effects.

Closing

This 25th blog entry is offered as a status update with no major new development.

- Fini -

Appendix A - Musings - Three Entities and Three Interactions

In the classical manner of proof by exhaustion, the question

Is the *mnp* Model of three basic entities whose only difference is in one of the three methods of interaction is sufficient to explain the known electrical, magnetic, electro-magnetic, and gravitational properties of matter, fields, time, and space as measured by physics, experience, and the existence of life?

must be paired with the opposite question "Are three basic entities necessary? Could two suffice? One?" Offering no proof, the author's initial answer is no - three values on one conceptual dimension seems like a minimum. "Conceptual dimension" is used in place of "property" to emphasize how few are needed, not to inflate the number of dimensions in the Model or to conflate physical dimensions with concepts properties and behaviors.

Side Trip Into Different Ways to Create Variation in Interactions

The author admits there are many ways to form those three or more values on one conceptual dimension. From a single entity combined in different ways, limiting the number of results is important. If 5 or 9 or 10^n possibilities arise with similar probabilities or sizes, then the results are not simple enough; the combinations are too complicated.

Further reflection suggests that topology holds the key to reducing the 3 entity issue. Some single basic entity could form positive, negative, and truly neutral foundations but would need 3 dimensions to form unique shapes in those 3 dimensions. That involves opposing (directions? foldings) for positives and negatives or additional dimensions that give a basic identity opportunity to combine topologically in different fashions. In three dimensions, a figure eight path that rotates about an axis on one side of the figure eight either has the path leading in at both poles or leading out at both poles, forming two shapes that could interact differently. But how would such convolutions be matched by other configurations that would limit the number of interaction types seen at a higher level? That is, how would the system limit the number of possibilities to be commensurate with

String sections all identical with identical properties could also combine to form different shapes in multiple dimensions, with the topology of the presentation being different in our three space.

Note that interesting rotations become possible in 3 space and confusing and non-unique in higher dimensions.

End of Side Trip

The interesting issue is "to create negative fields and particles and to create positive fields and particles" do we need 2 or 3 different patterns? The author suggests for a negative static electrical field, we need something that responds one

way to a field around a negative charge (attracted) and something else that responds the other way (repelled). For that field to exist, something must spread that field without being consumed itself.

Apparently the concept of "proof" has over the last century gradually become "quality of explanation" since the foundations of the Theory of Proof have been moving or changing. Even so, the author recognizes that the *mnp* Model can make few claims to Quality of Explanation.

Appendix B - Humor - Parallel Universes (2013-07-25 and 2014-02-12)

The multiple parallel universes model of physics seems to be becoming more acceptable and mainstream as diffraction and interference experiments get harder to explain.

A standard thread is that the other parallel universes exist when any probabilistic choice is made. In other universes the opposite DID happen.

So now parents have an even stronger tool for offspring control. Bad enough that parents say "you will _fall down_" or "if you do that you're going to _hurt yourself_" thus usually proving to their children that they don't know what will happen. I personally prefer "you might _____" or "if you do that you might _____" or "I don't want you to _____" so at least they don't need to question my honesty or knowledge.

Now parents can say "think about what will happen in all those other universes even if it doesn't happen to you in this universe." So "don't _____ because even if you don't get hurt in this universe, all those other children like you will get hurt in the parallel universes." Heavy karma for anyone to be dragging around.

Remember, though, that royal scapegoats didn't work too well for raising future kings. Or at least kings seemed to do what they wanted, hence the length of the Dark Ages.

So maybe there's hope.

Mechanism for Spin and Orbital Angular Momentum Revisited - Post 24 (2013-06-11)

Using the Twist Variation in the *mnp* Model

Introduction

This document builds on the 2013-06-02 post Spin, Angular Momentum, Shells, and Orbitals and does not repeat the background information contained there and in previous posts and the main *mnp* document (currently quite outdated 2012-12-). Certain suggestions in the June 2nd blog are called into question. Qualitative suggestions, including additional reasons to picture particle structure as coils perpendicular to the surface rather than flat on the expectation surface, are presented. Many different ways of trying to understand h and angular momentum in the *mnp* Model all seem to lead to the conclusion that the basic entities may have a relatively large radius of influence and certainly a relatively large radius of "effective mass."

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- Appendix A - Notes section C
- Appendix B - Spin Angular Momentum - I - Details section C

Twist Variation of Angular Momentum

The twist variant of spin and orbital angular momentum behaves ”properly” for leptons of differing mass and charge and differing coil diameters in the *mnp* Model of elementary particles. The *mnp* Model sees, for example, electrons as six quantized loops of ”negative charge material” made up of aligned basic *n*-entities as closely packed longitudinally as the equilibrium between Travel Alignment plus Axis Alignment against Separation ”allows.” What does angular momentum mean when a six-filament strand twists? The strand may twist many different ways, but to form a closed figure (think of a spheroid) the strand must make an odd number of twists. That odd twist is (for the twist variation to behave ”properly”) the source of Spin for the particle.

Take a transverse section of the strand, with radius r:

```
  o  o
    /r
o  +  o

  o  o
```

The radius r and distance to adjacent filaments r represents the equilibrium distance between filaments based on the Separation effect. The angular momentum is actually in the movement (precession?) of the filaments in the strand around the center of the strand. The entire very long strand, compared to its radius, is rotating and that angular momentum of the rolling cylinder leads (to be explained later and calculated even later) to Spin. Any direction of view from outside the electron will see this rotation projected around the axis or view.

Orbital Angular Momentum

If the spherical shape is twisted 180 degrees, two 180 degree twists are applied to the strand to achieve the resulting multi (in the first case, two) lobed shapes. The 180 degree twists are in opposite directions from the flexible point of view of the center of the strand, but in the same direction when viewed from outside the electron. So from outside we see angular momentum if looking along the axis of the twist, either clockwise or counterclockwise, and no orbital angular momentum if looking across the twist. Projected on a z axis, that should be 0 or $+h/2\pi$ or $-h/2\pi$.

Shell Sizes

The author has had difficulty relinquishing the image of the coils having axis mostly perpendicular to a surface of expectation. The previous blog Spin, Angular Momentum, Shells, and Orbitals in the *mnp* Model contains explanations of coils unraveled with Coulomb potential and *m* basic *m* entities supplying the means to open up the coils. That blog was missing an essential point. The ONLY way for coils flat to the surface to open up is to have fewer coils, since the length of the quantized filament loops is essentially fixed, as is the length of the strand loop.

Coils Perhaps Perpendicular to the Expectation Surface of the Shell?

If the coils of the electron charge structure have an axis parallel to the ”surface” of the shell, shell quantization might be explained. Losing a coil might allow the other coils to spread more along the coil axis to a limit, since the longitudinal stiffness of the strand might allow a certain amount of expansion. The argument for relaxation of coils as the six filaments are slightly less tightly coiled in the previous blog Spin, Angular Momentum, Shells, and Orbitals in the *mnp* Model is useful here, but does not apply in the plane of the coil due to the quantum length of the strand and loops. Coils perpendicular would not need to twist in alternate directions to lie ”flat” on an approximate surface of equal Coulomb potential in the case of S-shells. The energy in the shells would be contained by Axis Alignment (the basis of charge and magnetic effects) rather than Travel Alignment and would not need to stay with the coils themselves but would be bending at much higher radii to merely stay within the shell, tending to follow the axis of the ”spring” of the coils. The basic entities that constitute this energy will be approximately aligned in Axis and hence more or less polarized.

Electro-static fields become simpler. Coils perpendicular to the surface will actually send individual entities of the same type more perpendicular to the surface and individual entities of the opposite type more parallel to the surface, independent of which way the coils are rotating.

Additional Support for Coils Perpendicular to the Surface (2013-06-09)

- Coils need a half twist to flow smoothly due to the longitudinal stiffness of the six filaments, and those twists need to be basically the same direction.
- By twisting six existing loops, the Model provides a mechanism for quantum loops of charge material to combine, separate, and re-combine.
- The weak interaction, seen in the *mnp* Model as the complete exchange or separation of charge material loops between particles, takes time to unravel the entire strand. The length of the loops will be approximately one or two times c * interaction time. The factor of two is present because an untwisting may also untwist the "back" or "other side" of the loops.
- The strong interaction, seen in the *mnp* Model as the interrupted and incomplete exchange of charge material loops between quarks, has time for the transfer of filament loops to be interrupted, with no early completion as a weak force interaction since the strands are completely twisted.
- Since a large number of coils are expected to be present, the difference in Spin Angular Momentum at shell numbers less than thousands is not expected to be apparent for numerical models that rely on all coils to provide angular momentum. (2013-06-10 2110 considered unlikely to be needed)
- The basic entities in the *mnp* Model can pass through each other, and strands and loops can pass through each other, but parallel and almost parallel stranded filament loops have a great deal of resistance to passing through, since so many basic entities are involved in aligned filaments.

Much in the *mnp* Model of static charge fields, moving charge fields, and magnetic fields will need to be revisited, as will response to Coulomb fields. So the author includes coils perpendicular to the "surface" as a definite possibility. To be continued.

Checking the Numbers

Looking at (and for) numbers can be a useful sanity check for a theory. Even determining if a range on numbers could make sense is better than discovering the numbers could never make sense. Discovering that the numbers could never make sense is still better than running with an impossible theory.

So the author will try (again) to examine angular momentum in a mostly classical fashion. Spoiler alert (2013-06-10 1500): if the twist variation does not work, the angular momentum is not a direct effect, but as in the previous blog is a "peeling back" from the normal tight configuration of the strand. As such, no direct justification for h is possible yet .

As a starting point, if total angular momentum h were to be provided by a particle with mass 9.11e-31kg acting as a point or a ring moving at c, the radius of the circle would be:

momentum h = m r c -so-
r = h / mc = 2.424e-12m

This should give some clue that unless the angular momentum effect comes from somewhere else or some non-intuitive configuration, movement of mass alone cannot account for Spin. (2013-06-09) A number of explorations of configuration follow.

Notation:
m_e = mass of electron
l_l = length of the quantized loops
r_1 = radius of strand = closest the basic entities want to be in a transverse direction

If the strand, traveling longitudinally at c, makes 1/2 twists per quantized loop,

c/l_l = number of half rotations per second
$c/2l_l$ = number of rotations per second

Spin Angular Momentum - I (2013-06-04)

The first approach to angular momentum looks at angular momentum of the mass of the electron rotating in the strand (m(r x v)) as centered on the center of the six filaments in the strand. Transverse velocity of the filaments in the strand is

$2\pi r_1 c/2l_l - or - \pi r_1 c/l_l$

Transverse angular momentum due to a twist is

$m_e c\pi r_1^2/l_l$

Experiment shows that projected angular momentum S_z is $\hbar/2$. The author may have a constant factor wrong, but suggests that the angular momentum in the twist, spread over the entire surface of the electron, is h. The Stern Gerlach experiments measure anomalous angular momentum (from outside the particle) so sees basically the spin of the top half of the particle. Viewed from inside the particle, the effect of spin is twice as much. At least that is the author's current interpretation of one of the differences between introductory quantum mechanics' model of the electron and Dirac's four vector description of the electron.

The details of the first set of calculations for Spin Angular Momentum have been relegated to the Appendix. Twist momentum is proportional to the square of radius r_1 and inversely to the length of the loop l_l, so twist momentum goes down linearly as the radius goes down since loop length is proportional to radius.

Stop the Presses - Spin Angular Momentum - II (2013-06-09 0530)

But the entities are not necessarily seen in the *mnp* Model as acting at their center. The r_1 distance represents the Separation distance, not the radius of the effect of entity interaction. Since the basic entities are seen as having effects on each other ONLY to some radius r_{effect}, other models of "mass" distribution are possible. The author finds thinking of the entities as a "shell" useful if imprecise. The Separation distance could represent something like the thickness of the "shell." The "mass" would be distributed around the $4\pi r_{effect}$ surface. Since mass arises from the existence of the basic entities, their three interactions, and their ability to change the direction and axis of other entities and have their direction changed by other entities, the author prefers to use "mass" in quotes. Inventing another term such as "presence" is the alternative.

The angular momentum of a spherical shell of negligible thickness is

$2/3 mass r^2 (revolutionspersecond)$ or
$2/3 m_1 r_{influence}^2 c/2l_l$

The radius of Separation r_1 is much smaller than the radius of influence $r_{influence}$ so assuming a center for the entire stand is the center for all 6 loops and assuming all 6 loops rotate around the center of the strand with radius $r_{influence}$ will lead to negligible differences in calculations of angular momentum (certainly less than our assumption of spherical shells for each entity!) When all the entities in a strand from the flexible reference frame of the center of the strand are included:

$2/3 m_e r_{influence}^2 c/2l_l = h$ so
$m_e = 3h2l_l/2cr_{influence}^2$ or
$m_e = 3hl_l/cr_{influence}^2$
$l_l = m_e c r_{influence}^2/3h$

Calculating l_l for a range of $r_{influence}$ values:

The rotations per second and imputed speed columns are added for reference. Internally, the entities may behave very differently than the external behavior. They may not be physically rotating within themselves or they may not be limited to c within themselves so that apparent rotation of the basic entities may have outer surfaces appearing to move faster than light.

If the apparent size of quarks were $10^{-10}m$, then this table might seem reasonable. Having a lot happening inside an apparent fuzzy sphere surface might be plausible for quarks, perhaps even for neutrons and protons, but not for electrons which the experimentalists still consider points. Certainly if $10^{-18}m$ is considered the upper limit for quark and electron size and $10^{-17}m$ the range of the weak force, the $10^{-10}m$ number is not feasible. The range of the weak force is considered the range of filament contact for quarks, which exchange is completed in weak interactions. The size of protons and neutrons 10^{-15m} to 10^{-12m} is the range of filament movement in the strong force, which is seen in the *mnp* Model as attempted filament exchange constantly prevented from completing.

$r_{influence}$	l_l	rotations/s	imputed speed
1E-06	1.375E-01	1.091E+09	6.855E+03
1E-07	1.375E-03	1.091E+11	6.855E+04
1E-08	1.375E-05	1.091E+13	6.855E+05
1E-09	1.375E-07	1.091E+15	6.855E+06
1E-10	1.375E-09	1.091E+17	6.855E+07
1E-11	1.375E-11	1.091E+19	6.855E+08
1E-12	1.375E-13	1.091E+21	6.855E+09
1E-13	1.375E-15	1.091E+23	6.855E+10
1E-14	1.375E-17	1.091E+25	6.855E+11
1E-15	1.375E-19	1.091E+27	6.855E+12
1E-16	1.375E-21	1.091E+29	6.855E+13
1E-17	1.375E-23	1.091E+31	6.855E+14
1E-18	1.375E-25	1.091E+33	6.855E+15
1E-19	1.375E-27	1.091E+35	6.855E+16
1E-20	1.375E-29	1.091E+37	6.855E+17
1E-21	1.375E-31	1.091E+39	6.855E+18
1E-22	1.375E-33	1.091E+41	6.855E+19

Table C.6: ?Radius of Separation vs Radius of Influence?

Angular Momentum - III (2013-06-09)

The "twist" variant of Spin Angular Momentum still behaves "properly" for different charges in quarks and electrons and positrons. The magnitude appears much too low, though the mechanism of measurement and torque transfer has not been explained. That mechanism needs to rely on Travel Alignment and not Axis Alignment, since the same value for Spin is measured independent of the charge of the particle. So an additional mechanism, in the *mnp* Model search for why, needs to be found for the magnitudes of h and hence the Spin of the electron.

Repeated coiled loops might be a way to "generate" more apparent momentum. With $r_{influence}$ around 10^{-20}m the generation of influence needs to be about 10^{24} greater. If an effective radius can be 10^{12} greater, that works. If the effect is linear, as if number of coils would increase the measured angular momentum as a linear factor, 10^{24} coils might be required.

Angular Momentum - IV (2013-06-09 1900)

The perpendicular coil model may offer a number of numerical and theoretical advantages, in addition to the qualitative advantages listed earlier.

- Twist will exist everywhere.
- The magnitude of influence radius, coil radius, and angular momentum promises to be better. Investigated below.
- Since a large number of coils are expected to be present, the difference in Spin Angular Momentum at shell numbers less than thousands is not expected to be apparent.

So how do the numbers work? Coil radius is expected to be somewhat but not hugely greater than the radius of influence $r_{influence}$. The author suggests

$1.5r_{influence} < r_{coil} < 10r_{influence}$
n_{twists} is the number of half twists (odd)
$n_{twists} = l_l/2\pi r_{coil}$
$Tryansatz2 : r_{coil} = 2r_{influence}$
angular momentum = $?1/2?n_{twists}2/3m_e r_{influence}^2 c/2l_l$
$h = (1/2l_{=>l}/2\pi r_{coil})2/3m_e r_{influence}^2 c/2l_l$ or
$h = 1/6m_e r_{influence}^2 c/(2\pi r_{coil}$ try
$h = 1/6m_e r_{influence}^2 c/(4\pi r_{influence})$ or
$h = 1/6m_e r_{influence} c/(4\pi)$

So if the coiling radius is twice the influence radius,

$r_{influence} = 24\pi h/m_e c$

The radius of influence would be, uh, 1.828e-10m. Again, the direct approach is not feasible.

Angular Momentum V (2013-06-10 1600)

Return, finally, to the indirect or difference picture of angular momentum used in the previous blog Spin, Angular Momentum, Shells, and Orbitals in the *mnp* Model. Try to see the angular momentum as a difference from the "normal" tight coils for the electron. If the entire loop length is suggested by weak interaction decay which takes 1^{-8} seconds, the loop length will be 3m to 6m. If the loop has, for convenience, a diameter of 1m and a circumference of πm, the angular momentum of an electron mass traveling at c in a radius of .5m would be 1.366e-22. To reduce the angular momentum by h would be subtracting 4.849e-12 from the diameter. This suggests that the strand has in the neighborhood of 2e11 coils, give or take a factor of 4. The coil radius would be about 2.4e-12m, which again is bigger than expected from experimental results. Probably again related to the magnitudes of h, c, and the mass of the electron. This is a coil momentum variation, not a twist variant.

Angular Momentum Needs Extended Radius - Speculation VI (2013-06-10 1950)

The author's recent attempts to understand h all seem to point to needing a radius larger than the elementary particles. This could be shortsightedness. Yet:

Could the radius of influence and the radius of effective mass be MUCH bigger than the radius of coiling or the apparent radius of a free electron? The effects between entities would be minimal until the basic entities are almost coincident. This might allow coiling in small dimensions but "mass" to appear distant so that angular momentum are relatively large and dimensions are small. The twist variations may call for a radius of effective mass somewhat greater than the coil variations, but the difference is relatively minor compared to the leap from coil radius to influence radius.

In a twist variant with large influence radius, momentum of a single twist or half twist goes up as the square of the influence radius but down linearly as the number of coils goes up. To be continued.

Orbital Angular Momentum - Revisited

The theoretical $S_x^2 + S_y^2$ angular momentum from quantum mechanics might actually be zero, since looking all around the shell as if it were in a cylindrical sensing system, would see as much twisting in the strand going clockwise as counter.

In the perpendicular coil model, the magnitude of the orbital angular momentum may not be important, just the presence of twists in the opposite direction. The difference in projected angular momentum may appear to be reversing the spin of half the shell, though the effort to reverse that spin in two coils is miniscule. Currently, the magnitudes of momentum do seem to the author like a rabbit pulled out of a hat. The quantization related to twists is clear, so further development is warranted.

Conclusion

The twist variant of Spin and Orbital Angular Momentum is attractive in that it "explains" and tracks experimental and some theoretical quantum behavior. All methods of trying to "understand" angular momentum lead to similar "coils too big" results.

The V (fifth) approach attempts to compare h, the angular momentum of removing one coil, from a "tightly coiled natural loop" ignoring closure requirements by estimating loop size based on the time required for weak interaction decays and comparing the angular momentum of the mass of an electron traveling at c in that loop. Hand-waving to be sure; the 2e11 count for coils might be reasonable except that the coil size remains in the neighborhood of 2.5e-12m.

The VI (sixth) speculation suggests that the radius of influence and radius of effective "mass" are large, but the effects of the basic entities on each other are small until those basic entities get very close.

The perpendicular coil model, in which the lepton has a structure of tight coils with the strand twisted essentially one way with half a twist per coil and coil axis essentially parallel to the expectation surface, has a number of advantages over coils with axis perpendicular to the expectation surface. The perpendicular coil model could support either loop or twist momentum if the radius of influence is large.

- fini -

Appendix A - Notes

Yes, this is a new twist on the *mnp* Model.

One source suggests that a theory per week is about right for a productive theorist. Apparently I'm not usually that productive.

Regarding the Shell Quantization in the June 2 blog Photons and the Energy in Shells: "Theorize in haste, repent at leisure."

The author finds that differentiating the concepts (nouns such as Spin) from actions (verbs, such as spin) by capitalization helps keep what little clarity has been achieved.

Quantum mechanics unmeasurables, such as the magnitude of the spin angular momentum of an electron in any theoretical "measured" xy dimensions, where $S_{xy} = .866\hbar$, does not seem very useful at this point, nor are the cross sectional diagrams showing $spin_z$. To be continued.

Regarding fast and radical changes in a theory: A principle of what is now called computer science is that if the developers are finding bugs on an hourly or daily basis, there is no point in sending the product to beta testers to find bugs too. Maybe for usability testing, though a product ridden with bugs may not be very usable either. So maybe I should count blessings that few people are looking at the *mnp* Model now.

Understanding puns is harder than creating them. In like manner, understanding the *mnp* Model may be harder than creating it. Hats off to the brave readers.

Appendix B - Spin Angular Momentum - I - Details (2013-06-04)

Much of the material from the first investigation of spin angular momentum is included here, with less than optimal proof-reading.

$m_e c\pi r_1^2/l_l = h$
$m_e c = hl_l/\pi r_1^2$
Used later: $m_e = hl_l/\pi c r_1^2$

Solving for r_1 and for l_l gives

$r_1 = sqrt(hl_l/\pi m_e c)$
$l_l = m_e c 2\pi r_1^2/h$
$m_{loop} = m_e/6 =$ mass of one loop

If the transverse separation and the longitudinal separation of the basic entities making up the filament loops are equal, then more equations can be written, but since the mass of a single entity must be introduced, we are not closer to having two equations in two unknowns which would allow calculating the mass of a basic entity, the separation distance r_1, and the length of the quantized loop l_l.

$n_l = l_l/r_1 =$ number of basic entities in a filament loop
$n_e = 6l_l/r_1 =$ number of basic entities in an electron
$m_1 = m_e r_1/6l_l =$ mass of one entity

If the maximum density (that of the energy in fhotons, the particle aspect of classical photons as pictured by the *mnp* Model) were known, then numerical experiments with the magnitudes of the three interesting numbers could be made. The actual value for maximum density is likely to be between the Planckian density $5.155e96kg/m^3$ and theoretical quark star densities $3e18kg/m^3$ or neutron star densities up to $5.9e17kg/m^3$.

$m_1 = m_e r_1/6l_l$
$m_e = 6l_l m_1/r_1$

substitute for m_e in "Used Later" in the angular momentum formulas above

$m_e = hl_l/\pi c r_1^2$
$= 6l_l m_1/r_1$
$h/\pi c r_1 = 6m_1$
$m_1 = h/6\pi c r_1$
$r_1 = h/6\pi c m_1$

$m_1 = \hbar c/\pi r_1$

$m_e = 6 l_l m_1 / r_1$

So as r_1 goes up, the mass of each entity goes down, and the number of entities goes up. The filament loop gets longer, and the angular momentum of the wider separated filament twist goes up.

As a magnitude check, try the Planck density as the density of the filaments:

$5.155500x10^9 6 kg/m^3$ yields (with a factor of $\sqrt{3)/2}$ for the hexagonal packing transverse to the strand)
$r_1 = .34901045002666E - 043$
$l_l = \pi m_e c r_1^2 / 6\hbar$

a mass of one entity 1.69e17 and a filament length of 4.7e-73m which is shorter than the radius. LoL

The transverse rotation of the strand better not be too fast, or the basic entities may slow their "forward" progress to be making that lateral speed. No worries at twist numbers less than _

So for various theoretical r_1 values, what would l_l be. If $r_{transverse} = r_{longitudinal}$ what would n_e and m_1 be?

Obviously, this first approach doesn't work.

So five more alternates were looked at, starting at Stop the Presses - Spin Angular Momentum - II section C

Spin, Angular Momentum, Shells, and Orbitals - Post 23 (2013-06-11)

Abstract - short

Suggestions for why quantum numbers exist, why electrons follow the rules, and why 1/2 spin particles must be rotated 720 degrees return to the same condition are offered based on the *mnp* Model, which uses three tiny entities and three interactions operating only at very short distances to explain particles, fields, forces, and the measurement of space and time. A new interpretation of quantum mechanics' Ψ function is offered, perhaps to be called the "mass distribution interpretation" or the "coil surface interpretation."

Abstract - long

The fixed increments of angular momentum for spin and orbital angular momentum are seen as arising from the *mnp* Model of electrons as quantized sextets of loops of charge material with an essentially fixed length which coil, in an essentially fixed size with an even number of coils and an odd number of twists. Shells are seen as arising from the uncoiling of one pair of coils per shell number, reducing the number of coils in the electron. Orbital angular momentum is seen arising from reversed coil pairs, which can occur only when enough coil pairs have been straightened to relax the coiled loops.

The *mnp* Model is based on the premise that all entities making up matter and fields travel at c, the speed of light. This blog post aspired to add a second number, h, as the charge angular momentum of two coils in an electron or positron. After peerless review, the magnitude of h remains an experimental value for the *mnp* Model.

This document attempts to address one of the minor challenges proposed with the Hauser Criteria of Theoretical Success. "After you account for the quantization of the basic charge, how do you explain or incorporate quantum mechanics, for example, the electron shells." Note that quantum mechanics is considered a minor challenge for a theory of everything.

The development of the *mnp* Model has so far been qualitative, directed to understanding the experimental results of physics that must be explained and developing consistent ways to explain those phenomena. The author does hope to avoid chasing ever more complex phenomena with ever increasing mathematical complexity and ever increasing hidden dimensions.

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Deep Background

For those encountering the *mnp* Model for the first time through this "explanation" of intrinsic spin, quantum angular momentum, and electron orbitals: The *mnp* Model sees electro-magnetic effects arising from a tendency of the basic entities to align on their axis, which is perpendicular to travel for *m*'s, parallel to travel for *n*'s, and opposite travel for *p*'s. Gravity arises in even stranger fashion from the tendency of the basic entities to align in travel direction (since the basic entities travel BOTH WAYS in recruited gravitational field.) The mass of quarks, the extra mass called glue in quark triplets, the energy held by electron shells, and the basis of the photons of electro-magnetism is all made of the very same basic entity *m*'s. The *m*'s are recruited by loops of charge material, also based on Travel Alignment.

The three basic, tiny entities in the *mnp* Model are seen as moving at c. The charge material entities, *n* and p, can form single lines of each type *n* and p. These filaments formed into quantized loops in the early universe based on the attraction of Travel Direction plus Axis Direction effects with the tiny entities kept apart by the Separation effect. Since Travel and Axis Direction effects "look forward" somewhat, the filaments tend to coil tightly but also respond to outside influence easily since single filaments are flexible. Many *n* and *p* entities remain unattached as single entities and are available for recruitment as fields.

What's an Electron?

Filament loops of *n*'s can form six-strands which coil to form electrons. The six-strand loop has a relatively fixed length and is relatively rigid along its length and is flexible perpendicular to its length but not nearly as flexible as single filaments. As with single filaments, a six-strand loop coils at a relatively fixed radius based on the three effects and the tendency of the Travel and Axis Direction effects to favor looking forward, so that once a turn is started it is self-reinforcing, resisted only by the Separation effect. Since the six-strand is relatively stiff along its length, as a single loop uncoiled the six filaments will "turn over" in one complete traverse of the loop. Since the electron is a physical object and present in real space, the loop must be continuous at any given time and with each of the six filament loops the same length, the simplest loop would be a folded figure eight. (-: Invoking Noether's Theorem for loop and strand conservation would be premature :-) To bend that loop into a smaller area, even numbers of twists will be needed, adding two coils with each pair of twists.

Intuition check: Imagine a long stiff rope spliced to itself. Flaking it down to a smaller dimension will require two opposing twists. The demonstration may be confounded by the twisted nature of most physical rope, which makes twisting one way easier than the other, but the thought experiment remains useful.

An electron will always have an odd number of twists and an even number of loops, based on the longitudinal stiffness and the quantized length of the six loops.

Free electrons are seen in the *mnp* Model as normally tiny spheroids, though in the presence of fields may spread quite far. Free electrons are coiled naturally, as tight as they can be. A free electron, in the absence of fields, has a maximum number of coils, never more.

Spin is seen arising in the *mnp* Model from the coiling of the loops that form leptons. Note the contrast to the standard assumption that spin is fundamental.

Orbit is not a useful concept in the *mnp* Model, which does not see electrons as orbiting at all. The coiled loops form a shell, with the filaments in the coils moving at c. The loops need to "relax" in some fashion to form shells and are seen as recruiting m's to follow the n's moving in the coils, with more m's the larger the coil diameter. These m's form photons (fhotons in *mnp* parlance) when a shell shrinks. Perturbations to a coil or coils spread along the six-strand, usually at c. Perturbations may also influence neighboring coils "sideways" faster than the entities traveling along the coil would.

Notice one effect of the *mnp* Model of the electron: there is no "to big to fail" or "too fast to fail" since the electron is not traveling as a particle at ever higher speeds in larger shells, but just stretching its coiled net further. An electron in a large shell may respond to perturbations more slowly than an electron in a smaller shell when those perturbations travel across the coils while any perturbations along the coils will take the same amount of time to spread. The *mnp* Model sees no reasonable limits on electron shell size.

Mass Surface: Leptons are seen as having their mass at their "surface" because of the coiling across the logical surface, which varies as the basic entities within the coiled loops move. Since the coil locations vary and since the coils do not necessarily lay flat with each other and since coils locations move in response to fields and perturbations, the surface is approximate and diffuse, so the concept of "expectation value" remains useful. Cloud is a good term for electrons.

The spin of an elementary particle is therefore seen as a truly intrinsic physical property, akin to the particle's electric charge and rest mass." From Wikipedia downloaded 2013/05/20.

Spin Direction

Viewed from outside, the coils in an electron all travel in one direction, either clockwise or counter-clockwise. Two is an invariant scalar in the universe for the number of directions the coils in a surface can be rotating. The direction of the coils determines the direction of the Spin of the fermion, and that Spin is the same looked at from any direction outside the particle. so it appears to be a fundamental property. The Spin sign explanation is easy. Further, Spin is a constant property of the fermion, though electron shells can be turned inside out to reverse the coil direction and hence the Spin. So particles paired by Spin maintain their "hidden sub-structure" independent of what frames they are measured in. Why the magnitude of the spin is constant is the interesting question that will be raised again after a discussion of angular momentum.

Planck Constant - the Search for Meaning

This document attempts to address an origin for h in leptons. The Planck constant also shows up so significantly in the wavelengths of light and is only partially a matter of light being produced by electron shells contracting. A post long gestating will address this issue (partially); the mechanisms must be somewhat different than the lepton basis discussed here relating to the "tightest" curvature of the coils. The origin of h for photons will be based on the strength and distances of the Separation effect that keeps the basic entities apart as well as the presence of Travel Direction and Axis Alignment Effects. Later.

The author initially hoped that a simple check for a coil to have h/2 angular momentum could proceed as follows: Classical angular momentum is m(r vector cross velocity vector). If each coil has a radius r, there are n coils in a free electron, the mass of the electron is M_e, v is known to be c since all basic entities in the *mnp* Model are moving at c. So the angular momentum of a coil is h/2 which equals $(m_e/n)rc$. Mass per coil is .511meV/n or $M_e(= 9.11x10 - 31kg)/n$, angular momentum of one coil is h/2 and. Unknowns are n and r, n = mc/h times r and. r = n(h/2Mec). In the limit, if n is one and a single loop (the theoretical largest the electron could be), the radius is 2.42e-12 meters.

What would the radius of a loop carrying angular momentum of h/2 be? Using the classical formula with much more effrontery than art may not be a terrible idea, given that the basic entities all travel at c but see space as an orthogonal tabula rasa in the *mnp* Model. The effective radius would be 2.42e-012 meters. What does THAT mean? 1/21 of the Bohr radius is not a reasonable size for the entire loop that makes up the electron. The *mnp* Model just crashed and burned if the electron is incapable of expanding into a 1s shell.

A different interpretation of that radius of curvature is called for. Instead of a physical radius, that number is a radius of curvature representing how much the coils must UNCOIL from their natural tight configuration in order to remain a loop in the electron. Start with

n_{ec0} number of electron coils in a free electron
r_{ec0} Radius of electron coils in a free electron
l_{ec} total length of the coils in an electron = $2\pi n_{ec0} r_{ec0}$
m_e electron mass

mass per smallest coil is m_e/n_{ec0}

Geometry: To uncoil (by 2 coils) to the next largest "size" of electron requires that the new coil radius be $n_{ec0}/(n_{ec0}-2)$ of r_{ec0}. For large n, this is close to $r_{ec0} + (2/n)r_{ec0}$.

So a n=1 shell has one fewer pair of coils, and a n=2 shell has two fewer pairs of coils. What if a pair of coils were to be reversed in direction? In the n=2 case, there would be enough flexibility in the length of all coils for a single pair to be reversed. In the n=1 case, the shortening of length of the total strand would cause the electron to pop back to a free electron state with the reversed coils then being flipped to align with the majority. This reversal of coiling direction is not a brute force uncoiling followed by coiling the other direction, but is just a pair of 180 degree twists in the strand in the opposite direction to the expected twists,

Sub-Shells with Orbital Angular Momentum

P shells now aid in understanding Orbital numbers l and in understanding h. With l=1, the orbital momentum of the electron (x^2+y^2) is seen as h. So the author suggests the angular momentum in the two reversed coils is h or h times a constant, so that approximately $2r_{ec0}n_{ec0}mc = h$ or $r_{ec0} = h/(2n_{ec0}mc)$ and $n_{ec0} = h/(2r_{ec0}mc)$. Note that this is not quite a classical angular momentum, but represents the effort required to get those two coils rotating the opposite direction and does not include the lengthening of the coils due to Coulomb potential. So h is not useful as a magnitude yet, but the units make sense.

How to explain projected orbital magnetic numbers m_l? The two reversed coils appear, at any given instant, on one side of the electron. If a measurement is made, the test will force the axis of those coils to be either perpendicular to the z axis ($m_l = 0$) or parallel or anti-parallel to the z axis ($m_l = -1 or + 1$). The projected orbital momentum m_l is $\hbar$. Yet more numbers to visit later.

The taking of a measurement definitely forces a shell to make a choice. If, as *mnp* hopes to show, other shells with the same shape will be repelled by the choice of the first to be measured, the other similar sub-shells will be making a choice as well. Obviously electrons try to fill the sub-shells rather than collapsing if they happen to run into each other, as indicated by the stability and persistence of atoms in the universe.

D shells offer more degrees of freedom. In shells n=3 and greater, two pairs of counter-rotating coils can exist and the result will be a D-shell electron. A test at a given time can find the axis of both coil pairs perpendicular to the z axis ($m_l = 0$, one pair with axis perpendicular and one parallel or anti-parallel for $m_l = +-1$ or both pairs with axis parallel or anti-parallel for $m_l = +-2$. Two possible configurations exist: both counter-rotating coil pairs adjacent or the pairs separated, which would indicate that two types of D shells would exist (unless more are possible with different spacing of the counter rotating coil pairs.) Experiment indicates that 5 D shells can coexist, that different configurations of the counter-rotating coils do not lead to "different enough" shell shapes for more than 5 D shells to co-exist. The subsequent discussion of volume and cross sectional areas occupied by the sub-shells in Why the Pauli Exclusion Principle Works 170 is relevant here.

F shells have three pairs of counter-rotating coils. There are seven possibilities for 3 coil pairs: all axes parallel or anti-parallel to the z axis for +-3, two axes parallel or anti-parallel and one perpendicular for +-2, one parallel and two perpendicular for +-1, or all perpendicular for 0. There are three possible configurations: all counter-rotating coils adjacent, two together and one pair separate, and all three pairs separated. Presumably this would lead to at least three expected shell shapes, unless the relative distance between separated pairs leads to even more variations.

In this picture, the test for orbital momentum in P shells and above DOES make the electron choose. The counter-rotating coils are forces to make a stand either parallel or perpendicular to the choosing field. Current tests do not distinguish any information about 45 degrees or halfway. Those steeped in modern physics might say that such tests are impossible, though by now the reader can tell the author is a skeptic.

Digression on Shell Area:

Naive counting of unwound coils suggests 2p shells have a "surface area" similar to 1s, 3d similar to 1s or maybe 9/8 of 1s, 4f to 1s, 3p to 2s, 4p similar to 3s, … A table of "unwound coil pairs" for various sub-shells is an approximation of how "relaxed" the electron shell "surface" is: The number of "coil pairs straightened"

s	p	d	f	g
1				
2	1			
3	2	1		
4	3	2	1	
5	4	3	2	1

How shell area corresponds to shell energy is not entirely clear, since 2p shells definitely have more energy than 1s shells. Yet, with much more area, 2s shells have only 1/4 more energy than 1s shells and electrons can be bumped from 2s to 3s without a lot of energy or difficulty.

Hund's Rules

Since Hund's Rules on the ground state of electrons in an atom fold in electro-static issues as well as spin, the comments here are incomplete since they address only spin and coil direction issues. Electrons in neighboring shells will interfere less if they coil the same direction and have matching spin, since the approaching sides of the shells will have opposite coil rotations that do not interfere with each other, though the electro-static attraction from the nucleus will be the primary impetus for the first "bus seat" rule. If two "adjacent" shells are occupied by single electrons with opposite spin, the coil direction of the neighboring surfaces will match and so will interfere, with one shell probably turning inside out as it aligns with the other, then repelling to occupy separate shells (second rule). When unoccupied sub-shells exist, electrons paired by opposite coil direction and spin in a sub-shell would be expected to separate, with one turning inside out to match the coil direction and spin of its temporary partner, then to separate to occupy the available sub-shell (third rule). With shells more than half full, pairs of electrons with opposite coiling direction and hence opposite spins will interfere less with each other and with neighbors, so the electrons will form pairs when the electro-static forces from the nucleus are low (third rule).

Coulomb potential (static electric fields) are seen in the *mnp* Model as p entities traveling toward negative charges or away from positive charges, n entities away from negative charges and toward positive charges, and the m entities that form magnetic fields tending to be polarized toward or away from the static charge by Axis Alignment with the n's and p's and tending to travel more perpendicular to radial lines to the charge. This radial travel of the m entities is parallel to the coils of an electron in an s shell, so are available for easy recruitment by the electron's coils.

Photons and the Energy in Shells

The stranded loop that forms the charge structure of an electron will attract additional m entities by Travel Alignment to move parallel to the strand when the curvature of the strand is not too small (when the coils are large enough). That additional mass is traveling along with the coiled charge material in electron shells is traveling by the Travel Direction effect only. It is NOT polarized, since it is constantly changing direction and cannot align by the Axis Alignment effect with the charge material. Or maybe the m entities are polarized form the point of view of the charge material strand, but the net effect of each coil of m's worth is zero so it does not affect moments or angular momentums. In any case, the recruited m's cannot "cause" or create any angular effects themselves since they are caused to turn in the coils only by the longitudinal strength of the charge material loops.

That additional mass IS the excitation energy of the shell, which help with the Coulomb forces to keep the the electron coil loops expanded in the shell. The additional mass will be given up as a polarized unit, a photon, if the electron reverts to being a free electron

Obviously, since the excitation energy of the electron shell is so much less than the mass of the strand, the m entities that make up the additional energy are not as closely packed longitudinally as the strand itself. The m entities are emitted as a single photon, so the recruited m filaments must form sparse filaments and be close enough to each other to interact by Travel Alignment and Axis Alignment. Gray text is deprecated as of 2013-06-09 in favor of picturing the coils not flat to the "shell" but approximately perpendicular to the expectation surface. See Could Twists Themselves Lead to Spin and Angular Orbital Momentum 175 here and the 2013-06-11 blog post titled The Twist Variation in the *mnp* Model for more discussion.

The *mnp* Model is not quite ready to describe what happens when a fhoton comes into an electron shell. The fhoton may be captured by the shell or not based on quantums of energy. Presumably, in the *mnp* Model, the fhoton would spend a tiny bit of time to establish whether it "fits" and the electron shell will accept it. If not, since experiment shows that light not absorbed by an electron shell usually passes on through, the fhoton's induced fields lead it back to the original path if it fails to be captured. The answer is also related to the one-photon experiments of modern electro-magnetism, which the *mnp* Model can not quite explain unless the energy, called in the Model the fhoton, is easily guided by its self induced mechanical and electric fields.

In addition to being "clouds," electron shells and all other entities in the *mnp* Model are capable of passing through each other. Nothing is a hard shell or impervious, so for example tunneling is feasible, especially if there is an attraction on the loop on the other side once it gets through. A portion of a strand-loop can receive influence in part of itself, and the influence will take time for that influence to average out over the loop.

The energy retained by an electron shell will become important in the next two sections, on Quantum Numbers and Why the Pauli Exclusion Principle works.

Quantum Numbers

Spin offers two choices, based on coil directions either clockwise or counter-clockwise as viewed from outside the closed 3-d shape, which leads to negative or positive spin. The coil orientation is uniform around the shell so there is no "choice" involved when spin is measured, though fields and measurements can cause an electron to turn inside out and so reverse spin.

The following discussion concerns shell shapes. Since two coil directions are possible, all the numbers need to be doubled to determine the number of electrons allowed in that shell or sub-shell. Remember that the *mnp* Model sees the free electron as tiny, essentially spherical, formed by a coiling strand of six quantized loops.

Spherical, S (Sharp) Shells

For spherical shells, there are no counter-rotating coil pairs, so there can be no sub-shells other than the "sphere" with of course electrons coiling/spinning in opposite directions. There is no choice for the electron to make under measurement, it has an orbital angular momentum of 0.

P (Primary) Shells

For P shells the shell projected angular momentum makes sense if the counter rotation of the differing coils is parallel to z or perpendicular (and on one side or the other). The measurement forces the coils to "choose" an orientation in the potential/field. The possibilities are: coil axis parallel to the measuring z axis or anti-parallel (for -1 or +1 angular momentum projected around the z axis, don't ask me which is which), or perpendicular (0 angular momentum projected onto the z axis)

For a d shell, the momentum can be 2 pairs atop z axis for -2 or +2 angular momentum, on the other side for +2 or -2, both on the side for 0, or one on the side and one on top or bottom for -1 or +1.

Quanta - Why the Pauli Exclusion Principle Works

One of the axioms of Elementary Particle Theory is the Pauli Exclusion Principle, that no two leptons can occupy the same quantum numbers at the reasonably same location. The author's education has not progressed far enough into Quantum Field Theory to know if this exclusion is derived from a more basic set of principles, but the conceit of the *mnp* Model is to attempt to answer "Why?" from the three basic entities and three basic effects of the *mnp* Model.

Why do electrons behave quantized, and not occupy shells with the same quantum numbers? The answer comes in two parts. The first half of the answer is "what happens when two electrons with the same spin/coil direction interfere with each other." When an electron in a shell shares that shell with an electron of the opposite coil direction hence opposite spin, the coils are moving in opposite directions. The shells of course do not exactly overlap and are not stationary, but the two electrons have their own recruited m entities that make up the shell energy, each set traveling with the coils of one electron. Since the directions of travel for each electron are essentially opposite, the interference is very small. Neither electron will be recruiting m's from the other electron, so neither will collapse to a free state or a lower shell because the supporting m's have been removed.

When electrons in shells get too parallel, as when two electrons try to share 1s and have the same coil direction and spin, the energy (m basic entities) guided/recruited/trapped by the coils of one is attracted to the coils of the other.

And perhaps vice versa. The electron that attracts more might jump to a higher shell, the electron that loses energy will jump to a lower shell or become a free electron. Depending on whether more energy basic entities are available in the surrounding region or not, the result may be an excited electron and an electron in the original shell or an excited electron and an electron in a lower shell or an excited electron perhaps reverting to the original shell and a free electron. Note: where energy appears, the author is reluctant to use a confusing term, even energy potential or field potential, to refer to the free basic entities that exist wherever "space" exists and which are recruited for form gravitational, electrical, magnetic, and electro-magnetic fields that (mostly) superimpose except when a type of field becomes strong enough to dominate.

The photon comes out as a single photon since the m entities leave the coils almost organized. This experimental observation, that multiple smaller photons do not result from shell contraction, suggests that the strand makes the change starting at one location on the coils. So when the surfaces of two electrons are too parallel and the coil directions of both go the same direction, exclusion occurs.

So if the electrons have matching spin and are orthogonal enough (the Ψ function has spherical harmonics that are orthogonal in three dimensions at every given time), they will not interfere with each other.

Spin + and - states are possible for otherwise matching electrons because the coil direction is opposite, so that the coils are moving independently, mostly opposite in direction, and do not interfere much with each other.

So orthogonal Ψ's is a sufficient condition for electrons to not interfere. Is it necessary? Apparently, in the experimentally encountered shells, they are. Why? For s shells, it is clear (to me) that no two electrons with the same coil direction occupy the same sphere, that they will encounter each other over a large area of coils. For more complicated sub-shells, the author can only sketch investigations into how much surface area and how much volume is involved in the expectation values for the shells. If a shell has enough volume and enough cross sectional area at any given radius for the l(l+1)/2 shapes to not interfere but pretty much fills the surface of some logical concentric sphere with radius between 0 and the Bohr radius for that shell, then that many shells at that quantum number can co-exist. The known elements seem to follow the l(l+1) rule.

When a shell of a certain shape cannot fit with the m other shells of that shape, then overlap will lead to one interfering or stealing the energy holding the other out in the shell and one will revert to a free electron. The shells will try to NOT interfere if there is enough volume. Other electrons in a sub-shell do not insist that our electron of interest take a stand in the quantum mechanics measurement sense, only that the shell is orthogonal ENOUGH to not interfere

Absent geometric investigation, the author is reluctant to extrapolate beyond shells that have been measured or created and insist that electrons in g, h, or higher orbitals follow the Pauli Exclusion Principle that works so well for the known elements.

Spin Revisited

Spin is apparently the same magnitude for all leptons independent of the magnitude of charge. The best guess is that spin is a "physical" property based on the motion of the strand rather than an "electrical" property based on the charge material in the strand. In the *mnp* Model of quarks, the charge material is some number f of filament loops of one type and 6-f filament loops of the other type, for a charge of +-1/3 or +-2/3 or a neutral that is either rare, primordial, or one form of neutrino. The filaments are stranded, all moving the same direction. Modern physics considers the spins to be 1/2, even though work to measure spin in quarks proceeds.

Spin is apparently the same magnitude for all leptons independent of mass. The best guess is that the rotating fields caused by the intrinsic spin are not affected by the fellow traveling mass of m entities (glue, shell excitation energy, ...) because those entities are being recruited and guided by the charge structure strand anyway. In return, only influence from a measuring field that reaches the charge structure strand will change the course of the lepton during a measurement. (Effective Mass of quarks may confound this.)

The best *mnp* explanation of Spin currently starts with primordial coils, curved as tight as possible, as if on a cylinder or as coils extruded steadily. In order to even FORM a spheroid, those coils must relax a little. If the filament length is an exact multiple of a minimum coil length, the coils of the loop would need to relax by one coil, also to make an odd number of twists and an even number of coils so that the loops will be continuous and "real." That one coil worth of relaxation, spread over all the coils, is all that would be available for influence or measurement by a Stern-Gerlach experiment, so spin of -1/2 or +1/2 and projected spin could be +-1/2 $\hbar$. That one coil relaxation allows the strand to cause rotating fields in space and respond to non-homogenous magnetic fields.

In the *mnp* Model, those fields probably meet Bohm's description of rotating spin fields, but are caused by extra m entities that attempt to line up with the rotating coils by Axis Alignment, the basis of electro-magnetic effects, but by Travel Alignment to be more parallel to the electron surface, each entity moving in a line but the aggregate effect somewhat as whirlwinds. In the unlikely development that the m entities are slightly polarized by Axis Alignment, then quarks might have spin slightly different than 1/2 and the universe might have slight preferences for negative or positive in some cases. The author considers this unlikely. Any fellow traveling entities would tend to open the coils a little more, just as the shell energy opens up the coils of an electron in a shell, but not as effectively or to as large a diameter.

Magnetic Moment

Spin comes from coiling of the electron on the entirety of the surface, so magnetic moment$_z$ about the center of the particle will be due to spin projected by the upper half of the electron and the reverse spin projected by the lower half of the electron, though experiments such as the Stein-Gerlach are measuring anomalous spin and seeing just the "top" half. Magnetic moment due to orbital angular momentum will have a factor of 1, since that momentum is from one or more singular locations on the shell rather than the entire shell. (Speculation)

Why 720 Degree Rotations Are Needed to Return to the Same Condition - A Digression

Follow a point around the coiled loops, twisting to the other side of the strand/coil at every completed coil except for the first. Remember that the basic loop figure, a once folded figure eight with two loops, has only one 180 degree twist. By the time the point has traversed the entire loop, it will be back where it started. But it will be on the other side of the strand since there were an odd number of twists in the strand. So the point must make another complete traversal of the loop to get back where it started, on the same side of the strand it started on. The author suggests this is the WHY of 720 degree revolutions described by the spinors for spin 1/2 particles.

Interpretations

The image of an electron presented here is compatible with but supplements the Ψ description of an electron in quantum mechanics. The Born interpretation that Ψ represents probability density is incomplete. The Copenhagen interpretation that the electron is not really anywhere until it is measured is incomplete. The agnostic position, that we cannot say, is also incomplete. In the *mnp* Model, the electron's coils exist in three-space and are conserved through time, though LEP experiments or encounters with a proton may rearrange the filaments making up the coils. The electron's coils influence and are influenced over space very close to those coils but not by anything at a distance exceeding approximately a coil diameter.

So going back to the beginning of Griffiths Quantum Mechanics p2-5, if one measures a particle at C, "Where was the particle just *before* … the measurement." The realist position, it was at C, is approximately right but wrong since the entities in the coil are moving at c and the coils could be changing location in space at some speed less than c. If an experimenter had been able to measure just before, that measurement might have located "the particle" at a distance exceeding c/delta time, but that would be an expected artifact of the measurements which may "catch" the electron anywhere within its mass distribution. Certain interactions, for example of the strong force or the strong force and the weak force, might see implied "spooky interaction at a distance" if part of a quark is interacting at one location and another part is interacting at another and measurements of the after effects of those interactions are taken close to simultaneously.

The orthodox position, the particle had no location, it wasn't really anywhere, fits with the *mnp* Model in a philosophical sense. The *mnp* Model suggests the particle WAS really spread over a diffuse "where" related to the Ψ function and enough of it was close to C before the measurement that the measurement placed it at C. The Quantum Hall Effect and Fractional Hall Effect results seem to be more in keeping with a "real but spread" interpretation similar to *mnp* 's.

The agnostic position, "disproved" by Bell in 1964, that one has no way of saying where the particle was before measurement, is also partially true. Again, in the *mnp* Model we can say that part of the electron was at C but that its mass was spread and that, had we been able to do another measurement just before, we might have caught the electron at some other point in its distribution of mass.

In an atom, Ψ and the expectation value of the shell gives an approximation of the distribution of the electron. A moving free electron may be spread over something like its deBroglie wavelength. An electron moving near c may be spread over something like its Compton wavelength (but that repeats the previous sentence).

We might call the *mnp* interpretation of the Ψ function the "surface interpretation" or the "coil-surface interpretation" or the "mass spread interpretation" if the "*mnp* interpretation" or the "hyper-realist interpretation" are considered too narrow and non-descriptive.

Using Ψ to predict or guess how the mass of the electron is spread may be possible, but it does not provide enough information to know that spread. Some guidelines might include

> The coils will be continuous
>
> There are no points on a particle; from any given plane if there is not part of the particle or coils on one side, the first encounter as the plane sweeps toward the particle will be with a coil or a flatter section of strand, never with a true or sharp point. (-: To be blunt.:-)
>
> The probability distribution function will have no true zeroes and no true discontinuities.
>
> We might expect more coils in a region where the probability density is higher.
>
> We might expect fewer coils in a region where the probability density is going down quickly in two dimensions.
>
> Coils will tend to have their axis parallel to the axis of lowest probability density change at any given point.
>
> Coils might be absent from a region even though the expectation value is non zero in that area or even if the expectation value is greater than $1/n_{ec0}$.

Extrapolations:

The deBroglie wavelength of an electron may represent the electron's spread in the presence of moderate fields. The deBroglie wavelength has a limit at low speeds - it cannot go to infinity for loops, which have mass and finite, though perhaps large, dimension.

At high speeds, the Compton wavelength of a particle, which is the wavelength of a photon equal to the rest mass of the particle, may represent the lower limit of electron spread along the direction of travel.

We should be modest about our expectations - knowing a day's temperature at a given time is not really possible from an accurate function of average hourly temperature over the year, even when supplemented by an accurate function of average yearly temperature variation.

The author suspects that the Ψ function and Dirac's four vector model may even be about the best we can do in modeling an electron. The author does have the temerity to suggest that the normalization functions of the Dirac formulation will change if the *mnp* concept of resting mass as diminished by movement compared to the classical understanding of rest mass is accepted.

Put another way, the author has as little hope of codifying the coil surface interpretation of Quantum Mechanics as he does of finding truth in econometric time series of stock movement, though at the end of the day the various indices have their values and their usefulness.

Speculations About Other Probability Distribution Functions

Other probability distribution functions may eventually be created. Could we determine the probability of encountering SOME of the particle in a region? When the wave packet represents parts, how do we calculate and interpret probabilities that a region will contain SOME of the particle - if the total volume is such that a it could not ALL be contained in the rest of the region, then the probability goes to 1 but we don't expect that except for large partitions. Probably something from statistical mechanics?? Still will not get very close to 1 anywhere.

We might try to ask

> What is the probability density of entity directions in a particle? or
> What is the probability density of the coil axes in a particle? or
> What is the probability density of the changes in coil axes in a particle? or
> Can we normalize to "the probability of finding one coil" or
> Can we state "the expectation value for coils is _" or
> Can we state "the expectation for finding basic entities of the particle in a given region is _"

Again, the Ψ function and Dirac four vector Model seem to be proving very useful, thank you very much.

Electrons, Modern Experiments, and Modern Theory

Since we don't usually measure parts of an electron except in the Fractional Hall Quantum Effect experiments, the distinction between expectation values for measuring the electron and expectation values for "how much of the electron is here" are currently of only theoretical interest. Semi-conductor, Cooper Pair, and tunneling experiments and developments will not be affected. The electron is seen as a strong stranded loop in the *mnp* Model, so it will remain a single entity that cannot be broken with chemical processes. It can in fact participate in a cloud and slip through crevasses and be part of Cooper pairs or Bose-Einstein spin 1 composites, but the loop will always be available to a "measurement" as an electron unless changed by the Weak force.

Electron Shells and Crossing the Nucleus

Conventional Ψ functions in polar coordinates for electrons in P shells and above show 0 values for Ψ at the origin and in planes running thought the origin. That obviously is incompatible with an electron seen as a continuous six-strand loop. Comments of the form "the electron can't visit the nucleus" for higher level shells are frequently heard and seen. The author makes the following suggestions:

The coiled loop crosses over somewhere between the lobes, so the Ψ does not really go to zero at a spatial boundary but at a moving, cannot be located exactly, theoretical boundary. Quantum mechanics is not very concerned about phase anyway, so why not just accept that there is a fuzzy imaginary boundary that is not present in real space. The formulae usually assume the nucleus is a point source to make the polar coordinate development easy. The nucleus certainly is not a point. The author also points out that, in the *mnp* Model, electro-static fields cannot even be created by points!

Ψ functions for paired particles might separate, but not those of single particles. The author suggests that electrons in P shells and above may cross the nucleus, but that S shell electrons are very unlikely to have entirely crossed the nucleus and be all on one side. Some fields and forces may lead to an S shell electron being briefly on one side of a nucleus, but the author would expect that to usually lead to the electron becoming free. If a matching S shell electron of matching spin is present, one of the two may turn inside out by going through the nucleus from two sides to have opposite spin.

Problems With the *mnp* Electron and Quark Model

The *mnp* Model of the electron and other elementary particles is not without difficulties. Spin is not entirely settled. The explanations for the cause of spin and for the equal spin of all leptons does not yet satisfy the author.

If mere relaxation of a single (unbalanced coil or twist) allows Spin to be measured, why does further relaxation of coil pairs for electron shells not add to spin. Is it the unbalanced twisting rather than the extra coil? Or is it the twist itself, unbalanced by any opposing twists, that leads to spin.

Quarks

Why does the spin of quarks seem to match that of electrons? Quarks are more massive, and their charges differ.

For the more massive leptons, one suggestion for the equivalence of the basic spin for all leptons is that it is a function ONLY of the charge structure material, that the additional glue filaments which are easily reoriented in axis perpendicular to travel do NOT enter into angular momentum. If quarks, with mixed charge structure material, have the same inherent spin as electrons and positrons with single charge material, then mixtures of Axis in the strand-coil structure do not affect spin and only Travel Alignment affects spin.

The author suggests this is not a completely satisfying explanation by itself. Quarks are hypothesized to have different coil radii. The loops are all the same length, there will be an even number of coils and an odd number of twists in all sizes, but guaranteeing that there is exactly one coil worth of relaxation in all coil sizes requires a little more information. The measurement/experiment may find only one coil worth of available angular momentum distributed over the spheroid as "spin." Maybe the maximum error is less than 1 /$n_{spheroid}$ if almost one extra coil of angular momentum is spread over all. Again, not convincing.

Muons

Muon ("who ordered that") spin also presents puzzles in the *mnp* Model, which sees them as 6 loops of negative material plus 6 loops of negative and 6 loops of positive, providing the material to break up into two electrons and a positron if the loops recombine just right. This model of excitation makes the rare decay to 2e- e+ possible without having that

decay product depend on having adequate "broken electrons and positrons" in the form of n loops and p loops from which leptons can be recruited. Variation in decay percentages would have been seen in different experiments in the presence of different byproducts if the muons are only six loops of negative charge material with extra energy or a loopy configuration.

Unfortunately, the 18 loop model of excitation would seems to lead to spin 3/2 if the charge material loops determine spin and orbital angular momentum. Having one strand of six twist in opposite directions seems a little far-fetched.

Could Twists Themselves Lead to Spin and Angular Orbital Momentum - 2013-06-02

Could the twists themselves be the contributor of spin and angular orbital momentum. or the unbalanced or reversed twists, rather than the coils? Possibly.

In P shells and above, could the reversed twists be separated so that multiple coils would be "reversed?" Maybe, but would probably need to have one lobe all one spin even if it is reversed from the other lobe. This does provide another means to turn an electron inside out, turning part inside out then turning the other part back by untwisting. This is perhaps a more efficient way to reverse electron spin than spreading entirely over another shell or inverting over the nucleus. It also supplies a mechanism for the formation of lobes - the turning point going in and coming out are twists in the opposite direction. Quite possible.

The excitation states argue, somehow, that the unbalanced twists in the strand lead to Spin and orbital angular momentum without reference to how much charge material is present. If a twist in one direction is always accompanied by coiling in one direction, the discussion of the quantization of orbital angular momentum remains intact.

An advantage of the twist model is that coil size, coil expansion, coil length details, and fellow travelers all have no effect. The three remaining questions are how a single twist leads to spin all over the lepton, how excited states with extra filament loops create the same spin and orbital angular momentum, and what the magnitude of h means for two 180 degree twists of the structural charge material strand. To be continued...

Deferred and Rejected Ideas

The development of the *mnp* Model of the electron has gone though many iterations and adjustments over the last three months. A few of those rejected developments are included here as examples of what seems not to work.

#0 - n^2 Straightening Per Shell?

Might 2s shells have 4 pairs uncoiled (4 times the area of the shell??) The energy held by the second shell is not so much greater than in the first. If three extra straightened coil pairs are available for p shells, how do they, the electron, and experimenters decide which is which for orbital angular momentum? And in shell 3, how would 8 different straightened coils keep track of which was d and which was p? Rejected.

#2 - Entire Strand Loop is the Spin Angular Momentum

What if the radius of coils is so small that the entire mass times c times radius IS the spin angular momentum? A quick calculation of mrv as angular momentum and getting 2.42e-11m or less than the initial Bohr radius, rules this out. Rejected.

#3 - Uncoiling Effort is the Momentum

If most of the effort of the coils is spent in coiling, it is only the UNcoiling a little to form a sphere rather than just be coils that leads to spin (and angular momentum). because only that available influence will affect and be affected by fields. Just as "availability" may lead to quarks also having exactly spin 1/2. This has been incorporated in Number One.

#4 - Difference in Total Coil Length for Single Filament Loops and for Stranded Six Filament Loops Exactly Equals One Loop for All Strand Combinations

The quantized loop is based on the length of single coiled loops in the early dense universe, and the coils formed by 6 strands are different. Muons and quarks have different coil diameter. So having an excess loop h/2 moving around on the sphere to be measured seems unlikely. Discussed with Spin Revisited earlier. Highly Unlikely.

#5 - Spin of Quarks

If Spin is an electro-magnetic property, it would differ for the quarks. This led to an early proposal that the net spin projection of a nucleon is $\hbar/2$, but that up quarks have a spin of h/3 and down quarks h/6. In a neutron, one of the down quarks has spin opposite the others for a total of. Oops. Better make sure that's tested! Probably is! The durable neutron is seen in titled Weak and Strong Join as One Phenomenon in the *mnp* Model

as being one up with spin opposite to the two down quarks.

Protons - down is the binding quark, so spin 2/3+2/3+1/3 for opposite spin but opposite charge. Yikes. A bad idea taken too far. Rejected.

#6 - Spin of Muons

Why do muons have spin 1/2 when they are, in the *mnp* Model, made up of 6 n loops plus an equal number of n and p loops (either 6n+3p+3n or the preferred 6n+6p+6n)?

Muons have spin 1/2 which suggests that they may merely be "excitations" of 6 strand coils rather than the 18 coils suggested heretofore. How that excitation shows in structure is not clear, though if the twist per coil is 1/2 in the normal state, then twists of 3/2 per coil at least follows a linear relationship that we might expect from spin increments. Though how the extra twists qualify as excitation rather than spin directly … Or if there is enough m-filaments to cause larger coils in a balanced manner (that it, the filaments cause the coils to be larger and the larger coils allow the filaments to stay with the coils … This may be a better model of excitation, since it may match/be similar to what happens with electron shells. If decay were just giving up the extra filaments, as with electrons, we would not expect great structural changes but just an electron and some energy. ? Definitely inconclusive.

#7 - Can Logic Help?

Faced with ugly choices, the author has found that listing the possibilities can aid understanding, idea creation, and decision. 2013-06-02: In this case, the idea that unbalanced twists of the strand itself leads to momentum emerged as a strong candidate.

> Electrons have been tested and seem, at the scales we can measure, to be homogenous and point like. And light.
>
> Muons have been tested and found to be as homogenous and point like as electrons. They can "orbit" a nucleus, albeit closer due to increased mass.
>
> Neutrons have been tested and (presumably) show a spin of +-1/2.
>
> Could the *mnp* electro-magnetic intrinsic spin model be wrong? (Completely)
>
> Could the *mnp* quark model be wrong? Do p loops in quarks rotate counter to the n loops, so net charge effect is 6/6 of an elementary charge? No, then the effective charge would be -1. REJECTED.
>
> Could the *mnp* muon model be wrong? Is 12 or 18 loops of charge material too much, with net 6 negative loops for 6/6 negative charge?
>
> Do Muon's p loops rotate counter to the n loops, and that rotation have a physical effect of lowering the spin and angular momentum, while in quarks n and p loops rotate the same direction and physically contribute to spin? (No, in that image muons would have an effective charge of -2 or -3. The opposing images of loops sometimes traveling together (quarks) and sometimes traveling opposite (muons) seems ugly. The spread of influence and adaptation to changes and fields does not work well with filaments traveling in opposite directions. Movement in a strand in both directions does not "move" as *mnp* sees movement, momentum, and the Lorentz transforms that are an integral part of movement in the *mnp* Model. REJECTED.
>
> Is the *mnp* Model of Travel alignment effect stronger than Axis Alignment as assumed the last six months, wrong?
>
> Is the quark assumption of projected spin $\hbar/2$ wrong? Since the spin of quarks has probably not been tested thoroughly, and since experiment rules and logic and simplicity take second place in the development of the *mnp* Model, this is not quite answered. But the alternatives are ugly.

2013-06-02: The twist model seems more attractive with every addition to this list of conundrums.

#8 - Dirac Four Vector Description of the Electron

Dirac must have been onto something with his 4 vector approach to the electron, after the Pauli 2x2 matrices and Schroedinger's unitary Ψ function. Translating the useful or interesting details into understanding from the *mnp* point of view will take time (and education.)

At least, as with quantum mechanics, the spheroid must be closed in all 3 spatial directions and consistent in time.

For the Future.

#9 - Speculation on Left-Handed Preference

Could coiling lead to left-handed preference? Could counter-clockwise spin, with the angular momentum inward, be lower energy and clockwise spin with angular momentum out? Given that handedness and the sign of angular momentum is a convention rather than an absolute, the idea that angular momentum of the coiling could be preferred or lower energy is seen as simplistic. Since neutrons have two down and one up, with the two down having one coil direction and Spin and the one up having the opposite coil direction and Spin, a slight preference could be maintained for the life of the neutron. The proton has two up, connected by a down, with the two up having one coil direction and Spin sign and the down the opposite coil direction and Spin sign. Not Ready for Prime Time.

Conclusion

Explanations for the emergence of Spin, Orbital Angular Momentum, and the Planck Constant in the *mnp* Model have been presented. The two preferred candidates have useful similarities and offer an explanation for the quantum behavior of Orbital Angular Momentum and electron shells. Spin clearly exists, and the coiled twisted nature of the electron in the *mnp* Model explains the 720 degree symmetry of rotation for 1/2 spin particles. The Number One proposal (momentum is from relaxed and reversed coils) has interesting hints and interesting challenges. The Number Two proposal, that Spin and Orbital Angular momentum both derive from unbalanced twists in the strand forming the charge structure of the particle, is not as well developed. Investigating Dirac's mathematical description of the electron is the most promising third direction. Translating (after understanding intuitively) the electron four vector concepts into *mnp* terms is the author's goal.

The author has been assured on numerous occasions that "No one is thinking like this." Yet enough interesting results seem to be emerging to suggest a future in looking for 't Hooft's only possible disproof of Bell's Theorem: "substructure."

- fini -

Appendix A - Musings

The Planck constant may be a constant in the limit at low energy states. At high n values, the author is prepared to accept experimental results showing the angular momentum change rising gradually. But since the number of coils is very high, we may never measure the difference. The ratio would be on the order of n_{ec}/n_{ec0}. Of course, if such a change were detected, it would provide a clue as to the magnitude of n_{ec0}

When the filament lengths are described as relatively fixed, this means that slight variations may occur in entity spacing, but due to the three effects involved, the spacing will quickly average out. This might be thought of as slight elastic deformation of the filaments. Whether that will complicate calculations or just fall out of the interactions of the basic entities is not clear. Likewise, a coil may not be EXACTLY a certain size; there will be little variations as it overlaps or leads into the "next" coil that precesses around the "surface" of the particle, and temporary variations as the coil responds to fields, influences, and anomalies. Since a given coil is not identifiable, we would speak more of variations in curvature and axis. In fact, the ability to vary is essential so that the electron can absorb influences.

Why Explanation?

Hints that quantum mechanics DOES have explanations are exciting and have potential.

EmH comments that physicists mostly just accept relativity and quantum mechanics as is, rather than worrying about why.

EmH also notes that the author is making things complicated. But knowing why something occurs may almost always be more complicated than just knowing what occurs.

Math itself is not causative, but the need for closure (spherical harmonics) IS causative. Geometry alone is not causative in the *mnp* Model, but geometry plus the nature and effects of the basic entities is (we hope).

Rules and Math

"Exclusion" and equal distribution across degrees of freedom are useful principles in quantum mechanics, thermodynamics, and statistical mechanics but the author prefers to look at each claim on a case by case basis

Higgs as composite that doesn't quite fit? Not likely to be so easy to describe that or those entities

Why in quantum mechanics each distinguishable configuration would be equally probable is a mystery to me. Statistical mechanics' suggestion that energy is distributed equally across all degrees of freedom feels analogous but probably easier to understand. Of course the multiple universe theorists would see that as analogous directly - the possibilities of existence is evenly spread over the degrees of freedom for that enumerated existence

That said, the Legendre polynomials make sense, and with the potential depending only on radius, the separation of variables in spherical coordinates is magical. Likewise the general separation of independent variables or functions, as when two independent portions of a sum or difference equal a constant, both must BE constant

Quantizing of filament loops may well have happened early with great density and SINGLE loops forming a coiled cylinders, then tight balls. Proto electrons and positrons, 1/6 the modern size, may have been created at times of great density.

Philosophy

Variation is necessary so that electrons find their "stable" configurations for any given conditions/energy level/potentials. Conceptually similar to evolution - variation to find temporary stability. Playing dice is essential to the stability of the universe and its constituents

For the brain steeped in real world experience, it is difficult to imagine that uncoiling just two coils allows the electron to expand 10^6 times, while coiling just two coils the opposite way out of millions of coils leads to measurable momentum and an ability to fold into two lobes. This counter-intuitive small change leads to big effect is conceptually similar to movement in the *mnp* Model, where the stationary particle gives up some of its coil rotation to move perpendicular to the coil (which slows down internally) to speed up externally. (-: There's potential in this idea. Note the symmetrical -: and :- for parenthetical remarks attempting to be humorous. :-)

Complex numbers allow neatly for a coil's "go away from this location and come back" even though in the *mnp* Model that "going away" is within orthogonal three space and time. So the complex Ψ functions that must be squared and integrated to create real probabilities may be fairly direct cognates of coil behavior.

Complications Waiting to Happen

The *mnp* Model does seem to "make things complicated" as quoted below. The Planck constant has been investigated here in the context of electron shells. Another investigation will be needed for the *mnp* Model to explain the inverse relation between photon energy and wavelength using the three basic entities and three basic effects in the *mnp* Model. Hint: Light is seen as both particle (spelled fhoton in the *mnp* Model to avoid confusion with the two modern photons) and electro-magnetic wave, and the energy (m entities) in the fhoton is dense but has volume based on the Separation Effect, with the transverse diameter going up with energy, so the transverse area goes up as the square of the energy and the length parallel to travel goes down as the inverse of the energy.

Appendix B - Fun

Sayings

Oh, to know enough physics to be able to understand it all.
Oh, to not know so much physics that I know this endeavor to explain is impossible.

Humor

If one makes enough predictions and couches them as possibilities, one need never be wrong. - EmH

What's the matter? Indeed! I've been wrestling with that for years.

"It is difficult to play against Einstein's theory" –on his first loss to Fischer - Mikhail Tal

It was Aron Nimzovich who said, of chess, "Why must I lose to this idiot?" Reportedly to Saemisch. Or maybe not, since Saemisch was a respected player. The story I had heard years ago had Alekhine tipping over a chessboard with the same comment.

Perl's of wisdom - This seems to be a write only blog.

Poincare thought his New Mechanics should not be introduced to undergraduates. I also feel the *mnp* Model is not ready for undergraduates either. Thinking alike does not make me a great mind.

deBroglie travel and wavelength may be more fundamental than any frequency of light (that is, the gravity of the situation may be more important than the charge or the spark)

This new spin on "angular momentum" for electron shells and electrons may be a turning point.

What's the sound of a physics/quantum theory entering the infinite bit bucket? Planck.

Appendix C - Superseded Ideas

2013-04-28: The l(l+1) formula for sub-shells was attractive as a spherical symmetry. Numbers 2, 6, 12, 20 are all close to regular polyhedra, but then the numbers become 30 42 56 72 …

2013/02/10: Electrons could have a lightweight charge structure, with more mass as *m*-filaments. Electrons themselves may have a charge structure that makes up much less of the mass even of the electron so that there are many *m*-filaments even in an electron" The author had been resisting this idea, since larger quarks seem to attract more glue, and the electron, positron, and small quarks are relatively lightweight. Also, the coils in free electrons and positrons are quite tight and would seem not to support *m*'s as fellow travelers.

2013/02/13: Think about how long it takes to even out changes or influence in an electron shell consisting of coils traveling at the speed of light but overlapping significantly. To be continued.

2013/02/13: Attempts to determine, in the structural *mnp* Model that hopes to explain "everything", why the units of h are kgm^2/s. Could this be momentum integrated over length. Or force integrated over time?

2013/02/09: Surely the 2pi denominator for h to $\hbar$ is NOT actually a 6 (for 6 strands). Since we are taking spherical projections in some cases and working with coils of basic entities traveling at c in most others, 2pi makes sense.

Appendix D - Author's Notes

More diagrams would aid understanding. The author is currently handicapped by a lack of didactic opportunities, which could help identify what needs better or different explanation.

2013-04-26: A turning point: Instead of approaching coils in the electron by logically building from the ring up, modeling could start with a loop and investigate twisting it and seeing how much coverage or what radius it would achieve. That led to questions about even numbers of twists vs. odd numbers (1 twist for 2 coils, 3 for 4 coils). Asking if that additional coil could be related to $\hbar$ proved useful as well.

The new Could Twists Themselves Lead to Spin and Angular Orbital Momentum - 2013-06-02 175 may lead to a quick update of this post.

Edited 2013-06-11: Very minor changes. Shell quantization arguments noted as deprecated.

mnp - "Major Narrowing Point" - Post 22 (2013-02-03)

Thoughts on Theory

Single photon interference leads to the "major narrowing point" mentioned in the title. Either I'll be able to understand and explain those phenomena or I won't. Evolution or extinction.

Understanding those experiments is the current "hard" work - everything else seems "manageable." (I write blithely.) It seems that Bohm's "pilot waves" caused him difficulties too, though for coherent light they seem "manageable."

Process Similar to Grieving:

Picturing loops, filaments of "gluons" aligning with the coils with more "gluons" for larger coils, and movement so that particles could maintain their integrity with movement, took a long time. The process seemed to go through stages similar to grieving: not even understanding, active denial, gradual acceptance, coming to terms, coming to understanding, and finally creating the story for ongoing remembrance.

In single photon interference and diffraction, I can't run away from the issue though I needn't give up too quickly. If I can come up with an explanation, it may well help understand the bending of light in gravitational fields, which I used to suspect is not the same as the path taken by particles. Optics is coming up now because I've been trying to picture photons as dense bundles of energy with constant longitudinal cross section. As the energy goes up, the transverse section goes up squared, so the wavelength goes down. Ellipsoids or cylinders or paired cones or even rectangular parallelepiped of square transverse cross-section all have the same volume/length/transverse area "amplitude" properties.

Quick progress is not expected, so I have lots of education and house work to catch up while the unconscious plugs away.

The mnp Model is again at a narrowing in its evolution, though I can let it hang on long enough to find the way out as with movement and particle integrtiy. Single photon interference is the current "crux"

"Why is the author dumping all this incomplete information on the table? Because, as the next blog entry will indicate, the Model is at an evolutionary narrowing. If single photon interference cannot eventually be explained, the Model will deserve extinction. If it can evolve, then it will survive. Full report to follow."

"Challenges from optics. The end of the 19th and the beginning of the 20th century posed questions from optics and electro magnetism that were answered by special relativity and eventually quantum mechanics. Some of those same issues face the mnp Model in the 21st century. The wags, cynics, and careful readers may suggest that some of those issues need to be understood by the creator of the mnp Model. Single photon experiments and how fully they model coherent light experiments need to be carefully examined and understood. The Mach-Zehnder interferometer, if the single photon experiment exhibits the same interference pattern as the coherent light experiment bears some thought. Single photons can be seen as putting out "pilot waves" but the author still sees them as not as strong an influence as coherent "

01/16/13 destructive interference - do the fhotons just disappear? What happens to that energy? Problems for my model?

For the single photon experiments, the pilot wave hypothesized by de Broglie 1927 and then the Bohm interpretation fits with the mnp Model. As the author comes to grips with the single photon experiments, earlier comments about "first photon through" need to be revisited. Careful investigation of the 1/4 wavelength limit is needed. Note the 1/4 wavelength away allows electrical and magnetic fields created by the front of the fhoton to travel to the limit and back in time (barely) to see the back of the "front half" of the fhoton. The quotes are used around "front half" for now because it is not yet clear to the author whether the instigator, the fhoton, has two halves or just a front half with created fields accounting for the other half of the electro-magnetic waves. Fields spreading at an angle may see more of the fhoton.

If the first fhoton through is interfered with, I gotta change the document. I would expect LESS interference at least than when lots get stopped (but have been setting up fields) (single photon experiments mentioned by Deutsch)

google mach- zehnder single photon experiments for a good starting list

If the Mach Zehnder single photon experiment is the same as "classical optics" then the strength of the pilot waves do not matter, just their existence?? Tough one here, I've been know to deny or delay reckoning with experiment before. Certainly if the photons came from a laser but singly, there would be coherent field(s)

Fhotons do not split in a mach zehnder interferometer (front from back??) or send filaments one way AND another way - closing can occur HOW fast?

light is somehow easily influenced? Or easily influenced by its wavelength?

the field from one photon may be enough to effect one fhoton (remember that n photons is enough to effect n photons). Careful about fhoton - use it for my figment based prapagators, not for classic optical stuff until I am ready to talk about mnp

Negotiating em fields have more effect on light than electric or magnetic? Effectivel superimpose??

can we get three or four way interference from the same photon?? If truly impossible, that tells us something

01/09/13 What happends to polarization in diffusion experiments? Light bend perpendicular to polarization (perpendicular to axis AND travel?) Bent in direction of axis (perp to travel?)

01/06/13 redux - photon as front half only or both halves???

Will photons EVER combine with each other? How do the fields reflect off surfaces in sync with fhotons? Ouch

My own doubt that an EM wave could travel at c?? If nobody else doubts it, and everyone else sees how EM waves can reflect off the back of a surface or off a shiny atom, then maybe I shouldn't doubt it?? Or at least act as if I don't

I have noted that the distance from the sun and the "effect" or result of coherent light may show something about the size of figment effect area and wavelength compared to distance from the sun

The drawings of gravity wells indicate that the space transverse to the field is also being shortened?? Shapiro data seems to show that

12/31/12 really dialed in on relativity and the curvature of space. Yikes – I REALLY am out in left field, trying to describe metrics and . On 2012-12-26 or whenever I borrowed the books, Jay was interested too in how I saw space. Could the basis be two dimensional, he wondered, since rotations could be in 2 space as well. I did not get into cross products as defining lines and three space. Of course, Greene's/Stokes/... can translate down one dimension.

Particles, Photons, and Waves - Post 21 (2013-05-23)

This post collects the developments of the *mnp* Model since the December 11 post on the weak and strong forces that grew from the image of a quantized charge loop structure forming the basis for quarks and electrons. Included are suggestions for the basis for the mass of quarks, the inverse relation between mass/energy of photons and wavelength, and hints of understanding of deBroglie wavelength, relativistic mass and the limits of electro-magnetic acceleration of particles but not the gravitational acceleration, and the lack of gravity wave measurements. Thoughts about virtual photons from the main paper, post-dating the December 11 blog, are included. This post contains the good news.

Particles

The additional mass of particles with larger coils is now seen as filaments of the basic entities that make up light and magnetic fields which filaments align with the basic charge structure coils. The basic entities that make up light, magnetic fields, and most of gravitational fields are called m's in the main document and will be called that here for brevity. These m-filaments also form loops, but nowhere near as durable as the charge structure loops since they do not have the added strength of Axis Alignment to hold the loop together independently. When charge structure filaments are traveling in a straight line and their Axis aligns with the travel direction, m-filaments may have little tendency to align their (perpendicular to travel) Axis with the Axis of the charge strcuture filaments. As the curvature of the coils increases (the radius of gyration goes down), the tendency of the m-filaments to have Axis Alignment interfere with traveling parallel to the charge structure filaments goes up. When the basic charge structure coils are larger, more $m$filaments can align, leading to more massive particles.

This picture of the mass of particles moving together in coils has the added attraction of allowing the additional mass to travel as part of the particle, obviating the November 2011 concerns of recruitment, constant recruitment, and travel of the basic entities that make up gluons "within" the rings of the particle. It explains consistent particle mass in different parts of the universe and at different densities of field and matter.

For consistency in the *mnp* Model, the constant longitudinal cross section of the fhoton of the *mnp* Model must derive from the basic interactions rather than be a fundamental causal truth itself. That basic entities that make up the fhoton align by travel alignment and remain a relatively fixed longitudinal distance from each other due to separation is no surprise, and a tendency of those m filaments to bunch close to each other as allowed by Separation would make the fhoton itself quite compact. That the longitudinal area is constant as a result allows fhotons to organize themselves into their predictable sizes, as when filaments of m-figments leave an electron shell as a fhoton rather than as unorganized energy/separate m-figments

There is a gap between the rest mass of the loops that form coiled strands that provide the structure of particles and the experimental evidence for higher rest mass of basic and larger quarks. For quarks, which seem to have higher rest mass than electrons, some explanation is called for. If recruited m-figments take the form of filaments that parallel the strand and have a coherent Axis alignment 90 degrees to the Axis alignment of the strand, the figments in those filaments can redirect as the particle moves and so stay with the n and p loops. The attachment to the loops is only by Travel

Alignment. The coherence of the m filaments is by both Axis and Travel alignment. Since m-figments Axis does not align with Travel in m filaments, the Axis can be redirected with no change of direction. This makes m filaments unsuitable for structure but m filaments may be the explanation for the gap between charge structure mass and total rest mass for patricles, particularly the massive fermions.

This image of fellow traveling m filaments may or may not be helpful in picturing photons released by electron shell change. Given that 14.6 is so much less than the 511,000 of the electron structure, it is unlikely even one filament is following the entire strand of the electron unless m figments are much smaller than n and p figments. Yuck.

If m filaments match line up with the strand, does that account for electron energy? Or is the energy in an electron shell perpendicular to the coils and opening them up?

Does a bigger sphere mean slightly bigger coils or do slightly bigger coils mean a bigger sphere?

I should be calm about the fact that coiled strands of quantized loops matches the Standard Model's evidence of no internal structure, since the strand is uniform and the coils are uniform. Now if I could really BE calm...

Think about the trajectory of a figment in a strand in motion - it doesn't suffice to wave hands about the angle and inertia, it really needs to be consistent. May be related to "energy" and or spin. Is h related to light and $\hbar$- $(h/2\pi)$ to particles - might argue for coiled nature?

I really don't want complete flavor change, since that would suggest more mutability of the quarks than I want. What prevents mutability to a lepton/pion combination?

16 tons is not the effect between two figments in Travel plus Axis Alignment. It is the total effect of all figments within the effect radius in a strand. 16 tons divided by six times twice the radius over the spacing due to Separation might give an approximation of the effects of one figment. Or do we need to divide by another six (2013-02-04or5) since each of the six filaments pull on all six filaments?

Thoughts About Particles, High Energy Collisions, and Virtual Protons

LEP experiment works only with complete 6's, and an electron hitting a positron only has 12 strands to work with unless a third or fourth enters into the reaction.

*** From the main *mnp* document:

The gamma particles that come from "weak" interactions are mostly charged figments. The *mnp* Model will benefit (and may aid) the separation of "gamma particles" and fhotons into those made of one type of charge, those made of a mixture of charges, those made from m-figments oriented randomly but traveling in one direction, those m-figments oriented with one axis, and those m-figments with the front half oriented with one axis and the second half oriented with the opposite axis. The last are seen as "true" fhotons in the *mnp* Model. The *mnp* Model has not done extensive simulation on weak interactions yet. The basic principle of the speculations included here is that figments are conserved, so initial thoughts about weak interactions are mostly involved in "counting" the charge structure.

One possible confounding issue with "charge conservation" is that recruitment of charge figments around the strings is possible. When those recruited filaments become coils and how and when those coils are shed is not pictured. Whether that recruiting is close of symmetrical (negatives and positive filaments are recruited at approximately the same rate) is not clear. The Model sees torque as changeable (when a bulb is turned inside out). A negative gamma ray could result instead of an electron if the electron can't "regroup". (Why an electron needs to be 6 full coils worth of negatives is still unexplained.) Extra positrons and electrons appearing from neutral decay would be seen as possible if there are enough bulbs of the right material with appropriate (or convertible) torque. Gamma "fhotons" could be either negative or positive, they will tend to line up by Axis Alignment(?) when leaving. Gamma particles could be a pair or could be two pairs in some cases.

The *mnp* Model does not include a comprehensive catalogue of mesons and baryons, but the structural approach looks promising as a way to understand the plethora of particles (and perhaps revise the list slightly with respect to pions)

"Virtual Photons" (2012-12-12)

Three alternates are collected in the phrase "Virtual Photons." Neutral quarks, z in the *mnp* Model, have six loops of charge structure, three n loops and three p loops, in the same stranded coiled form that quarks have. Separated loops may travel together or be recruited to be together. As of 2012-12-12, n and p loops are seen as almost indestructible.

Side note: Single loops are flexible enough to participate in fields with single figments. If single n and p loops are mixed, they would remain almost undetectable, as are the single figments.

The third alternate, involving only m-figments, would see some "virtual photons as bundles of energy without structural current loops. m figment release sends off the same m figments as fhotons though not yet organized for long distance travel.

These alternates for "Virtual Photons" provide some basis for understanding principles of particle physics. For example, the OZI rule can be paraphrased as "if an interaction becomes ALL 'virtual photons' on some space-time boundary, it will be suppressed." This can be interpreted in *mnp* as "if the results of an interaction must be re-structured/re-formed entirely from unstructured and neutral material, that interaction will take longer and be less likely over a given time."

The author seeks another term for the hidden charge material in an interaction to replace the ambiguous term "virtual photon."

Gamma Particles (2012-12-12)

Many interactions in the weak force give off or require "gamma" or "fhotons." The *mnp* Model sees a sharp distinction between fhotons made of m-figments (light and glue) and gamma "particles" of n's or p's or n loops or p loops (or a mixture) which result, for example, from electrons and positrons meeting destructively. Pions come in multiple sizes. Some kinds have two strands of six loops each, some with opposite torque s and some with the same coil direction connected only by charge attraction. If one of the coiled strands in the later pairs can be turned inside out, so that the coil directions are opposite and the coils can trade loops, weak force interactions can take place.

Gamma particles will require the same care and clarification and classification as "virtual photons."

Other pions are two quarks in structure, hence the kaon's multiple decay possibilities. *mnp* Model

Color in the *mnp* Model (2012-12-11)

Color Change is the tendency of quarks to try to swap units of charge and fail, and the connection between quarks is at least partially the strings that result as these sixths are partially loaned.

It takes time to pass part of a charge structure loop, and the loops may well elongate if the quarks are pulled apart. The stretched loops will get increasingly strong as they straighten. This binding by loan is a dynamic process, which seems to match well the description of quark interaction.

Color and RGB themselves seem to be concepts not needed in the *mnp* Model.

Quantum Chromodynamics is not being thrown out with the bathwater yet.

*** end of materials from the *mnp* document

Thoughts About Particles and SM

Another test might be the existence of a short-lived down quark with mass between down and strange or a little higher. It would usually decay to down - in a baryon it would spontaneously do that quickly. This could show up paired with opposite down, opposite strange, or opposite itself. Masses and branching ratios are way beyond me at this point. Digging in the Review of Particle Physics by the Particle Design Group (1256 pages) is daunting but necessary.

Even if such a quark d' is found and even if the suggestion that strange is in the same generation with down were accepted, that is just window dressing and re-arrangement to the standard model. Beauty is predicted to have at least wider error bars than charm unless three separate forms of beauty are found. Even if charm and beauty are seen as the same generation and even if top and a matching -+1/3 over-the-top were found, no fundamental change is involved.

Other geometries than that proposed by the author could account for three possibilities of down and anti-down quarks. Geometries even can be imagined for just two possibilities.

Photons, Fhotons, and Waves

For consistency in the *mnp* Model, the constant longitudinal cross section of the fhoton of the *mnp* Model must derive from the basic interactions rather than be a fundamental causal truth itself. That m figments align by travel alignment and remain a relatively fixed longitudinal distance from each other due to separation is no surprise, and a tendency of

those m filaments to bunch close to each other as allowed by Separation would make the fhoton itself quite compact. That the longitudinal area is constant as a result allows fhotons to organize themselves into their predictable sizes, as when filaments of m-figments leave an electron shell as a fhoton rather than as unorganized energy/separate m-figments

picture of photon as raw coherent energy, forming ellipsoid as it travels and encounters the unformed field. Does it recruit the back half entirely? or 2-1-13 does the back half merely "appear" to be there, given that the em fields reverse on their way to random equilibrium?

if photon is cone and cylinder, then only approximately correct. If ellipsoid, or cylinder or oblate spheroid, then exact

Had I written thoughts about energy and wavelength – that if the cross section of the photon taken longitudinally has a constant area/number of figments, then the third dimension leads to energy inversely proportional to wavelength(!). Over the holidays idea. Not perimeter, but area or count of figments. Don't know if it is pear shaped, elliptical, rectangular, but something "self healing and self directing"

Thoughts on Compton scattering (scary) and the well structured particle lead to thoughts of the well structured fhoton (in 3-d). Long writing lead to fhoton must be self organizing in 3-d especially in the two halves (run together sometimes?, but always get polarized. Self organizing when a few figments go into giving energy to the particle. Mass as bunch of figments and mass as bunch of figments in the fhoton lead to conservation too

Quanta of energy when momentum influences light or light influences momentum. Momentum increment makes sense when photon does the influencing. The deBroglie wavelength IS wavelength of photon that would take away all momentum or that gave all. Now in gravity, would expect any level of influence on momentum, though measuring a photon influence will be quantized. For magnetic field, I have to learn more is that TOO is quantized.

h

These alternates for "Virtual Photons" provide some basis for understanding principles of particle physics. For example, the OZI rule can be paraphrased as "if an interaction becomes ALL 'virtual photons' on some space-time boundary, it will be suppressed." This can be interpreted in *mnp* as "if the results of an interaction must be re-structured/re-formed entirely from unstructured and neutral material, that interaction will take longer and be less likely over a given time."

Gravity

Being Wrong 94 - gravity waves - null result supports that gravity waves or the gravitons interact with each other

gravity depends on the incoming figments/gravitons. If none coming in then none going out. G changed early in the universe, but has it changed since? Or will it go down once the universe reaches some density whereas up to that point mass influences all it can and no more?

Rotating masses interact with the returning gravitons recruited by outgoing gravitons. Mathemtically that should be interesting - what happens in the intermediate distance field for a rotating mass

Light acts like gravity only on behalf of its sender (as if the sender was a long way away). Also acts like gravity of a mass in the direction it is going. Getting some idea of the graviton/light ratio will indicate how much influence light has. Light does not direct gravitons in all directions the way matter does.

Light and matter do not necessarily follow the same geodesics. Beyond the MOND limit, outgoing matter is affected while ingoing matter sees perhaps a random fluctuation if stuff HAD been outgoing. Light will be unaffected by the MOND limit, says here, because it does not have enough effect to narrow the gravitational field. My argument that light may have a different trajectory will have to wait, perhaps, but variation IS established.

How does light bend - gravitational only, or magnetically only perpendicular to orientation or both (and in what proportion). The equivalent question is will changing the axis have priority over changing travel direction or will both operate "equally." The coherence of the fhoton will influence results. As will coherence of the field.

Movement

Length contraction is only a good model at speeds somewhat below the speed of light. Separation gets in the way of true asymptotic "lengths go to zero." Ironic that we used to think of kinetic energy in the limit as v approaches 0.

Explaining inertia, time dilation, and length contraction for movement may or may not be attractive - probably not to trained physicists who would see no need for explanation.

acceleration - as direction gets closer to parallel to travel, the amount of field has to go up because the angle of effect is lower, so more influencers are needed. Gravitation oncoming, magnetic field perpendicular. I have to internalize whether there is more "push back" from the moving particle - does it diminish the field as if it had more mass

Field of Physics

I too could mourn the loss of expertise requirements - computers have gotten so much bigger, faster, and able to cover inefficiencies so well. Tools and languages have gotten better. The need to be careful and conscious of computational resources was a big challenge, and made programming a lot of fun. Sigh.

On Calculations - Post 20 (2013-02-07)

This post will explore three aspects of calculations needed by the *mnp* Model, a structural model for physics with tiny discrete entities that provide a structure for particles and fields. Since the *mnp* Model pictures the three constituents of matter and fields as uniform size, speed, effect, and hence mass, with three modes of interaction, the computational needs will be simpler than string theory or quantum loop gravity. Still, many computational issues will be shared with similar models hoping to "emerge" physics from some sub-structure.

- How to do the calculations of huge numbers of basic entities, large numbers of loops, and numbers of quarks and particles in a finite time on finite computer systems
- What to calculate, that is, what functions to use for fundamental interactions
- How to get the basic forces of physics from a three entity/three effect model

This post makes no attempt at nor pretense of completeness. Some issues have already been discussed in the main document and are incorporated here verbatim toward the end.

Calculations to explore the *mnp* Model will need to advance in many different directions. Many issues can be investigated independently. A sample list of just a few of the issues:

- Computational issues
  - Efficient modeling of huge numbers of entities
  - Display of entities and their contribution to fields (color, hue, pattern, useful alternations, ...)
  - Using parallel computation, either networked or threaded. Obviously, tuning the Model by trying different parameters for given calculations can be done on networked machines once the calculations are determined.
  - Geometry of coil coverage and length, twisting and stranding on a sphere
  - Geometry of time dilation and length compression of coils with movement
  - Geometry of a filament making a turn at c while maintaining a separation distance (and what that separation distance might mean to a "sphere")
- "Fundamental Forces"
  - magnetic fields
  - static electric fields (perhaps the hardest fields to visualize!)
  - moving electric fields and moving charge attraction/repulsion (perhaps the hardest to create and describe!)
  - gravitation
- Different Scales of Calculation Not all models will work only with the smallest entities. Some will mix small scale with a large scale influence, some may work only at large scales.
  - Entity interactions in field superposition
  - Entity formation of filaments
  - Entity formation of strands and coils
  - Entity interaction to modulate and cancel gravity waves

- Gravity from a moving body may be effectively modeled as a shell of the given mass to examine fields from a moving body. Same with charge.
- Gravity from a large mass affecting coils in electrons
- Gravity from a large mass affecting larger coils in quarks ...
- Gravity from a large mass affecting photons
- Gravity from a large mass affecting individual entities in electric or magnetic fields
- Model the precession of Mercury, the Pioneer gravitational anomalies, and pulsars

Some of these issues may expand to be a paper, some will remain a note or a footnote. Some could be solved by knowing the prior art or the mathematics of the last few centuries, but whether knowing that history and using it represents an effective use of time is not at all clear. Feynman recommended that physicists know the basic concepts and derive what they needed. The author suggests most of us need to be exposed to those derivations for the derivation to be timely or effective. Bellinger (James, personal communication, 2011) confirms that this approach works well for math, physics and graduate level engineering.

Reinventing the wheel isn't all bad if the process leads to deep understanding.

The *mnp* Model has a number of computational advantages over other theories, though acceptance will be determined by whether the physics works rather than whether computation is convenient. One advantage is that the the basic entities are moving a constant speed c. Another is that they have a uniform and small range of influence and hence a uniform mass. Another is that the entities act in a flat Minkowski space, that curvature and compression result from that interaction and are a function of how matter measures space and time and do not affect the basic entities and their movements.

Entity Representation

Entities would be lightweight objects, pre-allocated and non-moving during the course of a simulation unless multiple remote or networked processors are involved and the entity leaves a local region. From a programming standpoint, no inheritance or specialization is needed. The interactions are the same for all. Since the three basic entities vary only in axis compared to travel direction, whether to identify the type of entity with an "entity type" is an open question.

Basic information for each entity: location, travel direction, axis direction. The axis direction could be an angle in the plane perpendicular to the direction, which would necessitate more computation, or a three vector possibly stored in fixed point. The direction vector needs to be high precision.

At least a single link to the next entity in the region is likely.

Most simulations are likely to be "discrete" with fixed time periods, For the simplest calculations, either the accumulated change to the direction of travel and direction of axis or the new direction of travel and axis will be stored. More complicated models of interaction, discussed later, will require more information with each entity object.

Representing Coordinates

The *mnp* Model has the computational benefit that the basic entities interact with each other only over a short distance, so that computations of interaction between entities can confine searches for influenced or influencing entities to a small region. Another benefit is that entities normally maintain some minimum separation, so that while the scale is tiny, infinitely small dimensions are never needed.

If a whole number represents the coordinates of a region that is some convenient multiple of the influence distance, the resolution of the fractional part of a coordinate needs to be finer than the separation distance normally maintained by entities such as those in a filament or strand. Whether a 16 bit unsigned fraction representing (0 to 1] suffices is not yet known in the *mnp* Model.

If we intend use an index to determine which region(s) contain an entity, the top bit of the fraction can indicate whether the relevant adjoining region has an index one greater (top bit of fraction is set) or one less (the top bit of the fraction is zero)

Whether such fixed point representations are helpful is another issue. Efforts to calculate in fixed point have been warranted at some points in history but may currently be unnecessary.

Number of Regions	Formula for Probability
1	extra^3
2	$3(1/\text{n})\text{extra}^2$
4	$3(1/\text{n})^2\text{extra}$
8	$(1/\text{n})^3$

Table C.7: Probability of Finding All Influenced Entities in n Regions

Prior to the days of CDC 6600's and 7600's, fixed point calculations were most efficient. Then for a while, supercomputers handled floating point faster than integers. Yes, the young man who doesn't know enough physics to know that a structural Model of the universe is impossible is old enough to remember CDC and to have worked on Xerox Data Systems 940's with floating point handled by input-output to a twenty liter module. In the days of the 8080 and the early IBM PC era, fixed point was again most efficient.At some point with SUPER parallelism and very lightweight processors, we may benefit from fixed point calculations again.

Partitioning Space

A quick look at how to partition the space to be modeled when working with just the tiny entities is included here as a sample of the thinking needed for computation in the *mnp* Model.

If we divide up the space in multiples of the influence diameter, what multiple is most efficient? For now, we will use i~ for twice the minimum distance at which entities no longer influence each other. One can think of i~ as just over the diameter of the region where entities can affect or be affected by an entity at the center of the sphere. For computation, cubes that size are convenient.

If we set the partitions of space at the influence diameter, eight regions need to be investigated for interaction between entities. The influence diameter should represent an open interval (the author's preferred approach) or the divisions should be just slightly greater than the influence diameter. If dimensions are taken to be a power of two times that influence diameter, coordinates can be resolved to an index (potentially large) and a fractional mantissa for which floating round-off should not be a problem. We do not expect to simulate suns at the level of entities, so loss of precision in the index may not be a problem.

If the divisions are larger than i~, an entities position with a cube may allow 1, 2, or 4 regions to be investigated rather than 8. Fewer regions may result in fewer cache misses but will lead to more work checking for overlap and hence influence in those larger regions with potentially more entities.

Entities centers are used to place entities in a region.Bigger regions lead to more comparison but to less need to move entities into other regions. Bigger regions may allow for less memory flogging if regions are kept in separated areas or separate computers.

If n is the region dimension divided by i~, where n >= 1, all neighboring entities can be found in 1, 2, 4, or 8 regions. The formulae for the fraction of searches that require searching 1, 2, 4, and 8 regions is in table 1. "extra" is $(n-1)/n$:

The following table then shows how much computation "work" is expected at various region sizes. "Expected Regions to Check" represents that average number of regions that need to be accessed, and the "Expected Volume to Check" represents the average relative number of entities to be checked for overlap and hence influence.

Note that in checking two entities, if their centers are further apart than i~ they will not influence each other. No square root need be involved, since the distance squared can be compared to the influence distance (or the influence radius) squared. Back in the 1980's, skipping a square root might have been important to the development of custom processors at SLAC, but the author is sure many people have had the same idea. In the 2010's skipping a square root is not such a big deal.

Expected values represent the sum of the products of the probability of a situation and the work or benefit involved in that situation, in the classic manner of calculating expected values. Note that the expected work of checking overlap goes up steadily and by more than the square of the region size. The work on the expected number of regions to check is above the inverse of the region size. With regions 8 times as big as the influence diameter, only 67% of the entities in the region will see all influencing or influenced entities within that one region. With regions as big as the influence diameter, the probability of needing to scan 8 regions is 1.

Region Size	Regions to Check - Probability				Expected Regions	Expected Volume
1	2	4	8	to Check	to Check	
1	0.000	0.000	0.000	1.000	8.000	8.000
1.01	0.000	0.000	0.029	0.971	7.882	8.121
1.1	0.001	0.023	0.225	0.751	6.958	9.261
1.2	0.005	0.069	0.347	0.579	6.162	10.648
1.5	0.037	0.222	0.444	0.296	4.630	15.625
2	0.125	0.375	0.375	0.125	3.375	27.000
3	0.296	0.444	0.222	0.037	2.370	64.000
4	0.422	0.422	0.141	0.016	1.953	125.000
8	0.670	0.287	0.041	0.002	1.424	729.000

Table C.8: Partitioning Space For Calculations With Fixed Distance of Influence

It would be possible to investigate regions smaller than the influence diameter, but for regions >= .5 the diameter the number of regions to search will be 27, 18, 12, or 8 so that locality of reference and moving entities to other regions will both be compromised. For regions >= 1/3 diameter, the number of regions will be 64, 48, 36, or 27.

Thoughts About Simulation and Parallel Processing

Discrete simulation, taking fixed time slices, seems appropriate for many of the calculations needed in the *mnp* Model. Discrete simulation operates by creating a new model of where everything is based on where it was. Need twice memory or location/direction doubled for each particle, processor works completely on one effector. Or works completely on one receiver, for which idea the author wishes to thank Greg Ward *Radiance* (personal communication, 1987) and G. Ward *Rendering with Radiance : the art and science of lighting visualization.* (Morgan Kaufmann, San Francisco, 1998) With each pass, we don't move location or direction information, just alternate indexes for subsequent passes. If the model is based on influencing ("shooting" in ray tracing parlance), calculate the influence on each, then a quick, linear second pass is to apply that influence, so no need (or savings) for an index because is a two pass process - calculations are done on fixed offsets within each of the lightweight objects representing an entity. If limits on effect given, we need to determine how many influenced (keep a list if we don't want to rescan) and perhaps how much influence was offered. Add up the overall effect then make another pass to normalize the effects. If limits on effect received, those are normalized in receipt phase. If entity influence works by "if x can't receive part of our influence, give that to another" then computations seem to be in deep trouble.

Sorting and merging on parallel processors is quite feasible, though it may or may not be needed in sorting entities into regions. One note - if a processor is merging a number of lists, a second processor could be working from the back of those lists to merge the other direction. Partitioning the merge sets would probably be less efficient. Binary searches on n>1 sorted lists might be interesting.

Linked Lists of Entities in a Region

If we keep linked lists of entities in a region and need to move entities as they move to different regions, is a doubly linked list needed or can we work with a singly linked list efficiently. If the item to be snipped is not the last item, swap with the next item and then place the item (which is now in the next position in the list) where it belongs, at the head of the list. Memory references: item to be moved, next item in the list, head of the list to which the item is moved. Only if the item to be moved is at the END of the linked list (its "next" is zero) do we need to search the list.

If the singly linked list has the last item point to the head of the list, we need a method to identify the "end" of the list. For the item to be snipped, we need to check if next is "head of list" and swap with the actual first item in the list and adjust the head of pointer and next pointers appropriately. If the item to be removed is the only entry in the list, then resetting the list header suffices.

Are Octrees Needed?

If the regions to be modeled are huge and the density of basic entities low (the vast majority of regions with less than one entity) then octrees might be an efficient method of locating entities. Since the need for "Modified Newtonian Dynamics" is seen only where gravitons are spaced further than their influence distance, and since there is the question of whether

the spacing applies to the 3-d spacing of the gravitons or the 2-d spacing perpendicular to travel, the need for sparse matrices is expected to be limited. The basic entities are everywhere, they're everywhere.

What to Compute

Computer scientists enjoy the discussion of how to compute. The domain specialist, the physicist in this case, wants to know WHAT to compute. As described in the main *mnp* paper, the functions and constants that represent entity interaction might be complicated. The technical side of computations for the *mnp* Model are interesting and will become important, but the computational issues will ultimately be driven by the physics of the model. The following snippets will illustrate the range of needs.

Calculating Entity Interactions

Perhaps we can categorize interaction types, based on "how much total influence can an entity have" "how much influence can an entity have on a single entity" and the reverse, "how much can an entity receive from all nearby entities" and "how much influence can an entity receive from a single entity" which should mirror the second question. Additionally, questions can be asked about whether influence is "sent" when it is apparently not received due to balancing influences. Further, details of when an influence takes effect after being received may be important. Certainly, realizing that stable coils require that the Travel Alignment effect and/or the Axis Alignment effect must be slightly "forward" affects how those alignment tendencies operate and are programmed.

At the entity level, influences need not act like classical forces nor like quantum effects. Whatever works, since the universe clearly does function. We can consider influences on a basic entity to be instantaneous. We do not have to operate within entities as if c is constant. Or we could posit that it takes c for influence to travel to the center or some other point which THEN changes orientation or direction. So it could seem, at this time, that the *mnp* Model has too many degrees of freedom in describing the three interactions of the three basic entities.

Issues of how much an unrestricted entity influences another are NOT issues of computational complexity, nor are whether entities that are within the influence distance have full influence or partial influence based on how much of their "surfaces" are overlapping (which is 0 at influence distance up to maximum when coincident and linear in between, the author's current favorite) or some other function of distance between centers. Complicated transfer functions may slow simulation speed, but do not add to the complexity.

- If the basic entities act on each other with no limitations, so that an entity will have a fixed influence on all the entities around it, no matter how many there are, and an entity will receive an unlimited amount of influence from however many entities are close to it, computation is easy.
- If an entity can receive only so much influence, then a scan at the end of a simulation cycle can limit the amount of influence received in calculating the next position, travel direction, and axis direction.
- If an entity can only send so much influence independent of whether that influence is received, then we need to keep track of how much influence is "offered" than go back and normalize that influence before applying it.
- If effectively unused influence is available to influence other entities, the computational complexity goes WAY up, probably more than number of entities squared.

  For example, if two entities approach a third from opposite angles, so that the third middle on undergoes no change, do those approaching change direction just as much as if they had changed the direction of the middle one? True, the approaching entities may see each other too unless they are separated by more than the influence distance. It is possible they each graze opposite regions of the middle entity.

  If a free entity intervenes closely in a coil, the various entities in the coil will have a balanced effect on the free entity more or less in the longitudinal direction. The *mnp* Model used to have non-transitive influences (Traction was the early origin of gravity). Now the Axis Alignment effects ARE transitive - if an entity can hardly budge from a loop, all the entities in the loop are budged a tiny bit.

The harder the calculations need to be, the less likely philosophers are to conclude that the universe is just a simulation.

More than just basic entity interaction must be calculated, and more complicated situations may shed light on the functions needed for entities to behave consistently with our universe. The coils in an electron are small since the loops making up the coils are all the same type, so the m filaments that can participate with the coiled charge structure of the electron is small. The mathematics of why modest amounts of additional m filaments are possible in larger shells

or shells with more "twist" will be interesting. Tuning may well be an interesting possibility here. Of course, the *mnp* Model is tuning itself to model the universe we know. Following are some "notes to self" that may make little sense to the most casual observer. Sorry.

Separation would be simpler if it IS transitive. "Safest" for our concepts is if Separation does not lead to increasing speed of the entity. This said, some tales of creation suggest the earliest expansion involved increased velocity due to the Separation effect. So Separation might want to be redirection as possible or even displacement laterally even if the net speed exceeds c a little. Future speculations on "what if the speeds vary a little?" - the varying speed stuff could only be part of fields and never part of matter or photons and so seems too scary to contemplate at present.

Do we need low cunning to limit the amount of influence sent? What about breaking the regions cubes into 1/2 radius and calculating the influence of an entity on each of the 16 cubes in 3 directions and sum up how much would be taken (is it the same?) and then to TAKE influence from the 16 cubes based on how much total could be taken. Seems like cheating to apply influence to a hypothetical region and then receive influence from that hypothetical nexus of influence, but again, whatever works.

Whether photons seem to change direction more easily than change polarity might lead to insight into how Axis Alignment operates for the basic entities that make up photons (called *m*'s in the *mnp* Model.) Does the redirection depend on where the influencing entity overlaps the entity in the photon?

Gravity will have nothing to do directly with the polarity of a photon, but how it affects the electro-magnetic fields that influence the photon will need to match the known physics.

Sideways Axis Alignment - is it computationally harder to split Axis Alignment into a circumferential component around the line of travel and treat it as "easier" than to just go for Axis Alignment however that pans out? Details may be hard to work out.

Calculating the smoothing effect of incoming gravitons on local events such as rotating systems will be interesting, as will proving (or not) the attenuation of gravity waves as incoming and outgoing gravitons interact.

Earlier Writings on Computations for the *mnp* Model

The main *mnp* document uses a few terms the author has been avoiding in the blogs: the basic entities are figments and the energy/instigator part of a photon is called a fhoton. The earlier writings are included here, verbatim.

The radius of influence could be a Plankian measure, half that, or something smaller. Early calculations are likely to be "dimensionless." Rings are smaller or similar to Plankian distances, the radius of influence will be half or less of the ring diameter so that entities are not influenced by those on the opposite side of the ring.

Choosing a model for influence between figments will eventually be important, but for some early computations it may not be important. To establish that "random attraction" as seen by a moving figment was not adequate to maintain velocity, three different models were tried: present in the range of influence, linear dropoff with distance within the range of influence, and squared dropoff within the range of influence. All models produced similar results.

If "sphere surfaces" are pictured as the influence, the amount of surface on a sphere above a latitude is linear with the cosine of that latitude. So if two same radius spheres intersect, the amount of surface "inside" the other sphere is proportional to the distance between the centers: (2r-z)/2r. So interactions could be linear in the local distance (or squared in the local distance).

Thoughts on Limits and Stable Sizes

Coils and filaments should suffice as an explanation for the electron's long lifetime and quantized size.

Fhotons as Gravitons

For light to transmit "gravity" the Proximity effect needs to operate only on figments seen by the attracting figment and perhaps moving toward the attracting figment. The integral of gravitational effects from light directing figments toward traveling back along its path might exceed the energy of the fhoton.

Computation of Heavy Matters

Attraction. We should be able to ignore gravity for the early "what's stable" calculations. To later look at gravity as a local phenomenon aka Proximity. The attraction of all figments based on being close can be done by sprinkling some number of (traveling as always) figments in a region and seeing how the figments move in the region. principles: figments move at constant speed. If 2 figments are "attracted" that means their direction of travel is turned slightly toward each

other. “Attraction” is short range, computationally can be a “yes or no” random choice or a random range of responses. We should get a drift of figment directions to align with the concentrations of particles and a drift of figments toward the axis of large concentrations (and large concentrations drifting slightly toward other concentrations). Might need to set lots of figments in rings so they don’t go too far. :-)

The math for forces, momentum, and angular momentum at relativistic speeds may be relevant eventually, though it is not needed for early investigation of stability.

Ruminations on Cosmological Calculations of Gravity

Calculations of the effects of gravity in space become extremely difficult in the *mnp* Model. Free n and p figments attract and affect “local” objects, light, and all figments, but do not travel inter galactic distances until they are organized. A blast of light from a dying star would make the star appear heavy, since the sent out fhotons will direct loose figments back toward the source.

Two consolations to human beings: 1) As my wife says, “The universe will still be there.” 2) In case of difficulty with the universe slowing down or expanding infinitely or contracting or being swallowed by a black hole, see (1).

**** End of Earlier Writings ****

Digression on Storage Issues

A storage medium may need a balance of 1’s and 0’s (or a charge balance or a spin balance) for stability. Can a code insure a balanced number of 1’s and 0’s? I’m sure it can. Compressed or not - compression probably enhances balance. When a region is encoded, if bits are counted, the region can be preceded by a number representing the number of bits to be inverted either at the beginning or the end so that the count of 1 and 0 bits matches (+-1 and +- the coding of the leading number.) So from a macro external view, there is no information there, no net charge. Rearrangement suffices, though efficient rearrangement requires external storage or memory.

Philosophical Thoughts About Simulation

Is the universe a simulation? Some physicists turned philosophers have asked that question. If the Heisenberg Uncertainty Principle is found to be causative (as suggested by Feynman as the reason electrons avoid the nucleus) rather than descriptive (as suggested by quantum mechanics derivation of h by Griffiths and surely others), then the probability of simulation goes up. If the calculations to simulate the *mnp* Model need complicated or co-dependent functions, the probability of the universe being a simulation goes down. So is the author rooting for complexity? We will see.

The strong form of the Uncertainty Statement: The Heisenberg Uncertainty Principle is only CAUSATIVE as in Feynman’s electron exclusion argument if we ARE being simulated

LoL or Droll?

Those who wish to integrate gravity and quantum mechanics might need to think outside the well understood and successful box that physics is in. Off the grid? Weird? Unheard of? The “Unthought.”Gradual evolution toward a unified understanding of physics seems unlikely.

Wags might suggest the author is doing no better at emulating Donald Knuth than he is at emulating Michael Faraday. Oh well.

To Affinity and Beyond!

Digressions - Post 19 (2013-02-07)

Would investigation of geometries and symmetries lead to insight into the combinations of charge material that make up quarks and so support the posited six loops in coiled strands presented in the December 2012 blog entry? The short answer is no, that other geometries and and symmetries would also be supported, but the digression is interesting and provides reasons to look further at some of the predecessors of the *mnp* Model.

subsection*Digression on Topology, Combinations, and Geometry What geometries and symmetries could lead to a specific number of combinations? The specific situation has six items with two candidates, four of one called “n” here

and two of another, called "p." Investigating linear, 2-d, 3-d, more dimensions, circular, spherical combinations, and amorphous groups come to mind.

Group theory, topology, and maybe other combination/permutation studies seem to be involved.

Permutation groups, symmetry groups, and Cayley's theorem seem like candidates. The challenge seems to be to express geometries of symmetry, to enumerate symmetries, and perhaps most important, to be sure that all have been enumerated.

Thoughts so far:

For an amorphous (0 dimension) collection, only 1 possibility exists.

For a circular arrangement with symmetry, four of one kind and two of the other have three combinations. Currently the author's favorite

```
  d       d'      d''

 p p     p n     p n
n   n   n   p   n   n
 n n     n n     n p
```

Investigation yields other geometries that also yield three combinations, found below.

For 1 dimensions with linear symmetry where either direction is equivalent, do we have multiset permutations 6!/(4!2!) / 2? possibilities? Eight. Unlikely that physical arrangements within elementary particles would be linear, but if the six units are arranged concentrically, the four and two group would have 15 possible arrangements!

Things get complicated after that.

In two dimensions, many pictures can be drawn. Five in a circle around one in the center seems to yield 1) minority "p" in center 2) majority "n" in center, minority "p" together 3) majority "n" in center, minority "p" spaced by 1 on one side and two on the other side for three combinations.

```
  d       d'      d''

 p p     p n     p n
n n n   n p n   n n n
  n       n       p
```

Categorizing the possible pictures has probably been done. Having the six in some sort of proximity, that is to say, not at some distance approaching infinity, may keep the number of alternate pictures and geometries manageable.

In spherical geometry, with six items arranged at ends of three axes, there are two possibilities and not three as first thought. If we place minority "p" at top – the other minority "p" unit is opposite or adjacent.

Other arrangements of unevenly spaced items may exist. Are they treated like lattices? The term dual comes to mind.

In three or more dimensions, having only six items should limit the number of pictures or dimensions we need to examine.

subsection*The Physics Behind the Search for Combinations Since these thoughts are related to a general model of small quarks and small leptons as six quantized units of charge material that sees the down quark as four negative plus two positive for -1/3 elementary charge, the arrangement of units may be relevant, even if that arrangement is hidden from us by scale or other dimensions.

The author's preferred image is of six quantized loops in a strand, coiling over the surface of the quark or lepton. That hides the structure, presents a uniform surface, has spin of two possible directions, puts the apparently uniform material at the particle's mass surface, and needs no extra dimensions.

That specific image leads to the suggestion that the up and anti-up quarks (five loops or one type and one of the other) have only one arrangement, but the down and anti-down quarks (four parts to two) have three arrangements. The author suggests the lopsided arrangement is down, the symmetrical arrangement is the strange quark, and the intermediate form a short lived version of down quark that should (but may not) survive long enough to be seen in the chaos of LEP and earlier experiments. Wild speculations: The author suggests charm may come in one form, but beauty/bottom in three that would show up as wider error bars if not as distinct particles at high energy. The top quark should be paired not with bottom but with an over-the-top quark that has +-1/3 charge and a few very minor variations.

But even if that third down (d') is accepted, that only makes the strand (circular symmetry) model possible, since other geometries yield the same number of combinations. The "five around one" model could be a strand. The spherical/three axis model would require that the axes be hidden in other dimensions since elementary particles do appear to us to be uniform, but that does not bother physicists.

Minor note: the linear arrangement can probably be ruled out since the five and one grouping would have six different arrangements, which are not confirmed by the single mass of up and anti-up quarks.

subsection*Further Mathematics Questions Are there geometries that yield exactly two combinations? Two amorphous groups of three, where the choices would be 1 of the minority in each group or both of the minority in one group. Further thought leads to three amorphous groups of two in a logically circular pattern, where the choices would be 1 of the minority in two of the groups or both of the minority in one of the three groups.

Finding combinations of two is the fallback position if the down quark resoundingly does not have another variant. Physics' Standard Model of course sees down quarks in the first generation and strange quarks, though radically different in mass from charm quarks, as part of the second generation with charm. So orthodoxy so would prefer to see the quarks as an amorphous single group.

If extra dimensions, hidden or not, are involved then the possibilities expand. The next section, on predecessors to the *mnp* Model will touch on that issue. With only six items to combine (or three in the case of rishon model), few dimensions would seem necessary.

Digressions on Predecessors to the *mnp* Model and On Topology

To illustrate other, perhaps unspoken assumptions of topology, examine the rishon model (Harari-Schupe preon model from 1979). RM (if one may be so familiar) has an interesting "linear" combination of three preons – positive charge, negative charge, and neutral, all with 1/3, -1/3, and 0 of an elementary charge. The combinations are linear and order is important, determining color in quarks. The *mnp* Model is not concerned about color per se since it has other explanations for quark trios and since it deals in sixths rather than thirds. Yet the author recognizes the kinship of *mnp* with a model that sees electrons and positrons as unalloyed combinations of the same constituents as the quarks and suggests that bosuns such as W and Z are also combinations of the twice as many of the basic units as quarks.

Your author sees the conceptual rotation of three rishons as similar to the spin of quantum mechanics which needs to maintain its direction in its contact with four space so that in the rishon model TVV and VVT are different (colors). A number of geometric interpretations would be consistent. Travel order (which is encountered first in time by other particles interacting) could account for a linear first/last relation. Concentric spheres also exhibit "first" "last" and "linear" Rotating rings with a mandatory gap also exhibit linear ordering. Overlapping filaments with slightly different starting positions will also suffice – the three don't need to be completely discrete. Whether the linear assumption of having a beginning and an end was considered by the rishon model creators has not been investigated.

Others have recently proposed solutions. Piotr Zenczykowski in "The Harari-Shupe preon model and nonrelativistic quantum phase space" (http://dx.doi.org/10.1016%2Fj.physletb.2008.01.045 Physics Letters B 660 (5): 567–572 6March2008) proposes imposing "ordering" using "genuine rotations and reflections in [quantum] phase space." Zenczykowski refers to this proposal as a minimal solution to realize the fundamental " physico-philosophical idea" that the rishon model uses to represent quark color.

Bilson-Thompson actually uses the term topology in the arXiv article "A topological model of composite preons" (arxiv:hep-ph/0503213v2 2Feb2008 submitted 27Oct2006). He suggests, for any preon like model, "braids composed of three 'helons"' in positing a model of braided trios of "helons" where the braiding leads to stability.

Both articles ask why no 3/2 spin states and mention Cabibbo mixing (the quark mixing matrix) as an issue. Those questions are answered very differently in the *mnp* Model. A 3/2 spin nucleon would have no weak/strong interactions but would be held together very tenuously only by charge, in the *mnp* Model.

Four questions of "all preon models" that have not yet been answered (or translated) by the *mnp* Model are raised by Deutsch in D.Deutsch, *The Fabric of Reality* (Penguin Group, New York, 1997).

- adhoc CKM matrix elements
- Hofstadter's distribution of electric charge in nucleons (positive on the surface)
- EMC effect – bigger nuclei have less Fermi motion and presumably greater self-volume based on the uncertainty principle

- proton spin paradox – in the *mnp* Model, some of the loop may be loose in the nucleon and so some of the spin out away from the quarks themselves. This is related to residual strong force effects, which are not yet satisfactorily explained.

David Bohm and pilot waves get a mention from Deutsch, with the conclusion that pilot waves are more complicated than parallel universes (p.93). At least pilot waves are on the field and considered a competitor rather than being behind 28-6. Lights out.

Of course, the *mnp* Model is even more ambitious than the rishon model in attempting to explain both particles and fields as built of the same low level entities. In attempting universal explanation, the *mnp* Model is more akin to quantum loop gravity, though *mnp* chooses a much more limited base of three entities with three interactions.

Adventures Await.

Weak and Strong Join as One Phenomenon in the *mnp* Model - Post 18 (2012-12-09)

The charge loop structure of matter, as presented in the *mnp* Model, provides insight into the Weak and Strong Forces that show them as unified by charge loop exchange. The Strong Force arises when the exchange is stopped by the presence of a third quark. Reasons nucleons formed as multiples of the basic charge are proposed. Reasons for left-handed preference, at least in regions of the universe, are sketched. Reasons for up/down/electron dominance are touched upon. The "Strong Residual Force," which holds protons together with neutrons and forms a "surface" for each, appears to be very different and is the remaining inadequately explained Force in the *mnp* Model.

The Addendum ends with a sketch of how many of the ideas developed here could be adapted to the unitary elementary particles of the Standard Model.

What's Up With Protons and Neutrons in the *mnp* Model?

The Weak Force, which holds the charge of a particle or changes the charge of a particle, is the same mechanism as the Strong Force, which tries to change the charge of quarks but fails, leading to connection between those quarks. The strongest quark combination happens to be a triplet that pretty much insures failure of charge change. That combination is called a proton. One other triplet is fairly durable. No other combinations except the two opposites last very long, and the two opposites do not last long when vastly outnumbered in the modern universe.

Unfortunately, this differs from orthodoxy which sees Electro-magnetic and Weak as unified into the Electro-weak force and the Strong Residual Force as the residue from the Strong Force.

Background - the *mnp* Model View of Particles

The *mnp* Model is a sub-preon image of the physical realm based on three tiny entities that interact in three ways over very short distances and which the author hopes can become a Theory of Everything. The three entities m n and p are called figments. They are tiny, moving at the speed of light in an empty orthogonal space, have an even tinier radius over which they resist getting closer to other figments (called Separation), have a radius within which they try to align Travel path with other figments, and have a radius within which they try to align Axis with other figments. m-figments have Axis perpendicular to their direction of movement. n-figments have Axis aligned with direction and p-figments have Axis opposite their direction of movement.

The Travel Alignment effect is stronger than Axis Alignment but figments form filaments which are strongest for n and p-figments where the Axis Alignment reinforces the Travel Alignment effect. In the early universe, filaments formed, joined into strands the most durable of which were six filament strands of the same type. Once a strand started to bend, it continued to coil as tight as the Separation effect would allow. When the filaments in a strand met the tail of that strand, the six became loops and the structure was what we call an electron or a positron. These particles then decayed on encountering each other, but the durable loops of charge material remained. From these quantized durable loops, which the author calls structural charge material, electrons, positrons, quarks, and the other particles formed and re-formed. Six loop strands are more durable and stiff than a single loop, which is amorphous and takes part in the fields with the loose figments left unless recruited into a six loop strand or a two loop muon neutrino. Six loop strands of one type are most flexible and lead to the smallest particles, electrons and positrons. Five:one strands are stiffer, Four:two

strand slightly stiffer, and Three:three strand combinations the stiffest. Adept readers will already have realized that these combinations lead to the charge carried by the quarks and explain the lack of "near matches" for charge.

Charge material and charge and charge loops and charge structure material are terms used here to refer to the *n*-figments organized in quantized loops aligned into a strand that form the basis of negatively charged matter and the *p*-figments organized in loops aligned as a strand that are the basis of positively charged matter. When loops are not in strands, they may be part of particle physics "virtual photons" or may be just take part with the unaffiliated and ever present *m n* and *p* figments that can be recruited and organized into gravitational, electro-static, magnetic, and electro-magnetic fields. The *mnp* Model has explanations for gravity, electro-static, and electro-magnetic forces that arise from Separation, Travel Alignment, and Axis Alignment. Field formation is highly non-intuitive and is discussed in the main paper (`http://www.worldlyte.com/physics/mnp/mnp.pdf`). So the terms "charge" and "charge material" are useful when speaking of particles and matter, but the mechanisms for interaction and classical forces are different in the *mnp* Model.

This discussion ignores neutrinos and covers simple fermions, which are based on six charge material loops of two types that the *mnp* Model sees as forming the strand that coils to be the structure of the basic (small) fermions. The loops are given letters n and p corresponding to the basic entities/figments *n* and *p*. When the names are needed, neutrons and protons are spelled out. Neutrinos are not addressed here, so "six loop fermions" refers to the simple quarks and leptons for want of a better term.

What's a Proton?

A proton is three quarks, two up (5p1n which is a coiled strand of five loops of positive charge material and one loop of negative charge) and one down (2p4n which is a coiled strand of two loops of positive charge and four loops of negative charge) for a total of 12p6n or a net charge exactly balancing an electron's charge. This balance is one reason the universe exists as it does and a main reason chemistry works at all. One quark has spin differing from the other two, so it can attach to the surface of the other two. Answering "How does this work?" requires answering three questions fundamental to the way the *mnp* Model sees charge change.

Why Do Quarks Attract?

Coiled strands would be attracted to coiled strands traveling in the same direction and of (about) the same radius by Travel Alignment. This requires proximity, within the radius over which Travel Alignment occurs, perhaps called h . The closer the charges in the strands are to matching, the stronger the attraction. There are two ways for spheroids of coils to have the strands traveling the same direction in proximity. If the coils of each sphere are turning opposite directions (relative to the center of each sphere), the coils can align when the spheres touch. Otherwise, if the coils travel the same direction on each of the two spheroids, the spheroids must be nearly coincident. Squashing two fairly stiff spheres together takes a great deal of energy, though the figments are capable of passing through each other. The direction of coiling matches quantum mechanics and particle theory concepts of spin. Says here.

What IS Charge Change?

Take, for example, a cross section of joined strands of up and down:

```
 p p
p   p
 p n
 p p
n   n
 n n
```

The upper n may try to change places with the p below it, forming over some length of coil.

N.B. The author suggests that, at least in electrons and positrons, each loop of a coil is accompanied by a half twist which allows each loop to be the same length. If present in quarks as well, this leads to more twisting of the connection between strands. The filaments of course can pass through each other over the resistance of the Separation effect.

The result would be a strand of six matching loops:

```
 p p
p   p
```

```
 p p
 p n
n   n
 n n
```

If nothing interrupts this change, a positron of six p loops and an anti-up of five n loops and one p loop will result because the positron's coils are significantly smaller than a quark's coils. Obviously, in a proton or neutron, something interrupts this process.

Why Are Quark Triplets Durable?

In a triplet, there is another quark with a spin. It will be attracted to one or the other of the first two quarks of opposite spin, and will form a similar attachment to the quark of opposite spin. This document will call the quark whose spin differs from the other two the "binding quark". The third quark may be called bound quark #2. The *mnp* Model sees that third quark preventing the decay of the first pair. Coils are long and complete change would require one or probably MANY more traversals of each sphere by the other. The third quark, also attempting to change charge structure with the partner gets in the way and repels the first quark (and may be traveling an opposite path so interference is assured.) The attempted interchange will be "undone" at some point between the quarks, with related roiling of the near electro-magnetic fields that appear as glue made mostly of *m*-figments.

Quarks as triplets are durable, and once a durable structure exists it might be expected to endure. Only outside influences will change that structure. In the early universe there were many such influences.

Why Are Protons Durable?

Quarks triplets in general are durable. A proton may be especially durable if the binding quark is the down quark, since the preferred strand joining will be to the p strands of the binding quark.

```
 n p
p   p     up
 p p
 p p
n   n     down
 n n
```

The single n filament of the up quark tends to be pushed to the outside of the twelve strand combination, so there is less opportunity for six adjacent p loops to form as a strand. More important, neither up quark can roll around the down quark enough to exchange strands and produce a positron since it is repelled by the other up and the down is restricted from rotating by the other up quark. So protons as currently formed have an expected lifetime exceeding $10^{3}3$ years, according to experiment and many theories.

The strand join between an up quark and down quark have NO combinations that are symmetrical, so something will always be happening between joined coils. The quark triplet will be dynamic, always moving and changing.

Presumably the process, especially the undoing, will attract m-figments that look like glue, but the basis of the joining and failure to complete the transfer of the entire charge loop is what keeps the proton together as a proton. The "glue" is a result rather than a cause.

What's a Neutron?

A neutron is three quarks, one up (5p1n) and two down (2p4n) for a total of 9p9n or no net charge. For the most durable neutron, the up quark has spin different from the two down quarks. The down quarks may be slightly larger than the up quark, but the coil diameter is similar enough. Whether the p loops get sent around more, and so are a little "above" the more staid n loops that are the bulk of the down's is an open question. Experiment shows the neutron "shell" appears positive(?), but picturing the shell and the attraction among protons and neutrons is still to be developed as the future "Strong Residual Force in the *mnp* Model"

The down quarks are a little bigger because the strand is a little stiffer, the coils are a little bigger, and so the down quark engages a little more "glue" in the form of *m*-figments and perhaps *n* and *p* figments and so has a little more mass. So when a down receives three p loops in trade for three n loops, the resulting up is a little smaller and gives up some of the field that the up quark had retained.

Why is a Neutron Durable?

The neutron has been reported to have a half life of 15 minutes, 62, days, and when combined with protons, exceeding the life of the universe. Triplets, themselves, seem quite durable. Change may require outside influence. Further discussion of neutron change will be given in the "Why do Quarks not Congregate as Groups of Four and More?" quarks section below. How the proximity of other nucleons or specifically protons affects neutron decay is not worked out in the *mnp* Model. Better explanation of the Residual Strong Force probably helps understand neutron non-decay.

Why Are There No Other Quark Combinations?

Protons and neutrons may be been selected as the most durable types - investigation and enumeration of the possibilities is needed. Issues include fractional charges, the "neutral quark," the solitary charged quark, nucleon fractional charges, 3/2 spin nucleons, quartets and bigger groups, two quark combinations, mesons with spin 1, and anyons. After considering those issues, the Model is prepared to look at the formation of durable triples, left handed preference, and the dominance of up and down quarks.

Why No Other Charge Fractions in Quarks?

Loops of charge material have been quantized since the early universe. The *mnp* Model suggests early recruitment led to stable quantized loops of n or p figments as described in the Refresher, above.

Incomplete strands no longer need to exist. A strand of five will find another loop of some kind to fill to six, so incomplete strands are expected to be uncommon. Six strands look more stable to the author than some other number (though four strands could be stable with opposing charges). Experimental results indicate that six works for charge options in the quarks, so the Model will be tuned for that result. The necessary numeric tuning will teach us about the stability and durability of our universe's constants. The *mnp* Model does not yet prove that six filaments make a stable strand, so that number can be considered an experimentally determined input for now. In collider experiments, positron/electron annihilation are expected to provide numerous loops of available material. Six filament strands are stable, so quark charges will be even multiples of 1/6.

Six of one type is a positron or an electron, whose strand is flexible and so the lepton is tiny. Unless something special happens, the lepton is lost to further interaction with a quark bundle.

The blog article `http://mnpmodel.blogspot.com/2012/11/bigger-quarks-in-mnp-model.html` covers the one form of up and anti-up and the three forms of down and anti-down (the symmetrical form is Strange).

The only other type of complete strand in addition to the up family and the down family is a 3+3. For lack of known precedent, I might call that a z. It would, in stable form, either be three and three or all alternately spaced:

```
 n n    n p
n   p  p   n
 p p    n p
```

The alternately spaced version would be unstable in the presence of any other strand, so is probably not relevant except as a rare variant. This hypothetical fermion could combine with other quarks, but it would be hard to coax into proximity with other quarks since it is electrically neutral and very nearly magnetically neutral. It would behave rather like a sedate neutrino.

The 3+3 is called z here. Capital Z may be 9+9 current structure loops, and W- 6+12 and W+ 12+6 or some other even bigger structure or combination, given that a muon appears to be 6+12 or perhaps 9+3. As a "quark" z would be hard to see since it has no charge. It is big to be considered a neutrino, though a single pair of mixed strands might be the basis for a muon neutrino and have a rest mass around $.17 MeV/c^2$.

Are "Neutral Quarks" Candidates For Nucleons?

From a charge loop structure viewpoint, z's could participate in triplets for form nucleons. Since they don't or such triples are exceedingly rare, an explanation needs to be found. One possibility: z's are bigger, their coils are bigger, so when the quarks soup existed from which nucleons were formed, z's might have been preferentially attracted to z's of opposite spin, with the result being an electron-positron pair that would usually degenerate to twelve charge loops. z's might also be slightly more attracted to down and anti-down quarks, based on loop size similarity.

Another explanation is that z's would not be attracted electrically to quark pairs of the same spin but opposite charge and so have little chance to form triples. Eventually, when the universe had expanded enough and stable triples had formed, further triple formation was not possible.

Why are Quarks Not Found Alone?

The author suggests quarks do exist alone, but in the modern universe they are exceedingly rare and generally short lived. A table of combinations can be offered. The quarks are shown by charge rather than name, though z (0 charge) and e and p are shown as letters to indicate that they more or less drop out after a reaction:

Quark Charge	contents	2/3	1/3	-1/3	2/3
2/3	5p1n	p 1/3	p z	p -2/3	p e
1/3	4p2n	p z	p -1/3	p e	e 2/3
-1/3	2p4n	p -1/3	e p	e 1/3	e z
-2/3	1p5n	e p	e 2/3	e z	e 1/3

Table C.9: Charged Quark Pair Combinations

Note that of 16 possibilities for the charged quarks, four lead to electron-positron pairs which usually result in twelve bare charge structure loops or ten plus a muon neutrino. Four possibilities yield a lepton and a z, the "Neutral Quark." The other eight yield a lepton and a single quark. So the number of free charged quarks goes down 75Note that interaction requires the quarks to be of opposite spin. If two quarks are attracted only by charge and meet another quark of opposite spin, they could potentially form a triplet.

The z also makes itself scarce. It is not attracted by charge to other quarks, so will encounter another quark only by proximity and accident and will combine only if the spins are opposite. A z meeting a z of opposite spin will produce a positron-electron pair. The frequency of spontaneous lepton pair generation may give us some hint of the density of "neutral quarks" in matter and regions of space.

Quark	contents	2/3	1/3	-1/3	-2/3
z	3p3n	p -1/3	p -2/3	e 2/3	e 1/3

Table C.10: Charged Quark and Neutral Quark Combinations

So a z meeting a bare quark will produce a lepton and a charged quark, which can in turn be attracted to another charged quark. A generation for z decay is expected to take MUCH longer than a generation for charged quark decay.

This discussion makes examining neutron decay (and proton to neutron conversion) feasible. Since the only channel seen for neutron decay is to a proton and an electron, a feasible picture emerges. A z finds a down quark of opposite spin in a triplet and attaches on the outer side. It is not repelled by the charge of the other quarks. It donates three positive charge loops in exchange for three negative charge loops. This exchange occurs as the n loops attract each other and p loops attract each other along the shared 12 strand. When the six matching n loops are in position to separate, they do. Energy may be released from the z, which becomes much smaller, and is released from the down which becomes a little smaller.

This image of neutron decay is heavily dependent on the presence of z fermions, so neutron decay might well be dependent on recent high energy reactions.

The author expects particle physicists to have great trouble with these sketches, since the familiar cross section, entry angle, and scattering vocabulary is not used. They rightfully ask about the energy results or drivers required by the reactions. Someday.

Why no Nucleons With Charge +-1/3 or +-2/3?

The later section "How Do Durable Triples Actually Form" suggests reasons that only nucleons with neutral or integer charge were formed in the early universe. Further speculations on non-integer charge is in the addendum.

Why Are There No 3/2 Spin Nucleons?

If all three quarks have the same spin, they do not interact to attempt "Color Change." The surfaces do not join strands rotating in the matching direction and the quarks can only be attracted by charge. So the tend to quarks separate. The universe is old enough that those quarks have either found matches or been returned to six charge loops. Now we see only complete nucleons or mesons (pions/kaons and other quark pair structures) as a result of high energy experiments in colliders or high in the atmosphere.

In a composite of # quarks, at least one must have a different spin for the composite to function, unless two or more are essentially coincident or concentric, which should be quite rare and short-lived.

Why do Quarks not Congregate as Groups of Four and More?

Three is a great number - with two directions of spin, three is the biggest collection that can be stable with two types of units. For more than three quarks, there must either be enough room around one quark of different spin for three or more. Numeric investigation is needed to rule out this possibility. If both spin directions have two or more quarks, quarks of mismatched spins would be expected to find each other quickly and an electron or a positron might be expected to drop out quickly. A line of alternating quarks would not last very long either, since the quarks are attempting to roll around each other? This must be developed further.

Note that neutron conversion to proton and electron seems to require a fourth, z fermion, for the duration of that conversion. Another image of neutron decay, requiring a z to trade three p loops for three n loops so that an electron can be formed while leaving a proton, suggests that for a while a four quark unit exists and decays to a proton and an electron. Investigation on why a z and an up or why a z two ups and a down have nothing to do with each other is warranted when *mnp* computations are possible. This section heading had once been "Getting Down With Quarks as Threesomes" but the internal editor chose to save that for the few reader's still with us. Aren't you lucky.

The careful reader (and many others) can reasonably conclude this exposition on three quark models is interesting but unpersuasive. The careful reader may also have recognized z's as a candidate for dark matter. To be continued.

Why Are Two Quark Combinations Unstable?

None of the two quark combinations can stay stable. If the spins are the same, there is no "color exchange" so the quarks do not associate for long. They may stay together by charge attraction and be willing to combine into a triplet with a third quark of opposite spin, which might be attracted by charge.

If two quarks have opposite spins, there are always six of one charge loop, so a positron or electron can drop out. The symmetrical balanced charge patterns are expected to be more stable. The anyon versions quickly decay or find other items. (To be enumerated at some point.) If experiment shows that same spin quarks combine as pairs, either some momentum or force is causing one to invert and so reverse spin or the two are not touching but happen to be coincident. Note that the concept of "quantum numbers" and unique quantum position is currently seen as very nuanced and very non-automatic in the *mnp* Model.

The quark anti-quark combinations may be the only symmetrical combinations that have a chance of lasting a short while. To be looked into. For example, up and anti-up and down and anti-down:

```
 n p          p p        n n
p   p        p   p      n   n
 p p          n p        p p
 n n          p n        p p
n   n        n   n      p   p
 n p          n n        n n
```

Looks like down and anti-down would last longer than up and anti-up since the symmetry looks better.

Why are the 1 Spin Mesons... So Short Lived?

If the two quarks in a meson have the same spin, the two parts do not bind strands and have no basis for interaction other than an attraction by differing charge. If the two quarks have opposite spins, there is a basis for connection between the strands and "weak" interaction is likely.

Anyons are Rare in the Modern Universe

We don't see many anyons any more because our experiments start with positrons and electrons (from the LEP which can maybe generate stuff but starts with multiples of six loops) and with protons (LHC) and with nuclei (LHC) which already bias toward up and down?

Mesons are not created denovo any more, but from up and down mostly, so they don't have the freedom of association they did in the early second of the universe.

How Do Durable Triples Actually Form? 2012-12-07

All Right Already! Can we now describe how durable triples would form? Yes, and that means refactoring this document. For those not acquainted with last two decades of computer science, refactoring is the recasting of an entire work based on new understandings or new requirements that change the implementation fundamentally or new hardware that requires radically different approaches or new development tools and languages that seem to require a completely new means of negotiating in the problem domain.

Any quark pairs of opposite spin will produce a lepton plus either a lepton, a z, or a charged quark. No triples there. Only opposite charge quarks of the same spin will stay near each other. If their net charge is 0 (2/3 and -2/3 or 1/3 and -1/3), they will not attract another quark and each is free to be attached to another quark of opposite spin as a pair with resulting lepton and fermion. Only if their combination has a net charge will they attract a quark of charge opposite their charge balance. The only combinations are 2/3 with -1/3 and -2/3 with 1/3. These will attract a -1/3 or -2/3 and 1/3 or 2/3 respectively. If that third quark has opposite spin, they will combine as a triple. If the third quark has +-1/3 net charge the resulting triplet is neutral, and it will not attract more attention from other quarks by charge. The two matching quarks will have opposite spins.

Why only a neutral quark? The preferred explanation is based on a highly charged binding quark with a highly charged bound quark. Take the up, anti-up binding quark, and down quark case:

```
2/3 to -2/3    -1/3 to -2/3
 p p            n p
p   p          n   p
 n p            n n
 n p            n n
n   n          n   n
 n n            n p
```

The two highly charged quarks of opposite charge tend to push/pull the single p strand from the binding quark to the bound quark. The other bound quark will tend to keep its two p filaments away from the negative filaments of the binding quark because the n filaments will be more attracted. The second bound quark will not contend for the single p filament in the binding quark. So a positron will pop off, leaving a quark pair to become an electron and a down. The other case, with an up binding quark, will produce the opposite results. This explanation calls for a low charge binding quark to match the low charge bound quark.

A second explanation involves further quarks and is relegated to the author's "Journal of Negative Results."

So there is a plausible picture of why three part quarks have the balance they do and why only four combinations were possible in the early universe. The only two arbitrary issues are left vs right spin and charge direction which is the choice of "up and down" or "anti-up and anti-down". For both issues, once a choice is made by the universe or a region, it would stay set. Rather like the exponent of 4 in the Lagrangian that is assumed to indicate time could have gone either way from the Big Bang. We would never know the difference.

Why a Preference for Left Handedness?

(2012-12-07 2230) When quarks were forming, loops would be recruited into strands, coiling left or right would occur, and more loops would be recruited. Extra loops might retain the coiling hinted by the strand they did not join, so leading to more quarks of the same spin. If a small region had quarks of the same spin, they might well recruit/create still more of the same spin. The quarks would survive because they would not join for Weak charge exchange. The imbalance could spread. Quarks of different charges but matching spin would attract by charge difference. Quarks that happened to be created with the opposite spin would be instant candidates to be binding quarks.

Why Do Up and Down Quarks Predominate?

The author currently has no confident explanation of why, once an imbalance of up and down appeared, that imbalance would continue to be selected over anti-up and anti-down. (2012-12-09 2350:)

- A possible channel for dominance could be that if an anti-proton or anti-neutron presented a negative charge surface the way protons and neutrons present a positive charged surface, they would be attracted to the locally dominant protons and neutrons and, being outnumbered, might lose their outer surface fields provided by the residual strong force. Without this protection, the anti-fermion might be more subject to decay from loose quarks, pions, and z's.
- An alternative is that if a proton or neutron meets an anti-proton or anti-neutron in the presence of protons and neutrons, the initial reaction fragments could be "rebuilt" with the help of the surrounding protons and neutrons.

Cosmology may or may not offer hints of when up/down preference was established. Universal up/down predominance would suggest that up/down prevalence needed to be established before left-handed preference or at least not later.

Speculations on the prevalence of up/down/electrons as the six loop fermions that make up the universe or our region are in the Addendum

Color Change and Flavor Change in the *mnp* Model

Color Change is the tendency of quarks to try to swap units of charge and fail, and the connection between quarks is at least partially the strings that result as these sixths are partially loaned.

It takes time to pass part of a charge structure loop, and the loops may well elongate if the quarks are pulled apart. The stretched loops will get increasingly strong as they straighten. This binding by loan is a dynamic process, which seems to match well the description of quark interaction.

Color and RGB themselves seem to be concepts not needed in the *mnp* Model.

Flavor change is completed charge structure exchange, finishing while color change can be seen as incomplete charge structure exchange. Changing a quark to another type, as when a down in a neutron changes to an up. Whether the new proton is as stable as one with both ups having the same spin is an open question. The author would suggest not.

Experimentally, it seems that neutron decay leads to a proton and an electron rather than an electron and a meson, so the author has more explaining to do. Certainly charge structure loops are available for recruitment. If loops are required, then neutrons could successfully traverse deep space at high speeds since they will not be recruiting loops in transit.

Quantum Chromo Dynamics may have additional nuggets of experimental truth, so the author is not proposing to remove it from the curriculum.

Weak Force in the *mnp* Model

The Weak Force is seen as allied with the Strong Force in the *mnp* Model, but comes in two variants. The decay of d', the variant of down that has the two p filaments separated by one n filament if we can ever see it, may give a hint of the speed of unrestricted rearrangement of filament loops in the strand or in multiple strands. The decay of Strange requires some small outside impetus, but is also just a rearrangement of the filaments in the strand.

For Weak reactions in general, when two strands join, they will tend to sort the strands to be together by type unless they are symmetrical. A muon is symmetrical, so it lasts a while. Strange too. So when up and down with opposite spins come together, the prior arrangement of n and p filaments will determine the pace of mixing. Apparently filaments/loops don't break normally in any of the reactions known to physics including entry into black holes, though this issue is still to be decided. Two six loop fermions joining require spin of opposite directions. If the result is a single larger unit, one of those joining effectively "turns inside out" to complete the join. If the result is a trading of charge loops, only individual charge loops "change spin," which should take very little coaxing.

If two quarks are connected, the pair's lifetime would be in three parts: how long does it take to start the connection (time to contact), how long for the entire strand pair to be rearranged (maybe the length of the loop/c), and how long to separate (probably quickly, since the separation is probably occurring as the rearrangement proceeds).

Strong Force in the *mnp* Model

The Strong Force is the attempt by neighboring six loop fermions (or larger) to trade filament/charge loop coils, which is interrupted by other forces. This has been described in "Why Are Protons Durable" above. Most protons are a trio for the duration of the universe.

Residual Strong Force in the *mnp* Model

How do nucleons present a "sphere" to each other with presumably adiabatic properties of "push on the sphere, move the quarks inside"? The *mnp* Model has no clear picture. Speculations are in the Addendum.

Having currents of *m*-figments, with Axis in for protons and neutrons and out for anti-protons and anti-neutrons, flowing from near the quarks to some fuzzy boundary surface, is currently a contender. Having coils of the charge loop material slightly loose and "visiting" a logical surface while spending most of the loop travel time and length within the quark is another contender. Neither contestant looks like a winner at present.

Iso-spin in the *mnp* Model

Iso-spin is a formalism that combines charge, baryon-ness, and strange into a single "basis" that is conserved by some forces and has helped categorize forces. It does fold in the ability of strange to decay to down without changing charge. While interesting, the *mnp* Model finds the catalogue of what is conserved by what force far more useful. Calculating "cross sections" will require revisiting this issue if enumerating possibilities and probabilities does not suffice or if the predictive power or descriptive shorthand remains useful with *mnp* 's Model of Weak and Strong. IEP 132.

Gauge Bosons in the *mnp* Model

Gauge bosons are the force carriers for strong, weak, and electromagnetic interactions in the Standard Model. If seen in the wild directly, the *mnp* Model would ask about spin, charge, mass, lifetime and interpret them as particles or anyons or composites. They are not needed in the *mnp* Model now that Weak and Strong are added to the "explained" column with gravity and electromagnetic forces. Residual strong force still needs a satisfactory explanation. The whole *mnp* Model still needs to answer the EMH criterion, vis "Do you have any numbers yet?"

Counter-Intuitive Benefits of the Higgs Class Experiments

The ferment and particle creation at CERN makes it a wonderful time to be an experimentalist. For the *mnp* Model, having more particles to map is interesting. What may be most interesting of all is not the particles created, but the feel for how long it takes for complete chaos to sort itself into "normal" stuff. The CERN experiments have the advantage of already having left handed protons and left handed up quarks, so will tend to get/receive/see stuff that matches. Whether the presence of gravity, organized magnetic fields, and charge loop structures make present conditions different from the early universe in subtle ways is not clear. Also not a problem, just an experimental condition for the LHC efforts.

Understanding the catalogue will be fun. Looking at the "re-form" times may be a better guide to the recruiting in the early universe, though now gravitons are going both ways. In the early universe "before the gravitons returned" recruiting and building may have been little influenced by gravity.

Conclusion

Weak and Strong return to being contact forces, as Fermi suggested.

"Weak" is the completion of a process, "Strong" is the start of the same process that cannot run to completion but leads to binding. Both depend on contact or very close proximity that becomes contact. Weak does not need a big boson, just spins that are compatible and enough charge material to drop out a positron or an electron. And enough energy to put the six loop fermions in proximity if they are not already close. Since quarks may have the lepton's ability to "turn inside out" and hence reverse spin, "enough energy" could include what it takes to invert a quark.

"Residual Strong" may be markedly different from Strong and Weak.

Whew

And this isn't done yet. On hearing that I had made progress on the important topic of the Weak and Strong Forces, my son had the perfect reply. "Good! Do you have any numbers yet?"

Current efforts in the *mnp* Model have been to understand and describe the phenomena that need to be predicted. Chasing after theoretical effects and bolting on corrections for phenomena discovered or recognized later hold no appeal for the author. The experience of String Theory, of the SU(5) Grand Unifications, and the theories "ruled out" by Bell's Theorem provide enough examples. The author has often hoped for "the serenity to accept the things that have been measured, the courage to question the things merely theorized, and the wisdom to know the difference." He'll need it.

All that being said, number two son is right. It's time for numbers. The Model is ready.

The plan will be to balance numbers for some of the physical processes and see if that balance works for other processes. The hope is to avoid infinite rebalancing, that a durable resonance can be found.

Postscript, Only For The Strong

While much of this material will seem wildly deterministic and mechanical to modern physicists, the author suggests that the probabilistic nature of quantum mechanics and indeed the predictive nature of particle interactions will probably be supported by the *mnp* Model. Certainly, the mnp Model will need to follow experimental results and eventually predict others. If z's are rare and unpredictable, if charge structure loops exist independently and enter into field effects with the bare figments but sometimes form simple structures "spontaneously," the probabilistic predictions and measurements associated with modern branches of physics will be sustained.

The author wishes to make common cause with string theorists, quantum loop theorists, and the preon theorists if any are left. The major question is "What phenomena do we need to model, and how do we understand those phenomena?"

For example,

- What theoretical work has been done to identify the aspects of special relativity that really need to be explained. And what can be omitted as representing modern preference? Another example, what do we need to understand about neutron decay?
- What is the last word on nuclear packing, ordering, and stability?
- What are the experimental results that lead to our knowledge of dark matter?
- What are the experimental results that lead many to conclude the universe is accelerating its rate of expansion?

A model that attempts to match all current interpretations is lost. A model that misinterprets experiment is in trouble. It is doing too much work and leading itself away from effective explanation.

Philosophy of Physics also has or should have a fair amount to say about how to judge theories, how to judge and interpret experiments, and how to arrange the thought processes needed to do physics. "On the Interpretation of Experiment and the Development and Classification of Theory," anyone?

If you don't have the right answers, it's best to have the right questions.

Addenda

Speculations on Proton Durability:

The author suggests that a most durable form might exist, and that form would be preferred over time. In the most durable protons, the spin of the two up quarks matches so that they do not combine when their surface coils approach each other. This leads to bonding between the down quark and each of the up quarks. The up quarks contend for the only two adjacent p loops in the down quark, maximizing their interference with each other and minimizing the opportunities to successfully "steal" a p loop from the down quark.

Experimentally, on the order of 10-17 seconds is required for quark pairs to decay when the results have balanced charge. When pairs create a charged result, the sorting of filaments in the paired strand may take more time so that on the order of 10-8 seconds is required to complete charge change if the result has charge. The stability of up quark to down quark connections may benefit from the sorting of loops required in the paired strand of up and down.

Speculations on Neutron Durability:

The author might speculate that some neutrons, with matching spin in the two downs, are very durable. If the spin of the two down quarks differs, the physical proximity of the negative charge structure loops should lead to earlier formation of an electron as a coiled strand of six negative charge structure loops, though this should be inhibited by the third quark.

Experimental Question: If we can collect a lot of protons from neutron decay, is their half-life measurable?

Wild Speculations: If unstable neutrons (and unstable protons?) can be created, we may have a very expensive but very compact way to store energy. Hopefully NOT with so much energy the storage acts more like an explosive. We will NOT call the process cold fusion.

Speculations on Six Filament Strands

Philosophers may see beauty in the six filament strand, since it leads to a limited number of quarks and a limited number of combinations of spin and charge and a limited number of stable building blocks for the universe. Five or four strand filaments would have wide ranging effects the author hasn't time to explore. Two spin options and two fractional charge options leading to stable nucleons may be grist for not just numerology but serious particle theory and exploration of options and alternates.

Speculations on Nucleons and +-1/3 and +-2/3 Charge

Hand waving alert. Achieving a fractional charge with three quarks requires that one or two of them be a z as described above or that a quark-anti quark pair be present but not both. Maybe the *mnp* Model is saved by the elusiveness of the neutral "quark z." Otherwise, this is a good question, requiring enumerating the possibilities and the stabilities. Three downs make a muon or a tau which is a strand of 18. Three anti-downs an anti-muon or anti-tau. Both of these are single 18 filament strands and act like single particles (leptons). Three ups (charge +2) have so much positive charge material that a positron might be expected to drop out immediately. Enumeration will include "which of the three quarks has the differing spin." We might call that the bonding quark. So with one bonding quark of one spin (5 choices) combined with two quarks of the other spin (5*6/2 combinations) we get 75 different possibilities, a manageable big number. We could eliminate any alternates that contain the neutral z, assuming that while it could participate in the Strong Force, as a practical matter it is unlikely to be present when triplets form by charge attraction followed by attachment or a third quark. Without z, we have (4*4*5/2) 40 possibilities to investigate. Twenty if charge symmetry is invoked.

If a z is needed to facilitate neutron decay and it is what becomes the electron by trading three loops, energy may be released by the z as it becomes much smaller. Or if the z, being electrically neutral, does not engage any *m*-figments as glue, then no or negligible energy will be released as the z shrinks to an electron. Side note: if the z does not engage the figments that make up the electrical field, it will throw off/create no Bremsstrahlung radiation as it travels at relativistic speeds, just as neutrinos throw off none.

Speculations on the Residual Strong Force

Having a charge structure at that surface may be an attractive idea and works for electrons and positrons, but the surface of nucleons does not twist into shells with other angular momenta - as far as I've heard. Hence the defined surface of nucleons and the binding between nucleons lacks the charge structure that forms electron and positron shells and that supports the electrical effects on each side of those shells.

Why protons and neutrons have a surface when their charge structure is a much smaller region inside is emphatically not clear. In one model, the author sees the residual strong force as a result of the electro-magnetic fields created by the quarks in nucleons. Unpublished diagrams 2012-12-05:1200 of "Residual strong force" show m's forming flat ribbons by Travel and Axis Alignment as in fhotons, bending to flow at angles to other flat ribbons but sharing the Axis Alignment with axis pointed in along the "surface". These dynamic ribbons would form the "surface" of the nucleon, forming vertical convection loops that overlap. The convection currents may flow through each other but cohere into a surface if Axis Alignment is strong enough even when Travel Alignment (which is stronger) not? This suggests relatively smooth approximate surface, a little fuzzy but NOT knobby. The proton/neutron surface may be the limit of cohesion of the m-figments, similar to the limit at which gravity goes down by $1/r^2$ (Referred to by the MOND acronym in the *mnp* Model writings. The convection currents may have some similarities to the "return of the gravitons" in the early universe. The author has seen speculations on the similarities of the MOND radius, the density of the universe, and the density of nucleons and other particles, and the strengths of gravitational forces at the boundaries of each.

Recruiting *m*-figments to act as the surface for a proton or neutron is slightly ugly in the *mnp* Model because travel at relativistic speeds requires either 1) that the charge structure being continually recruiting "glue," 2) that the "glue" be recruited when the charge structure slows, or 3) that the "glue" travel with the charge structure. Option 2 suggests that some of the "Effective Mass" be shed or sluffed off at relativistic velocity. Option 3 would operate only if Travel

Alignment were to keep the "glue" traveling with the charge structure, with graceful resumption of motion relative to the charge structure on slowing.

An alternative explanation that does not yet have the author's approval is based on partially extended filaments pulled out by strand attraction but then released as part of the strong influence of the other bound quark. The coils that bind an up and a down quark are p filaments, so protons would be throwing short portions of their p filaments (bound at both ends to a quarks) around the inside of the nucleon? In a neutron, if the up quark is the binding quark, then p filaments will be present. If a down quark is the binding quark, the two down quarks may throw around shorter lengths of n filament?? This might indicate that two classes of neutrons and two classes to protons exist and that they behave a little differently in the nucleus. Having coils of the charge loop material slightly loose and "visiting" a logical surface while spending most of the loop travel time and length within the quark has a philosophical attraction of being a "Residual Strong Force" and of behaving consistently at relativistic velocities.

Why does the Residual Strong Force not operate elsewhere at different scales? An electron shell is already beyond the limit so the electrical field radiates evenly. An electron is too small to affect *m*-figments in the way that quarks or quark combinations can.

Neutrons and protons are seen to "form a bound state" in experiment. Understanding those experiments, the dimensions involved, the proximity of the quarks involved, whether the bound states apply to more than one neutron with a proton, the speeds and durations of the experiments, and the conditions that do not show binding, will be useful in understanding and describing the residual strong force.

Again, the length of this discussion indicates that the "Residual Strong Force" is not well understood in the *mnp* Model.

Conjecture: Nucleons in a bigger nucleus are a little bigger.

Question: Does a nucleus NEED to be swept by an s shell electron every once in a while to mix the figments that form the fields in the nucleus?

Speculations on Up Down Dominance

The prevalence of +2/3 and -1/3 charge quarks and electrons is believed to be universal rather than regional. The strongest argument states that if the up/down/electron prevalence were only by region, astronomers would see boundaries where more than usual interaction takes place and more energy is generated.

The author wonders how much interaction would be measurable when the few particles in deep space are traveling at almost the speed of light from or toward the most attractive mass. Since "anti-matter" is just material of similar structure with opposite charge structure loops in the *mnp* Model, the author suggests that anti-quarks and quarks do not necessarily obliterate each other but can react strongly, weakly, or electromagnetically to form byproducts that will eventually conform to the up/down/electron/z/amorphous charge loop pattern of the universe or our portion of it. Most interactions would be when the traveling nucleon encounters suns and planets. Anti-neutrons or anti-protons hitting the upper atmosphere pack a similar wallop to neutrons and protons. Whether anti-protons and anti-neutrons hitting a mineral surface such as the moon would create different effects than protons and neutrons has probably already been answered.

To back current conclusions about the universality of up/down preference, the explanation for up/down predominance would need to put the imbalance and subsequent recruiting VERY early in the development of the universe or at an era where mixing was stronger than expansion.

Unsatisfying images can be offered in hopes of stimulating further ideas. (2012-12-08)

- If the initial expansion of the universe had all *n*-figments on one side, all *p*-figments on the other side rushing outward, with *m*-figments between also rushing outward, the return and mixing would occur across a boundary that might allow a preference to establish itself in the formation of quarks. If that region of mixing were relatively small, if the return was fairly focused, that mixing could occur for the entire universe of particles, followed by expansion.

  The *mnp* Model sees the quantization of charge structure loops as being formed only by positrons and electrons, since any other fermion would lead to a different loop length. Whether electrons and positrons could be formed and the destroyed in an expanding universe before quarks were formed from the quantized loops is not clear to the author.

  An even wilder image, of an initial expansion to "create" space followed by a somewhat focused contraction followed by the recent expansion, may solve a few puzzles. Positrons and electrons could be formed on the return of

figments toward a moderately focused area, then torn apart as the positrons and electrons got even closer, then six loop fermions formed as described above in a condensing or compact but expanding area with up/down/electron predominance being established/recruited then, followed by the expansion and gathering of galaxies we see today. The numbers will eventually need to show

- If neutrons and anti-neutrons and z's existed and were mixing and still dense enough to form more quarks and fermions while allowing z's and the neutrons to form charged nucleons and six loop leptons, a slight imbalance might be magnified. If protons form bound states only with neutrons and not anti-neutrons then another avenue of preference may open.
- If an electron could catalyze the decay of an anti-proton or an anti-neutron and maintain its own structure, then the "first" decayed neutron (or anti-neutron) would have an advantage.

```
electron       anti-proton        anti-neutron

 n n   meets   p n     n p   or   n p     n p
n   n          n   n   n   n      n   p   n   n
 n n            n n n n n n        p p p n n n
                   p   p              p   n
                    p p                p p
```

The quark diagrams are not spacially accurate, since the "twelve strand" cross section for each pairing is separated onto opposite sides of the binding quark. Further, for the anti-proton and proton, the binding quark usually has the same twelve stand image, of attaching the two in the binding quark to the majority of the up or anti-up quark:

```
 p n         n p
n   n       p   p
 n n         p p
 n n         p p
p   p       n   n
 p p         n n
```

Note that each of the up or anti-up quarks is contending for BOTH of the matching loops in the binding quark, probably maximizing their interference and the durability of the trio.

- Least attractive is finding some difference between *n*-figments and *p*-figments or p loops and n loops or the number of p loops and n loops.

Longer answers suggest more options and less certainty.

Development of the *mnp* Model has proceeded over the last sixteen months. Early "Ring" Models presented spin, sixths of the elementary charge as fundamental to quarks, field recruitment, neutrinos, and other concepts but did not satisfy the author as describing matter well enough. In October, 2012 it became clear that Loops rather than Rings (`http://mnpmodel.blogspot.com/2012/10/loops-may-be-quantized-basis-for.html`) were the conceptual shift needed to effectively explain inertia, movement, and particles. The *mnp* Model has grown quickly since then. The author suggests it is now a complete enough concept. The next step is "proof of concept" and numbers.

Apologies

The experimental work to measure particles is invaluable and the theoretical work to understand that body of knowledge is useful. The barriers for a well trained physicist to

- considering particles as having structure (or sub-structure if you insist),
- considering that interactions may happen by proximity and recruited fields,
- and considering that mediators are not needed

are all formidable. The author is aware that considering a structural model such as the *mnp* Model requires suspension of disbelief and suppressing patterns of thought acquired at great effort.

Yet the author suggests that an approach based on spin and sixths of an elementary charge "mixed in a way we cannot see" could make current particle theory and QCD interesting. If the strong force arises due to incomplete exchange of quantized sixths and the weak force from complete exchange, bringing calculation to a simplified Quantum Chromo

Dynamics might be possible. QCD might be less colorful, but the knowledge of experimental reality contained in QCD is invaluable. The image of up/down recruitment and quark triplet formation presented here can be separated from the loops of the *mnp* Model and used by the Standard Model. Even the three possible versions of down seen by the *mnp* Model, d d' and d" also known as strange (`http://mnpmodel.blogspot.com/2012/11/bigger-quarks-in-mnp-model.html`) could be described as different arrangements of the quantized sixths that appear to be uniformly spread in the quark. Different arrangements lead to different masses "in ways we can't yet explain."

The coiled loops forming a strand of six is just one image of the way matter could form its stable and not so stable combinations.

```
down    down'   down''
 p p     p n     p n
n   n   n   p   n   n
 n n     n n     n p
```

Thanks, readers. I hope it's been fun.

Bigger Quarks in the *mnp* Model - Post 17 (2012-11-30)

The "loops of charge material of fixed length" model of particles that leads to charge quantization in the *mnp* Model also offer understanding of Strange, Charm, Bottom, and maybe Top. Wild and Over-the-Top, the *mnp* Model is an interesting means of interpreting experiment.

The *mnp* Loop Model image of Up has one loop of negative and five loops of positive as a strand with cross section:

```
 n p
p   p
 p p
```

This is limited to one form, while Down has two loops of positive and four loops of negative which leads to three possible patterns for the strand that coils

```
 p p    p n    p n
n   n  n   p  n   n
 n n    n n    n p
```

Three patterns seemed to offer three forms of the Down quark, which has been incompatible with the single down quark of experiment. I had rationalized earlier this week that the first is the most stable form, since the "others" would tend to migrate the two minority loops to be adjacent.

On focusing accidentally on the "bare mass" and "effective mass" of quarks on page 135 of Griffiths' Introduction to Elementary Particles Second, Revised Edition 2008, the following thoughts burst out:

Strange is not that big! So Strange is the third form of "down" and is somewhat stable, since the loops do not have a preferred direction for migrating. The second form might be seen briefly in accelerator experiments. I would consider it bigger and "heavier" than down, but probably not as big or "heavy" as strange. I call it d' or down' since the minority loops/filaments are separated by one majority loop. It would decay almost always to down, though with added energy might occasionally become strange. Strange (d") has the minority loops separated by two of the majority strands hence the double prime. d" is the third form:

```
 p n
n   n
 n p
```

Further, whatever is added to the first generation of quarks to form the "second generation" leads to Charm and Bottom! These are closer in mass and are the real second generation! Further, bottom might come in three versions, b, b' and b" just as down comes in the three versions d, d', and d". For b, if extra charge material loops are added between generations, the difference may be small compared to the mass of the b and the number of configurations large so statistical significance may be hard to achieve in differentiating the types. The error bars on the mass of b may just be irreducable.

Whatever is added to the second generation leads to Top t and "Over the Top" o, where o may come in three versions o, o', and o" or perhaps many indistinguishable versions. Of course, it is possible that o is impossible. I do intend to

use/hijack the wonderful work of quantum mechanics for that investigation. Certainly o would be high energy.

The "whatever is added" could be more loops/filaments of balanced charge, as in the first cross section picture of a muon as a coiling strand of 18 filament loops:

```
    n n
   n   n
    p p
 n p   p n
n   p p   n
 n n   n n
```

Charm might be:

```
    p n
   p   n
    p n
 p p   p p
n   p p   n
 n p   p n
```

It appears that the outer form, grafting ppnn onto three pairs in the inner ring in cross-section, creates an outer surface that looks like the anti-quark of opposite charge. Since the charge structure is actually overlapped as much as Separation will allow, that image of "outside surface" may be effectively chimerical.

"Whatever is added" could also be extra twisting of the loops over the surface to make a stiffer charge structure and hence a larger "sphere" with more opportunity to interact with and recruit the mediator entities.

Or "whatever is added" hasn't been imagined yet. To be continued.

The "anti" versions of these quarks would be reversals of n and p in the diagrams, but essentially similar.

Many questions remain unanswered in the *mnp* Model, both about big quarks and quark behavior. Is there something about the symmetry of 6 of a single charge that makes big quarks form or is it just that those particles "resonate" and last a little longer than loop collections that do not add up to a multiple of "elementary charge?" Can the quark triplets be forever changing loops but never getting to all of one type which would decay quickly?? Descriptions of quark behavior suggest the loops actually link quarks, so that stretching is resisted by coils that stretch, rather than just by "glue". The loops are always in the process of being exchanged, apparently, rather than being exchanged sequentially?

The Education Extends

On the Origin of Universes - Post 16 (2012-11-29)

How did our universe begin? Current descriptions of the Big Bang have many answers, but what are the questions?

Questions that can be raised in any theory (and some possible answers) include:

- When is the velocity of light, c, fixed? (initially, after initial expansion)
- When does uneven distribution occur? (initially, early in spherical expansion, after shell expands to initial radius, later?)
- When do larger baryons form? (early in order of descending size, when electrons, after loops, after electrons)
- When does the predominance of electrons, up, and down develop? (when leptons and baryons form, after electrons and protons, after leptons and baryons of "regular" and anti variety, as universe expanded and by region - though the counter argument is "we see no interface of high energy reactions")
- When does gravity start working as at present? (initially, after an expansion, after some "complete" expansion)
- How many universes as we know them exist? (none - its imaginary, one, an uncountable infinity are created constantly)

- When have the huge particles existed? (At the beginning, when created in the labs, when intelligence somewhere created them in labs, when intelligence somewhere created a fireworks show of organization for all to see) Pick all that apply.
- Can causation flow backwards in time? (No, don't know, not relevant, only from the origin and then the universe would be the same anyway, yes)

Questions that can be raised by any structural model include:

- When do the structural units appear? (initially, after some expansion, some other time)
- When do the structural units attain their present form? (initially, after initial expansion, constantly changing, other)
- Do the structural units change? (no, not since some early epoch, with age, in black holes, constantly, other)

Questions raised by the *mnp* Model, a structural model which sees everything consisting of three types of entities that differ only in "Axis" interacting in three ways over very short distances

- When is the magnitude of the Axis effect set - earlier was phrased when is the amount of Spin set? (initially, later??)
- When is the direction of the Axis compared to direction of travel set? (initially, early, by the end of initial expansion, later??, whenever entities move)
- Did the basic entities expand out then return so gravitons work both ways? (no, don't know, yes)
- When do loops form? (early, before electrons and positrons, as electrons and positrons form, in black holes, constantly reforming)
- When does gravity, with two way gravitons, start working as at present? (initially, after the initial expansion, after the mixing and return that followed the initial expansion, never - at large distances or near the unseen edge of the universe it still does not work normally, other)

When we say "initially," that can mean "in the limit as the age of the universe approaches 0 from the positive" Or it could mean truly from time 0.

The Big Bang theory of course says everything existed at the beginning or appeared when the universe was cool enough. On cooling, electrons and protons and neutrons remained and when cooled enough formed atoms. Focus on probability functions leads to suggestions that an uncountable infinity of universe exist, with an uncountable number created constantly, though this extension is not part of the Big Bang theory.

The *mnp* Model does not yet propose answers for all of these questions, but does answer some differently than the Big Bang theory. The new thoughts in the *mnp* Model see electrons and positrons being the original recruited shapes leading to durable loops of charge material that can then join in mixed strands to form the quarks. Earlier images of neutrinos as opposing rings have been superseded.

The *mnp* Model suggests we have one universe, with effect and hence time flowing one direction though gravity is affected by history. Many of the questions on origin have not been answered. Nevertheless, as a thought model, this exploration is titled On the Origin of Universes because a different set of answers might lead to a different universe.

We could explore the questions and answers by looking for connections between the questions, determining which questions or which answers lead to limits on other questions.

We could seek a "basis" in logic algebra or decision algebra (if such exists). Figuring out what is independent, what is orthogonal, and what is orthonormal as a basis will be interesting. Determining the "dimension" of that logical field (or how many degrees of freedom there are) for the Origins of Universes would be fun. If not for me, for someone. Thank you, R Shankar, for the description of vectors, scalars, fields, basis, and normal.

The previous paragraph could be phrased as: many possibilities for when various "constants" come into being exist. I am trying to work out the logic diagrams, nomenclature, and notation to handle the options. I am sure some branch of math has already done this. The answers are certainly not linear in that some of them preclude other answers to other questions. Instead, the author offers a story in which a number of decisions have been made somewhat arbitrarily, to illustrate the possibilities involved in the origin of a universe with fine-grained structure.

Here is offered a bedtime story with many titles and many subtitles. Choose from “Origins” or “Origin” or “Murmurs of the Beginning” or “A Creation Story” or “Building a Universe”. Or ”Quiet Expansion” or ”Timeless Expansion” or ”The Grand Recruitment” or ”Building a Universe” or ”Measure” or ”Measuring Space and Time” or ”Forming Place and Then Time” or ”Growing a Universe” or ”Imagination Matter and Time” or ”Not with a Bang but a Whisper”. One could argue that the plural of universe is created by various answers to the questions raised. The author suspects only one set of answers to the questions formed the singular universe we all share.

Origin - One Story

A narrative for the reader’s enjoyment as suggested by the Mostly New Physics Model, *mnp* 2012-11-29. Noting the choices made in answer to the questions posed of any origin theory is left as an exercise for the reader. Enjoy:

In a universe long long ago and not too far away, there was nothing. No space, no time, nothing. There was no music announcing the approaching dawn. There was no music to hint at the coming strength and violence of the planets.

Then in that void of no space and no time, there was a place or a very small region with many many many many points, all spinning their own direction, all at the same location. But there was no space and there was no time. Gradually (or quickly for there was no time) the many points aligned their Axis with that of their neighbors for they liked to spin the same direction as other nearby points and eventually (or quickly) ALL the points became aligned in the same direction.

When the Axis of all points was the same, the points realized that by being, they needed Separation. We are not sure whether Separation acts only when the points are Traveling about the same direction or about the same Axis. It may only act when the points are not the same, in which case something caused the points to separate just a little. We do know that the points started to move outwards from their starting place, perhaps slowly at first and then faster. They started to create space. Still, there was no time, since nothing stopped to compare to other points. Eventually, all the points were separated enough that their Separation pushed no more, or at least pushed only a little. All the points were moving the same speed, the speed they are still moving now. We do not yet know if the points had all moved away from the starting place, but they all moved at the same speed.

Once the points had Separated enough that they had no urge to spread apart further, they discovered that they did like to Travel the same direction with other points, so they tended to clump a little. There were fewer points in some regions of the space they were creating. They also found that as they Traveled, having an Axis was much simpler if it aligned with the line of Travel or if it was at right angles (perpendicular) to the line of travel, for they had an Axis and were always moving. So gradually (or quickly, because there was no time) the points all became separated into 3 types: the right handed spinners, the left handed spinners, and the more numerous spinners with their spin axis at right angles (perpendicular) to their travel. Even though there were now three types of spinners, there was no light and no particles and no time. The spinners moved their constant speed and spread out more, though they mixed and curved and turned.

Clearly, there were enough spinners with the right amount of Axis alignment urge, Separation urge, and Travel alignment urge that this universe would be lucky enough to eventually create matter and life and intelligence that could marvel at the beauty created, ask why, and seek to understand. But still there was no time, just a universe expanding.

The spinners’ urge to align with others in their line of Travel was strong, for filaments of spinners formed. Since spinners also had the urge to align with others in their Axis, the most durable filaments were of spinners of the same Axis type, aligned. Those with Axis along the line of travel or opposite the line of travel were the most durable of all. When filaments encountered filaments traveling nearly the opposite direction, the path was bent. The filaments found that curving, forming loops of constant size was easiest since Separation kept them from forming smaller coils but the urge to follow spinners in front kept the filaments curved. The filaments found that by combining with five other filaments of the same type into a strand, they were even stronger, and by coiling as much as the balance of urges allowed, they met an end of a filament that was their own line, forming a loop. All loops were the same length. Six loops in a strand, all of the same kind of spinner, were most flexible and most durable. We call those durable spheres electrons and positrons.

Now the universe had spinners that could combine to stay in one location, so now space and distance could have meaning. But because the electrons and positrons were close, they interfered with each other and the six loops would come apart. The individual loops held together, and when the volume of the universe expanded enough, the loops could combine. Sometimes with five of one type and one of another, sometimes four of one type and two of another, sometimes three and three to be the largest and heaviest of the combinations, and sometimes six of one type, the smallest and lightest. Forming, breaking, and reforming, eventually the six strand right handed, five left plus one right, and four right plus two left came to predominate. The mixed types, which we now call quarks, were most stable as triplets occasionally exchanging loops.

We have some idea why the third type of spinners, the most common ones, like to move over the surface of those groups, helping glue them together and adding many many more spinners to the groups than the right and left handed spinners themselves. And so the universe had matter, which was eager to interact with other matter.

When light first formed, we do not know. Light became common after protons and electrons were formed and joined into atoms, when the third type of spinner would fill the shell of the outer electrons and sometimes fill enough to expand the shell. When the shell would go back to its usual size, spinners would be released organized as light. We do know that light occurs when the common form of spinners arrange with some number traveling the same direction, with the first half all lined up to spin one way, then the second half lined up to spin exactly the other way. Spinners organized in this sort of group can travel together without being affected (much) by other spinners they encounter. The spinners themselves are moving at their speed and do not see time. Light itself does not see time, so it might have existed before electrons. But until there were electrons and protons, there was no way to make more light except by accident.

When electrons spread around protons to form atoms, the vibration of the electron could measure a new concept, time. Because the atoms would keep their distance from other atoms, space could be measured.

The universe now had a way to tell time, to measure distances, and to combine into atoms and light. And it was good.

And here, the Newest Creation Story ends.

But the universe did not stop creating.

Other stories tell how the stars formed from these atoms (and created new atoms), how those stars make light, how some of them make the medium sized atoms that become planets, how some stars make the heavy atoms that make rare and interesting additions to the planets, how our own planet formed, how the atoms of this planet combined into forms that could make more of themselves and how those forms got bigger and more complicated and eventually the forms that we know as people became self aware and curious enough to ask how this universe came to be and where knowledge came from.

That is all a wonderful part of creation, but not a part of this Creation Story.

But know that we now have music to announce the dawn, and a name for the first creator of this music and a name for his creation. We do have music to describe the movement and power of the planets, and a name for the first creator of that music and a name for his creation. And we have some knowledge of how the universe works. And some knowledge of how we as people work. And when we use and enjoy that knowledge, it is good.

Background Notes

This Creation Story comes from the *mnp* Model, A Fine Grain Architecture of the Universe, which suggests that two principles, three tiny entities, and three effects acting only over very small distances can account for the observed universe. See `http://www.worldlyte.com/physics/mnp`

The exact order of constant speed, Axis alignment, Separation, and the development of entities of exactly three types is not postulated in the *mnp* Model. Travel alignment may have little or no effect until all entities had completed their initial Separation, which would argue for formation of particles after an initial expansion, with development occurring in both directions from that initial radius.

The balance of this Story comes directly from the *mnp* Model, though names of the entities and effects have been changed

Loops May Be a Quantized Basis for Particles in the *mnp* Model - Post 14 (2012-10-29)

The *mnp* Model is now a collection of the numerous possibilities for structural models based on tiny entities acting only over very short distances. Some of the discoveries and inventions and re-discoveries in the Model may be useful in other "structural theories" such as preon models, string theory, and quantum loop theory. See Mental Leaps Required in a Structural Model.

To differentiate the various possibilities within the *mnp* Model, the author will now start naming the alternates for convenience of thought and discussion. The early *mnp* Ring Model is now deprecated, but led to many useful insights.

The *mnp* Coiled Filament Model sees the basic entities form filaments that coil. The Coiled Filament Model suggests that the length of the filaments is set by the coil's progress over the logical surface of the electron or positron.

The *mnp* Strand Model sees filaments make up strands that are all the same length and suggests that the configuration of the six filament strands leads to different charges and different sphere sizes and different masses for "elementary" particles by recruitment of the basic entities that make up photons, magnetic fields, and most gravitational fields.

The new *mnp* Loop Model sees the filament loops as all the same length/size/mass, and suggests that the many different particle sizes do not recruit basic entities to be filaments that happen to be the same length, but are combinations of pre-existing filament loops. The filament loops would probably be recruited in very dense regions of the universe, perhaps before electrons and positrons formed or as part of electron and positron formation. Certainly loops would exist in their quantum length before the larger particles formed.

Interactions of particles could be a matter of snipping and splicing coils, which would suggest electrons may eventually form one long filament in a 6 sided strand. This suggestion is unlikely due to the observed quantization of particles and the hypothesized quantization of loops. More likely, interactions of particles is a matter of removing and recombining filament loops in the strands that form the structural basis of particles. The author is reluctant to call this version the *mnp* Quantum Loop Model, though the phrase would be accurate.

Questions raised by the *mnp* Loop Model include:

- Does electron/positron annihilation destroy the loops or just unravel both of the strands of six loops completely, leaving twelve filament loops of charge structure?
- Are loose filament loops a better image of dark matter than loose linear filaments? Both images are better than loose tiny entities of charge material, which are basic constituents of fields as well as filaments. Such loops would probably travel less than uni-directional filaments, and so may cluster closer to masses than filaments would. Dark energy might then be the tiny entities that form magnetic fields and light, recruited by the loose loops. Or dark energy may be filaments of the tiny entities that are not organized in pairs to be photons and travel as light. Both images are better than loose tiny entities of magnetic material, which are the basic entities of fields and photons.
- If loose filament loops allow for "spontaneous" change or creation of particles, is the Model more attractive to modern theory by making such events more likely than pure creation of particles from the very basic three entities in the Model?

Conservation of Charge Material in the *mnp* Model

Beyond the charge conservation of the Standard Model, the *mnp* Model proposes that charge material is conserved, so that the charge material in neutrinos is maintained over time as is the charge material in the neutral leptons, mesons and big bosons. The good news: material is available for recruitment. The bad news: material is no longer being created or destroyed. If charge shows up somewhere, the material had been in that region and close enough to arrive at the speed of light or less.

This conservative attitude, keeping track of the charge material in a reaction, informed much of the particle speculations of the early Ring versions of the Model and much of the particle speculations in the Unsolved Issues appendix and the Ancillary appendix. For example, if muons (or some muons) can become two electrons and a positron, even if rarely, those muons would have enough charge material (eighteen loops) to form the three leptons. Particle spin is seen as less conserved than charge material, though if opposite spin is needed for electrons and positrons to annihilate, then spin gets to come along for the conservative ride.

Summary - the *mnp* Loop Model

The Loop variant of the *mnp* Model offers advantages and disadvantages as a proto-theory. Quantization makes logical sense, but "kicks the can down the road" by postponing the decision on why $85.17 KEv/c^2$ should be the mass of a loop. A defensible model could be built around such a concept, and quantization may have occurred when electrons and positrons first formed, or when "tiny" electrons and positrons of a single filament formed at the ultra high densities of the early universe. For a while in the expansion of the early universe, the compactness of electrons and positrons may have been favored, with the quarks and larger hadrons forming later. The tendency of charge material to stay in a filament would be a very strong combination of the two basic alignment tendencies in the *mnp* Model, which would explain the persistence of the loops since their formation.

Since the third type of entity in the *mnp* Model, the mediator or m, does not have the two types of alignment working along the same axis, the filaments formed will not be nearly as strong and so can form light and fields but not the basic

structure for matter.

Loopier and Loopier

Ideas Come in Batches - Reflection and Catching Up - Post 13 (2012-10-28)

This entry is more introspective and personal than the previous entries, containing many small ideas that have gathered over the last few days.

(2012-10-22) After having one MASSIVE step backwards yesterday, and feeling at a loss this morning, I've had three good ideas today. Feels a little like old times. Since two or all of the new ideas are covering old ground in a new way, those three steps may not be so much net gain. But as a hiker knows, continuing down the wrong path won't get you where you want to go and the steps taken have to be retraced.

The new structure proposal for neutrinos is already posted.

Cooper Pairs Over a Distance (2012-10-22)

Cooper pairs (two electrons that seem to act as one) over distant regions of a crystal lattice have always been a puzzlement. With the new filament model of the electron, we may see two electrons as forming one filament but having two (or more?) local regions where they are allowed to coil and collect by the partial potentials in those regions. The coil model makes the Partial Quantum Hall Effect more plausible, but does not explain the preference for rational fractions of an elementary charge e.

The earlier writings about Cooper Pairs were based on rings, and may or may not be salvageable. They look pretty ugly now.

Naming and Claiming

(2012-10-22) Separation is a better name for the first tendency of figments

The basic tendency of figments to separate should not be called Existence because that will have different connotations for readers. During the Initial Expansion, the Grand Expansion, whatever we call it, the tendency led to the separate existence of the figments, but Separation will be a better name for the tendency since then.

N.B. Axis Alignment and Travel Alignment have been the new names used the past few months for the deprecated Spin and Proximity, since they refer better to the tendencies of figments to align in those two directions. Axis Alignment is the tendency that leads to charge. magnetism, and electromagnetism effects. Whether figments will be seen as having their own spin is not clear and has been a useful concept for the author, but the term is confusing with other concepts of spin. Travel Alignment is the tendency of figments to align their travel axis whether going the same way or opposite. Travel Alignment leads indirectly to gravitation acceleration and gravitational fields.

Do I need to change the name Axis, since I want a different name from the center or axis or direction of filaments? I need to make sure I'm using direction for the Travel Alignment effect, and check on the filament centerline phrase to see if I am using axis misleadingly.

(2012-10-22) The abstract and introduction need to be more circumspect in their claims. They should not read like advertising. Maybe "provide interesting hints of explanation" or "suggest a picture of the structure of fields." And just lose the stuff I am not confident of, like muons who have been seen in the wild or at least the lab orbiting as heavy electrons. Over-promising is a good way to lose attention. Been there. Done that.

LoL, turning this into a blog post and then folding it into the Latex documentation will take time. Hopefully, my unconscious can use that time to review past ideas and create new ones. Muons, quarks, charm, strange may all benefit from this 4 filament strand, though string was an attractive idea as initially presented. Time for the unconscious is a good thing. I no longer come up with new ideas every day. Or even every week. (2012-10-24-2300) Two days later, even muons have an interesting new strand structure.

(2012-10-26) Thoughts on Yet Another Structure of Matter are ready, not for prime time, but exposure. They have come out before this blog post.

A number of thoughts about the development process are gathered here.

Ideas and Documentation (2012-10-22)

In manufacturing, sales and marketing is usually expected to exceed the cost of the product. In programming, discussion and documentation exceeds the time taken to program. That's the way it is. In doctoring, documentation and billing exceeds the time practicing medicine at least in our country. Unfortunately. In cell phone development, patent litigation and patent preparation now cost more than research. That is outrageous. But it is.

In science, education, background research, discussion, and documentation far exceed the time spent creating new ideas. That's the way it has to be.

Already, my time writing about these ideas exceeds the time spent having them. But if an idea or a program or a product is good, the sales, marketing, documentation, user training, and teaching are easier and more successful. If one wants those ideas or programs or products used, someone has to put in the perspiration.

Questioning Ones Self (2012-10-22)

Why am I willing to question myself? A long time ago, I worked with a designer, inventor, programmer who would submit his program as a deck of cards to the company's "in" hopper, swagger back to the office and exclaim "PERFECT." Turnaround was good enough that he could pick up the results within 25 minutes, make a change, resubmit the deck, and swagger back with the same exclamation. By induction, you may understand why I don't want to go there. Better for me to find mistakes than have the customer or a reviewer find them. So since I'm alone in this arena for now, some of my time has to be spent reviewing my own work.

Why I "Think Like No One Else" (2012-10-22)

A designer I once worked for wanted me, the junior designer, to work up some planning details so he could make a choice. I investigated what he wanted, found it would not meet the criteria, and presented conventional plans that would. I realized, later, he was faster and more experienced than but did not have the time to work out the details to see if he liked the result. He wanted to see my failures to meet the criteria so he could make decisions or adjustments or extensions (or criteria changes) himself.

Maybe I am working out the details of fields and particles using a particular approach so the senior designers can make an informed choice, to decide if they like the results enough to change the design or the criteria or if they dislike the results enough to continue accepting phenomena without explanation..

Since I've been more or less serious for a while, I offer some comic relief:

The Implausible and the Impossible (2012-10-25)

In high powered physics, time flows backward as well as forward.

The surest proof I know is that some seventy years before Richard Feynman told Quantum Mechanics to add up all that was possible and re-normalize, Arthur Conan Doyle had Holmes tell Watson "when you've eliminated all the impossibilities, the implausible must be true."

The fact that we can't explain the mechanism for Doyle channeling Feynman proves we shouldn't go looking for mechanism.

Onward

Many New Possibilities for the Charge Structure of Matter - Post 12 (2012-10-26)

Earlier writings developing the *mnp* Model had suggested that matter was made up of rings of charge material that, in the case of particles larger than electrons and positrons, recruited entities of the third type, magnetic mediators, to flow over the enlarged surfaces and to form the glue between quarks. Realizing that electrons behaved more like coils of a single filament and then that neutrinos could not survive or move as opposing rings lead to new pictures of those "elementary" particles. The image of neutrinos as basically a ring of four filaments in a strand led to a new picture of strands that might form the structure for other matter. Even though (2022-01-10) neutrinos are now pictured as unpolarized lumps of m's, quarks are coiled strands of six filaments.

Thoughts About Strands (2012-10-23 2230)

If 6 member strands exist and can be stable, that could explain the charge choices for quarks. Quarks' charge can be seen as made up of mixtures of plus and minus with the denominator 6. Down has charge -1/3, which could be 4/6 - and 2/6 +, and up has charge +2/3 which could be 5/6 plus and 1/6 negative. Six sided strands work in the *mnp* Model. There is no center filament, since it would be pushed out by the Separation effect to the perimeter of the hexagon whenever a bending occurs.

For down, two p filaments separated by 2 n filaments on each side could form a hexagon with sides "d" the Separation distance. Effects would be: $(1 + 2/2 + 2sqrt(3)/2)$ Travel and $1 - 2/2 - 2sqrt(3)/2)$ Axis so Travel alignment would need to be safely greater than sqrt(3)/(2+sqrt(3)) as strong as Axis alignment. But for up and anti-up, with only one filament of one charge, the Travel alignment effect would have to safely exceed the Axis alignment effect.

Since charge has always been stronger than gravity, the first reaction is just to rule out the possibility. I'll have to think about that some. Could the way that Travel works automatically lead to lower accelerations due to gravity than to charge even though the basis effect is stronger?? That will require more development for the fields and gravity.

Strand Possibilities (2012-10-24)

Braids <!– Cross sections –> of 6 filament strands have a countable number of configurations.

A balanced strand of 3n and 3p filaments has 3 geometric possibilities (representing forms of Z0?). Cross sections as ASCII art:

```
 n n      n p      n n
n   p    p   n    p   p
 p p      n p      n p
```

The strand for down with 4n and 2p filaments has 3 geometric possibilities. Anti-down would have n and p reversed.

```
 p p      p n      p n
n   n    n   n    n   n
 n n      n p      p n
```

5 and 1 has 1 possibility
6 and 0 has 1 possibility

My guess is the first of the 4 and 2 possibilities represents down, so that quarks up and down both are unbalanced in the strand.

(2012-10-24 2200) If the strands twist 180 degrees with each coil rotation, the unbalanced strands may actually reinforce adjacent coils better. The 180 twist may well be necessary for the filaments to travel equal distances in each coil (within the limits of unevenness as the coil "moves across" or covers the virtual surface of its sphere).

All these bigger and mixed strands would be stiffer in some sense, I think, than the pure strands that are electrons and positrons, so may lead to bigger spheroids. I still want to see the extra mass being from m-figments/glue but I do not yet picture how that energy would be trapped into rotating as part of the structure and so being mass. One thought is that the twisting of mixed strands leads to much more swirling in the fields immediately adjacent to the strands than the twisting in the uniform strands of electrons and positrons and that this swirling behaves as mass. Incomplete.

How these quarks would then recruit even more m-figments to interact with each other in a dynamic rather than static way is not clear to me either. If the quarks are each separate spheroids, the bonding would be complicated. Definitely not ready for prime time.

Muons as Big Strands of Filaments (2012-10-24 2300)

Muons would be able to form shells like electrons if they are actually three down strands together, eighteen filaments in all, traveling the same direction. ASCII art:

```
 n n   n n
n   p p   n
 n p   p n
    p p
   n   n
```

```
n n
```

Wild speculation: If there is a single “break” or imperfection in the muon strand, the life of the muon is related to the length of the filaments and the muon “comes unglued” when that imperfection has traveled the entire length of the strand? This would at least correspond to the time dilation of travel - the filaments effectively move slower around the coils in the universal reference or Minkowski frame as the velocity increases. Makes for a fairly long filament!

So the *mnp* Model offers new possibilities that answer some questions. Those possibilities do raise a troublesome issue - how could the tendency to align in Travel direction (the basis of gravity) be stronger than the tendency to align in Axis direction (the basis of charge and electromagnetism)?

The Adventure Continues

Neutrino Structure Must Change in the *mnp* Model - Post 11 (2012-10-25)

Neutrinos as opposing rings can not travel. (2012-10-21) Yikes. Panic. Relax. Sleep.

So what to do today (2012-10-22)?

Start with understanding the situation.

As opposing rings gain velocity transverse to the plane of the rings, the two rings’ tendency to Axis alignment pulls away from each other, leading to a tendency to return to parallel. At velocity .707c, the Axis effect may be 0, but then increase again as velocity increases then reduces to 0 again at c. Moving pulls neutrinos apart in the old Model.

What can neutrinos teach us? What can we learn from neutrinos? The second question is different from the first, but hopefully we are open to learning so the second is a very large subset of the first.

Neutrinos exist. They travel at the speed of light and probably slower as well. They go through matter with very little effect. They have very little or no charge. They have very little magnetic moment. The last two are probably precisely why they go through matter.

How to create a picture of neutrinos that works in the *mnp* Model? Or is it time to abandon the Model? Well, the second step after understanding the situation is to figure out what could be. Ergo,

Brainstorm.

What are the possibilities, implausibilities, and impossibilities?

Idea:	Comment: (usually added later)
Opposing rings	cannot travel as any kind of unit
Ring of one charge	unbalanced charge, though may be small
Opposing coils	problems "getting back" when traveling
Coils not flat but vertical	
Coils in a torus ("doughnut" to you Simpson fans)	
Wound strands moving opposite	getting back, same travel difficulties as rings
Opposing charge moving same direction	may make bigger coils
If electrons are to be believed, coils are natural once started	
Figments have a movement direction as a third attribute	Ugh
How could n and p filaments traveling the same direction be kept together. At parallel, they have no influence on each other but if they wobble, they will start to repel. That implies something keeps them together.	
Multiple strands, for example 2n and 1p	
Different diameters for n and p figments, so filaments of one travel inside the other.	I don't like this, but it might lead to a left hand preference as in the decay of cobalt-60 and a prevalence of protons and electrons in this solar system or galaxy.
A coil like a solenoid, with a few coils stretched to return back where the coil sticks out a little from the other charge coil, which also heads back through free space in the center	travel issue
Simple rings interlocked at 90 degrees	travel much above .707c would lead to flattening and crossing at 2 points.

Twenty five minutes later, I start the second page of notes:

Two strands linear going and 2 strands returning from two collections of coils (rather like the quark bulbs of 2011)	strands must be separated or they conflict
Coils as fundamental, looping back on opposite sides?	v=c looks ugly
Single filament of mixed n's and p's	Ouch - how does a filament maintain stability at the interface between n and p?
For travel, the filaments want to go the same direction.	Make that have to. Deal with it.
How about two filaments of each type, a cross in a strand <!– cross section –>.	A little complicated, but what would that take?

Side notes: Most of the value judgments here were added after the list was "complete." I do not like to stop the flow of ideas with loud NO's.

When is a list complete? Either when we run out of ideas completely, or the flow of ideas has slowed greatly and an idea looks promising.

Fortunately, the last idea did look promising. As ASCII art, the strand section <!– cross section –> :

```
 n
p+p
 n
```

where the + is just a logical "center" for the four filaments. Or

```
n p
 x
p n
```

And we can go on to step three.

Evaluate.

Neutrinos as Two Pairs of Charge Structure Filaments

With a matched pair of n-filaments across the diagonal of a square attracting each other by Axis alignment and Travel alignment, the other matched pair of p-filaments attracting each other by Axis and Travel. The adjacent mis-matched filaments attract by Travel but repel by Axis. Could that be balanced to be stable?

The first crude "effect" calculation in stranding <!– cross section –> suggests t (travel alignment effect) from 3 filaments plus the axis alignment of the single matching filament must be stronger than the axis alignment repulsion from the closer two, opposite filaments. The net repulsion is $2/sqrt(2)$ of the direct repulsion from one opposite filament. Use d as the distance between opposing filaments, so $sqrt(2)d$ the distance to the far filament.

Oh, but remember that the filaments are REALLY close and overlap. If the effect strength is inversely proportional to distance between the figments, going to 0 at 2r, and the filaments are as close as their Separation will "normally allow" in a steady state, all effects will be at essentially maximum, so discussions of whether the effect is linear with distance due either to magic or the proportion of "spherical shell" that interacts are unnecessary at this point. So ignore any differences between $2r - d$ and $2r - sqrt(2)d$. Since the filaments are so close, ignore that each figment might see very slightly more of the neighboring filaments than the opposite matching filament. How strong must the Travel effect be compared to the Axis effect? By 55 minutes after starting the second page, the formula is ready. If t is the Travel effect and a the Axis effect,

$(t + a) + (2/sqrt(s))(t - a)$ must be safely >0

$(sqrt(2) + 1)t$ must be safely $>(sqrt(2) - 1)a$

t safely $>.1716a$.

I have always assumed the "charge" effect of Axis Alignment is greater than the "gravity" effect of Travel Alignment. This ratio may work. Note I used "safely" since the two simplifying assumptions assume a little extra stability than would actually be present.

To maintain stability, each outer filament must stay outside the line between the two adjacent, opposite type filaments. But pushing a majority of the whole filament a distance opposed by the Separation effect of the other three filaments probably takes some doing.

One good aspect of travel in the same direction means that at velocity v, all figments in the filaments can have the same angle of travel to centerline, maintaining inertia as with coils and filaments in general.

Now what form does this stranding <!– cross section –> take to become a neutrino? A linear filament would always move at c and not be quantized and might be hard to recruit and start, so maybe a ring would be simplest. Doubt (2022-01-10) a ring transverse to motion could be produced in the quantity seen in this universe.

The inner two rings may wobble in their travel and the outer rings not. The inner rings may be shorter and so rotate a little faster. Or the inner and outer rings may switch places so that each travels the same distance. I imagine that usually two filaments would be inside and two outside rather than having one longest ring and one shortest ring.

Strands Twist (2012-10-23)

If the filaments could twist enough that all have the same length, that would be an improvement. With a little thought and a few sketches, what if the assembly of 4 filaments twists 180 degrees per ring revolution. That would lead to two filaments, 1 n and 1 p, the same length, traveling 2 circles or rings. The only difficulty is that at c, the filaments overlap. They will not be rotating at c (rest mass will be 0) and all figment motion will be in the direction of travel, so the discontinuity in filaments may be minor.

Growing filaments is fairly easy at least in high density regions like the early universe. Growing the neutrino may not be quite as simple, since getting opposing filaments to travel or form in the suggested braid going the same direction is hard to picture. At rest neutrino type rings could bend from filaments going opposite directions, but how that would translate to bent filaments of opposite types going the same direction is not clear. Well before (2022-01-10) neutrinos are NOT rings or strands but just unpolarized lumps of m's.

I am not entirely happy with this whole development, but it is feasible. This neutrino game ain't over 'til its over.

And more of the basic document needs to be rewritten.

So we have another image of opposing tendencies leading to stability. Let me add an exclamation point to that!

With thanks to William Shakespeare, one of the giants of literature,

"And thus by opposing them, conserve them."

Mental Leaps Required in a Structural Model - Post 10 (2012-10-22)

This blog entry has been moved into the body of the paper, page 45.

Coils, not Rings, Provide a Better Image for Particles and Make Inertia and Movement Feasible - Post 9 (2012-10-16)

Changing the picture of how rings interact and exist seem to remove many of the carbuncles and a few of the warts on the *mnp* Model.

The charge structure of an electron is seen as figments making one long filament with a fixed curvature based on two sets of opposition. Figments tend to maintain proximity to other figments of like axis and direction but resist getting too close and so form filaments. A filament tends to maintain a fixed curvature because the tendency to align axis is slightly forward looking and so maintains curvature and the tendency to resist being too close prevents collapse. Closing the smallest feasible 3d sphere may lead directly to quantization and a preferred size. When in a shell, the curvature of the filament may be a little different due to influences of charge and mediators (m's), so I am looking at pure "point" particles for now.

The long filament image also helps with movement and inertia, which was sketched earlier but was dependent on "fixed angular change." I had wondered how rings could maintain themselves when they appeared to need to make very fast angular progress when in the "retrograde" portion of movement and to have varying angles of "attack" and lateral movement and attraction. The drawings of rings with plane parallel to travel should be seen as sections of "coiled filament" rather than "ring" travel. I should not have seen the diagrams as elevations. If the figments in a filament have a uniform angle of travel to the axis of the filament, they will reinforce each others orientation and will move over the surface of the oblate spheroid. Length compression of the spheroid will follow. Changes and waves across the surface of the spheroid will spread slower as the lateral velocity increases and the longitudinal velocity decreases, in keeping with the Lorentz transformation for measured time. Inertia comes from the angle of travel for each filament to the axis of the filament and the tendency to maintain that angle once achieved and uniform.

The filament model also obviates need for rings to attract each other to maintain the integrity of the electron and allows shell changes while maintaining the unified particle. This new image of a long "stiff" coil feels more in keeping with quantum mechanics and more ready to parasitize that good work.

Early calculations suggested a maximum change in one coil's rotation when on a sphere of radius just above 1.8 times the coil radius, but refinements and programmatic bug squishing have lost that local maximum, at least for one model of coil curvature.

Question:

Is there a measured maximum wavelength for light (and hence a minimum energy and mass for a photon)? A length and minimum mass would help scale the filaments by provided mass/length and lead directly to a filament length for the unit charge. From early numerical investigations of curved filaments over a sphere, it looks like huge numbers of "coils" rather than "rings" will be involved. Such scaling is not really needed now for early investigations but only in late stages of Model development.

Prediction:

Have the Shapiro experiments or in fact any of the light ranging/transit of a large mass experiments looked at occlusion? I suggest that if occlusion occurs when light is traveling near a mass, that it is seen earlier than relativity predicts when the occluding body is headed toward the mass and later than predicted if the body is somehow leaving the mass. (Solar flares are more likely than spaceships, I suppose) If the occluding body is moving transverse to the mass, it will need to be further from the mass to achieve occlusion. Of course, this is based on calculations of expected occlusion. The

occluding object will be observed by light traveling the same path as the occluded object. Asked another way, do objects falling into a mass, when viewed from the side, appear to slow a little compared to predictions as they near the mass?

The *mnp* Model documentation has NOT yet been updated to replace rings with coils. The new terms Axis (Alignment) and Travel (Alignment) rather than the deprecated Spin and Proximity also remain to be folded in. Many of the basic concepts remain, including short distance interaction, recruitment, fields as non-random orientations in the "sea of random figments," rest mass as diminishing toward zero with increasing velocity, and the universal reference frame.

Adventure Awaits

Appendix D

Early Blog Articles

Selected blog articles and near articles are included here, in reverse order/ The introductory blog, ancient as it is, is at the end. Post one was written fifteen months after the author started thinking in c, er, thinking of c as so profoundly basic that everything moved at that speed.

Shapiro Radar Ranging Experiment - Post 8 Update (2012-05-24)

The Shapiro Radar Ranging experiment gets a new interpretation. As light travels near a mass, it is directed more toward the mass, but after light passes the point where its travel is perpendicular to a line to the center of the mass, it will be directed more radially away from the mass. The travel will not be symmetrical as most diagrams of light passing a mass indicate. In the Shapiro radar ranging experiments, as the reflecting body gets closer to being eclipsed by the massive body, the reflected light must come at an ever higher angle from the reflecting body. Light will need to travel further to arrive at the observer. Gravitational lensing can occur, but the further the viewer is from the large mass, the (slightly) closer the apparent reflector is to that large mass. Light passing near a mass, at least a cold dark mass, will emerge more horizontally polarized. In very strong fields, light may be increasingly disrupted or reduced in energy.

In the "new" *mnp* Model, the "Proximity" effect is a tendency of all entities within a tiny distance to align in the traveling direction (toward 0 or 180 degrees difference). So if entities acting as gravitons are moving in and out in equal numbers, how does acceleration occur? Geometry.

Gravitational acceleration is complicated in the *mnp* Model. The rings that make up matter are deformed and skewed. The field is very slightly stronger in the half of the ring closer to the large mass so the effect on entities in the lower half circle is stronger than on those in the upper half circle. In the lower half circle, the effect is slightly stronger on the quadrant of incoming entities than the quadrant of outgoing entities. The field is very slightly weaker (the gravitons are spread over a very slightly larger area) for the half of the ring further from the large mass. In the upper quadrants, the outgoing entities experience more effect from the field since they are curving out and spend more time in that quadrant than the incoming quadrant. The tiny differences in effect lead to a net acceleration in the direction of the mass we call gravity. At high field strengths, the deformation effects are not linear with field strength. Acceleration and time dilation and length compression effects are not expected to be linear with field strength.

The angles are tiny, the differences in time spent are tiny, the differences in effects are tiny, the speed c is, well, enormous. So the computational modeling of entity interactions will likely meet the same issues faced and solved by string theorists and quantum gravity computations. Computation of entity to field interactions will come first, and do not pose quite the same level of difficulty.

Regarding the Shapiro curve, neutrinos traveling at the speed of light will travel the same path, but not be subject to the polarizing effects. Different disrupting effects apply. Neutrinos moving at sub-light speeds in stronger gravitational fields might show more magnetic moment than in weaker fields.

Black holes become "scarier" than previously imagined. Any entities moving outward from a black hole will continue outward, but any matter entering the black hole at less than the speed of light will be torn apart. The fraction sent outward as mostly incoherent entities (dark matter and dark energy) will be 50% as the velocity inward approaches 0, 0% as the velocity approaches c, and about .5sqrt(1-v^2/c^2) for intermediate speeds, where v is the velocity toward the

event horizon. This is in the limit for small objects. The trailing parts of larger objects may pull some of that outbound dark matter and energy back into traveling toward the black hole.

The "Proximity" effect to align direction of travel is much weaker than the previously named "Spin" effect to align axis which leads to electrical and magnetic forces and fields.

Using the term "Spin" has been called into question as confusing compared to astronomical spin, quantum mechanics spin, and gyroscopic spin, so a term indicating Axis Alignment is called for. In like manner, a term for Travel Alignment is needed to replace "Proximity". The Traction effect may not even be needed

How did Special Relativity help the *mnp* Model? When a mass has a velocity, the entities that make up that mass have on average their axes of travel oriented in the direction of travel at asin(v/c) measured from perpendicular to the travel. At 0 velocity, the entities direction of travel within the mass is balanced, and the gravitational field is balanced. As velocity approaches c, all the entities travel becomes aligned in that direction. The gravitational field appears to travel the same velocity as the mass, if an observer could step back to see it. Masses moving the same velocity "in the same inertial field" see the effects of gravity as apparently coming from the mass where it is "now".

The *mnp* Model is attempting to provide an explanation for the experimental effects of general and special relativity based on the behavior of matter and energy rather than the structure of space-time. That such an explanation has not been created in 107 years does not stop fools from trying. The author admits that *mnp* could co-exist as a description of matter along side of space-time effects of gravity, but it cannot co-exist with the frame independence of Special Relativity. Hence the irony.

The Quixotic Quest continues

Shapiro Light Ranging Data Provides Opportunities - Post 8 - Draft (2012-05-24)

The Shapiro radar ranging tests offer a means to check the *mnp* Model if measurements with two low potential gravitational fields have been performed. If three or more sets of data are available, tuning the influence function becomes possible if the simple "first draft" of the influence function is not corraborated by the second set of measurements.

First guess, "influence function" for a gravitational potential and a single figment moving at the speed of light:

Pick an arbitrary number of figments per electron, perhaps a multiple of 3^2,4^2,5^2,7^2 times 2^20. This number is likely to be low, but does not matter for this calculation. So, the mass of a mythical figment.

Location of source, location of mass, radius of mass, mass, location of receiver (assumed "stationary" for now, at the guessed location that light will arrive)

For now, only 2 dimensions are important. The origin is the center of mass, the source has a negative x coordinate, the receiver has a positive x and positive y coordinate.

Neutrinos if moving slower than the speed of light will be easier to capture if moving horizontally in a gravitational field than if moving vertically. Testable? If moving at the speed of light, will bend more if traveling at an angle to the gravitational field than if traveling horizontally or vertically, but will be no easier to capture in any direction.

2012-05-23

$F = GmM/r^2, a = GM/r^2$, escape velocity=

time dilation = $sqrt(1 - 2GM/rc^2)$

Can we use the bending of light around the sun as a calibration, then the Shapiro timing as a shape/function test? !(05-24)

Light may be bent by the field strength, matter moved by the acceleration.

Gravity and Special Relativity - Post 7 Revised (2012-05-05)

Gravitational acceleration arises when the balanced numbers of entities acting as gravitons move in and move out at c, but the incoming entities affect slightly more than half a hemisphere of directions while the outgoing entities affect slightly less than half a hemisphere of mass's entity directions, and effects on entities moving more the same direction is

greater than on entities moving the opposite direction due to greater time in proximity. This leads to a net acceleration in the direction of the mass we call gravity.

The field effect due to mass is that all entities not moving perpendicular to the gravitons are directed toward parallel to the gravitons, so the entities that form mass, which are rotating in rings that then form spheroid surfaces, are directed more away from the mass when moving away from the mass and more toward the mass when moving toward the mass. The net effect is counterintuitive. Length compression occurs perpendicular to the field, lengths increase slightly parallel to the gravitons so that vertical rulers elongate from the distant observer's point of view.

Gravitational acceleration is complicated in the *mnp* Model. Entities acting as gravitons move in and out at c in balanced numbers. The rings that make up matter are deformed and skewed. The field is very slightly stronger in the half of the ring closer to the large mass so the effect on entities in the lower half circle is stronger than on those in the upper half circle. In the lower half circle, the effect is slightly stronger on the quadrant of incoming entities than the quadrant of outgoing entities. The field is very slightly weaker (the gravitons are spread over a very slightly larger area) for the half of the ring further from the large mass. In the upper quadrants, the outgoing entities experience more effect from the field since they are curving out and spend more time in that quadrant than the incoming quadrant. The tiny differences in effect lead to a net acceleration in the direction of the mass we call gravity. At high field strengths, the deformation effects are not linear with field strength. Acceleration and time dilation and length compression effects are not expected to be linear with field strength.

The angles are tiny, the differences in time spent are tiny, the differences in effects are tiny, the speed c is, well, enormous. So the computational modeling of entity interactions will likely meet the same issues faced and solved by string theorists and quantum gravity computations. Computation of entity to field interactions will come first, and do not pose quite the same level of difficulty.

Gravity and Special Relativity - Post 7 (2012-05-04)

Special Relativity posits that gravitational fields for a mass moving at constant velocity are seen elsewhere in that inertial frame as arising from the instantaneous position of the mass, not the position when the "gravitational information" left the mass. Same for charges moving. This leads (with attendant irony) to a much better formulation for gravity in the *mnp* Model not yet folded into the original documents.

Gravity results, in the *mnp* Model, from the (short distance) effect of the entities to align their directions of travel. This requires rethinking much of the author's writings on the *mnp* Model.

Picturing the effects of gravity on a photon (which is seen as an instigator) or on electric or magnetic fields becomes easier.

Length "contraction" effects due to gravity run counter to intuition and theory. In a gravitational field in the "new" *mnp* Model, matter would compress perpendicular to the field and elongate slightly parallel to the field (toward and away from the larger mass). The obvious question, how would such a model fit with the Theories of Relativity, had the author stumped for a while until the Experiment Question was asked. Why would this not be measured (and disproved) yet?

Length contraction due to gravity is much harder to measure than frequency changes. At the Earth's surface, gravity yields a time dilation of 7x10-10 so with no length effects (and taking the definition of a meter as applying only outside gravitational fields), a variation of .21 meters per second in the speed of light might be seen compared to measurements away from gravitational fields. Transverse length contraction may be less in weak fields, since spheres may become more like supereggs before becoming much narrower.

If length compression is equal to time dilation, the measured speed of light across an equipotential Earth surface would go up about 1.4x10^-9 or show an increase of .4 meters per second. That is getting close to the error bars in modern experiments. But most of our experiments are done near sea level, so variation would only show up at different potentials. At 3000 meters elevation, the time dilation would be 3x10^-13 different. At 5500 meters elevation, the time dilation would be 6x10^-13 different. The author volunteers to join that expedition to Everest Base Camp, but will probably not live long enough to see Experiment accurate enough to measure the difference. Experiments on the moon would be interesting since the time dilation is 3.1x10-11 or less than 1/20th that on the surface of the Earth. Acceptance of the author for THAT expedition is even less likely than acceptance of this Model. Experiments in space have the difficulty of needing to assume a measuring or timing technique.

Can Shadows Move Faster Than Light? - Post 6 (2012-03-05)

A delightfully clear demonstration of a bug crawling up a window and casting a monstrous shadow across the universe is provided by David Griffiths on page 427 of his 2005 Introduction to Quantum Mechanics. This is touted as a demonstration of movement faster than light that carries no energy, cannot transmit a message, and cannot be causal.

The author's first response (remember "intuition: useful, powerful, possibly wrong, potentially dangerous") was that no shadow would move faster than light, that it could carry "energy", can transmit a message, and can be causal. Careful geometry (2012-02-29) leads to the suggestion that, while message of the shadow takes distance/c seconds to arrive on the screen, multiple points on the screen may fall into shadow in less time than it takes light to travel from one of those points to the other. Afterward, those points can compare notes on when the shadow fell and decide how fast the "event" might have been traveling. As humans we have no trouble saying "those happened at the same time" or "everything happened at once." So we should have no trouble imagining two events that happen so close together that one could not warn or notify the other. "It happened so fast, I couldn't put on the brakes" or "the wave came in so quick I couldn't shout to warn the other surfer.". So the author was wrong to suggest (as written 2012-02-22) that "seeing the shadow or its edge moves faster then light is based on experimental and experiential fallacy." Investigating why the edge may move faster is an interesting education.

If our creepy bug moves up at v, the image on the screen moves up at v' If the bug is 1 meter from the light source moving at 3m/sec (one hundred millionth the speed of light) and the screen is a 1x10^8 meters from the source, v is 3e-8c and v' is apparently 1c. Light takes longer to get to the screen the further the bug gets from the center line from projector to the screen. For now the screen is perpendicular to that center line. If we increase the screen distance to 2x10^8 meters, v' is apparently 2c. This will take some care to work out.

The bug starts at time 0 on the line from the projector to the screen, perpendicular to the screen's position. The bug is Bd from the point light source, the screen is Sd. The bug moves upward at v. The bug's position is measured as s above mid-line perpendicular to the screen and s=vt. Bd is considered tiny compared to Sd. At time 0, the screen has been lit. Light takes Sd/c to reach the screen, so screen position of the shadow s' = 0 occurs at t' = Sd/c. As the bug moves up, s=vt. At a given t, the shadow position will be $s' = vtSd/Bd$ and the time for light to get to that point (or stop getting to that point) will be $t + sqrt(Sd^2 + s'^2)/c$. The ds'/dt' with respect to t is the "speed" of the edge of the shadow. Numerically, calculating $deltas'/deltat'$ makes it clear that if one is far enough away and the angle between the screen and the ray of light is not too great, that derivative will be higher than c.

The shadow can transmit information to a point on the screen, it can effectively transmit a lack of energy to trigger a reaction at that point on the screen, and it can be causal. That point on the screen cannot communicate with any other faster than the speed of light, so it may not be able to warn a nearby point that the shadow is coming if the shadow has also have fallen on that point before the message arrives. But there is no cause to abandon causality and no point in losing energy over the lack of energy in a shadow.

While the two turning points in the education of a physicist are Quantum Mechanics and Statistical Mechanics, we want to avoid over-learning and over-generalization too.

The Education Continues

Bell's Theorem is too Narrow to Prove Useful to Quantum Mechanics -or- to Provide a Philosophical Foundation for Quantum Mechanics - Post 5 (2012-02-29)

Bell's Theorem, that "all theories" about paired or entangled quantum information are inherently worse than quantum mechanics, is considered fundamental to physics and the philosophy of science.

The author respectfully suggests that Bell's inequality formalizes "all theories" into a narrow band, allowing "all theories" only information about the results of two experimental tests done on the quantum information and the rights to use only a hypothetical and unmeasurable angle lambda that relates to that quantum information, further requiring that "all theories" create a function in lambda that must be multiplied by the results of the two measurements. The formalism of Bell's Theorem claims to cover "all local hidden variable theories" but the physics community seems to have taken that to mean "all theories" in spite of warnings from Gerard t'Hooft and seems to have given up on causality and realism.

Ingenious experiments have verified Bell's inequality, which the author does not dispute. The interpretation and formalism

are what have gotten physics into trouble. The author will take four approaches in this discussion, two theoretical and two practical. The theoretical discussions involve asking a "physicist" with programming/information theory skills and a "physicist" with statistical or bio-statistical experience to create a predictor function that will be better than the results from quantum mechanics. Discussions of experiments with polarized light and with the spin of particles follow, but cast more doubt on the interpretation of results than the results themselves.

Objections from a Object Programming Approach -or- Dysfunction from a Functional Programming Approach -or- Contradiction/Confounding/Clarification from a Contractual Programming Approach

Assignment: Function rho is passed one parameter, lambda, which ranges from -pi to pi inclusive. The value returned for pi will equal that for -pi. The integral of rho over the range of lambda is to be 1. We may require it to return a value 0 or greater and less than 1. The function receives no information about A, a, B, b and is not allowed to make predictions based on A, a, B, or b. When multiplied by A(a,lambda) and B(b,lambda) and the result integrated over the range of lambda, it is expected to provide a result similar to (a dot b) when we (not you) integrate rho(lambda)*A(a,lambda)*B(b.lambda) over lambda.[1]

Good luck.

Failure will lead to stagnation in a field of physics to be determined later.

Programmer's Response: We cannot use a or b or A or B or A(a,lambda) or B(b, lambda) to predict rho or better yet that integral? You've prescribed how P will be calculated? Are you serious? Sounds like a setup for failure to begin with; a self respecting programmer would not accept the contract. No thanks. Stagnate. Go ask a statistician.

Statistician looks at Bell's Theorem

Assignment: We have run a few experiments that show a correlation between measurements of a physical phenomenon we can rerun. You are to create the best description of that variance using only single variable analysis: we will tell you what the correlation is with one variable and the correlation with another variable and want you to improve on the prediction results. You are expected to use those results multiplicatively with the function of your creation. Oh yes, we will tell you the main independent variable, but not the value of the other two independent variables used to determine the dependent values we will give you. You are not allowed to make predictions based on the value of those two independent variables. Analysis of variance is off limits. That is reserved for the one true theory. Failure will lead to you being banned from publication on this or any other topic within the field. Worse, failure will leave the one true theory able only to describe and without any means to discuss why; causality will be forbidden.

Statistician's Response: In statistics, especially bio-statistics, we rarely get the chance to rerun an experiment as often as we want, even when we have the money to do it. How exciting. But why, with three independent variables, are you allowing me access to only one? And why are you telling me that I must multiply by the linear results? Really? Do you want my theory to fail? It will, you know. We are used to looking for hidden variables all the time and describing results without knowing mechanisms, but to be told I won't be able to use known information in my analysis is almost a guarantee of failure. I'll pass. What is it you were trying to predict, anyway?

Conclusion to Theoretical Approaches

Bell's Inequality is ably described in Griffiths 2005 Introduction to Quantum Mechanics p425; the author even thinks he understands it. Yet Bell's Inequality is based on a straw man: if rho(lambda) is a multiplicative factor which must integrate to 1 over lambda and that cannot know anything about a or b or use them as variables, it is a pretty dumb hidden variable theory and should not be expected to do much. Quantum mechanics P is allowed to know a and b, and is rightfully proud and embarrassed that (a dot b) is as good as it can do.

Back to the statistician's question: what was to be predicted?

Polarization Experiments

Freedman and Clauser's experiments suggest a "new" phenomenon of signal enhancement would be required for the tightly confined theories of local realism to do better than Bell's inequality for experiments with and without polarizers.

Yet polarization DOES lead to signal enhancement in some cases. A polarizer is oriented horizontally in front of a sensor that only senses vertically polarized light. The sensor sees no light, no matter what is sent to the first polarizer. (If the polarizers are perfect or the first is "over aggressive" and the sensor slightly imperfect.)

Yet adding a polarizer in between, oriented at 45 degrees to vertical, does enhance detection. One eighth of the incident light will be detected. So in at least one situation, a Bell's Inequality is counterproductive.

The *mnp* Model suggests that experiments with polarized light depend on whether the photons being tested are part of an ongoing stream of radiation (with the attendant existing attenuating fields) or if they are emitted far enough apart to not be affected by recent fields.

The author suggests Freedman and Clauser's experiments are probably fine, just that the interpretation and formalisms are flawed.

Spin Experiments

Looked at from any axis, electrons have spin (angular momentum) of h/2 "up" or "down." Measuring one electron a second time at a different angle leads to a (more or less) random result. Measuring a paired electron after the first is measured at a different angle leads to a similarly random result. The author wonders if the distribution is any different when the spin of the first of a pair has NOT been measured but its presence merely sensed. He suggests not. Quantum mechanics sees that spin as an intrinsic property of the fermion, with no clear idea how the tiny mass of the electron could create that much angular momentum without spinning with surface faster than the speed of light. So the author needs to ask:

What is Spin?

Ohanian's description of spin as circulation of energy in the fields from 1984 published 1986, following work by Belinfante in 1939 and suggestions by Gordon in 1928 is interesting. [2] Am J Phys. 54 (6), June 1986. from `http://aforrester.bol.ucla.edu/docs/Spin_Ohanian.pdf` (thanks for the reference to Griffiths [1] 2005 pg171 footnote 25.) Seeing spin as a wave property works for both classical waves and quantum mechanical waves. Ohanian's treatment is compatible with (and uses) quantum field theory to quantize the effects, but is fundamentally compatible with classical wave treatments as well. In fact, the emphasis on circularly polarized fields sounds familiar. Conservation is met by circulation within a field!

Ohanian's description is in keeping with the *mnp* Model's view of electrons as surfaces of electric charge material rotating in rings either left or right, which would create "vortexes" in the field around the electron but no net effect unless an interaction/measurement occurs. The spin measured (or captured) by the Stern Gerlach magnets is apparently not a direct reflection of the left or right spin of the electron's charge structure, but an effect on the field that then effects the electron's travel, much as polarization filters affect electro-magnetic fields (and in the *mnp* Model, which then affect the photon) In the *mnp* Model, photons have two different "halves" with the first half consisting of magnetic entities with spin in one direction and the second half with spin in the opposite direction. Why that would create, independent of the photon's mass, a spin angular momentum in the field with exactly twice the magnitude of an electron's or quark's angular momentum is a question that shows the current limits of the author's understanding and education.

Conclusion

Physicists should have no trouble seeing quantum mechanics as an incomplete theory. Feynman is quoted as saying "nobody understands quantum mechanics." All hope of causality has been abandoned, prematurely in the author's estimation. Quantum mechanics is wonderful, beautiful, eminently descriptive, reasonably predictive, and may have put many physicists out of work. Quantum mechanics should be comfortable with the "incomplete" label.

Bell's Theorem need not confine theory to multiplicative factors that are distributive over addition, so quantum mechanics too has hope of expansion. The reliance of quantum mechanics on commutative relations when it suits the purposes of development and description may well be appropriate for charge based issues which seem to be symmetrical or commutative, but may not work with gravity.

To paraphrase an adventurous friend, The Education Continues

To speak for causality and realism: I ain't dead yet.

References:

1. D. Griffiths, Introduction to Quantum Mechanics, 2nd ed. (Pearson Education, Upper Saddle River, NY, 2005).
2. H. Ohanian, "What is Spin?" Am. J. Phys. 54 (6), 500 (1986).

Early Thoughts About Spin, Worth Ignoring

Spin as measured by the Stern Gerlach technique seems to be independent of the actual rotation of the rings of charge material that the *mnp* Model sees as the essence of an electron or positron or the basic charge structure of quarks. The Stern Gerlach apparatus seems to interact not directly with the rings. Muddling now: The author tried to see the uneven magnetic fields interacting with, for example, one of the three sides of the triangle formed by the topmost three rings, with the highest of the sides governing whether spin was seen as up or down. He has tried to hypothesize that cascading apparatuses would show identical results for electrons as long as the orientation was less than 54 or 36 degrees different. Spin seems to be independent of the mass of the electron or quark or nucleon, and (perhaps more critical) independent of the mass or energy of a photon. If the spin of an electron is seen as formed by the movement at c in a ring of charge, the spin angular momentum is mass c r effective if the charge spins at the radius. If it is made up of rings spinning at r tilda, then .... r effective would be 2pi h/(2 mass c). Using the electron's mass, the effective radius would be 7.6*10-12m, would be larger than the classic electron radius and much larger than current measurements. For a sphere of rings, the "electromagnetic radius" might be closer to "equivalent" For a smaller item such as a photon, the effective radius would be far greater and the lower the photon energy, the greater that radius! So a simple physical approach will not work.

[?] Bell's Theorem, `http://en.wikipedia.org/wiki/Bell%27s_theorem` (2012-02-29).

Light Speed is Constant, Time Dilates, Length Contracts, Gravity Slows - Absolutely - Post 4 (2012-02-28)

Light speed tests in one direction are claimed, but most miss a length contraction or a time dilation somewhere. This is important to quantum mechanics, quantum loop theory, and all the theories of everything.

At least one Model shows time dilation and length contraction as properties of matter, which agrees with Michelson -Morley (length contraction suffices), Kennedy-Thorndike (needs length contraction and time dilation) and Ives-Stillwell (time dilation only with transverse doppler effect). The Model passes the Mossbauer rotation (time dilation) tests, claimed Mossbauer type anisotropic tests (which fail to account for time dilation affecting both emitter and receiver), and Cole Very Long Baseline Interferometry (contraction in the baseline and the angle of the celestial body account for claimed anisotropy). Zhang suggests any tests will be indistinguishable from SR anyway. Does that mean that time dilation and length contraction are sufficient in a theory to be indistinguishable from Special Relativity? Thanks to Tom Roberts for the list of tests (`http://www.edu-observatory.org/physics-faq/Relativity/SR/experiments.html` and elsewhere)

The "One-way speed of light" Wikipedia article claims NO one way tests have been done, that all merely appear to be one way tests, mentioning 2009 Greaves, Rodriguez and Ruiz-Camacho AmJP, 1990 JPL maser/fiber optic measurements analyzed by Will and Zhang, and Romer's early measurement analyzed 1997 by Zhang. Special Relativity postulates that the one way speed matches the two way speed, but the 1904 Lorentz/Poincare Ether Theory and 1963 Edwards Theory of anisotropic space AMJP, while out of fashion, are considered experimentally indistinguishable.

The Cosmic Microwave Background anisotropy and the ongoing long-term AGASA experiment measuring proton/cosmic ray energies against the maximum expected by the GKZ theory may someday support the anisotropy of light speed, but are certainly not yet strong enough.

A large portion of the physics community seems to be comfortable with "experimentally indistinguishable," which the *mnp* Model can survive.

From that portion of the physics community still looking for proof of the one-way speed of light in support of Special Relativity, the author is seeking suggestions. Experiments that are current gold standards in different related areas and studies that explain their methodology are especially prized.

A universal reference frame, even if only local to the galaxy or galactic cluster, would make life easier for many theories and theorists, not just yours truly. The author suggests that ANY theory or Model attempting to explain mechanism will need to see the one-way speed of light as varying in the local reference frame.

Shroedinger's Transcript (2012-02-15) NB

I believe this was in this section of the *mnp* Manual but not posted on the blog. Now it is finally out as post 42. Useful? No.

Everyone was a high school student once, so perhaps can relate to this story of disappointment.

Imagine you are taking a course in the field you want to study. The teacher knows the material, relays it well, but is an extremely difficult grader and not terribly computer savvy. The school has just gone to all computer grading. You know you are on the borderline between an A and a B, have taken the final on which you knew most of the material, and are now waiting for grades to come out. The computer system is known to be difficult - moving the mouse over the wrong area brings up a different student when the teachers enter the grades. Your teacher has submitted the course grades and just gone on sabbatical to Switzerland for vacation and left all cell phones at home.

What is your grade? Since grades come in large quanta and are scalar, quantum mechanics would be the truest description of your situation. The wave function of your grade has the schematic form

$\Psi = 1/sqrt(2)(\Psi A + \Psi B)$

Your grade is neither A nor B, but rather a linear combination of the two, until a measurement occurs. At that moment your observation forces the grade to "take a stand": A or B. And if you find it B, then it's really you who destroyed your chance to get into your program of choice.

So, dreading knowing, you hope your parents open the grades (this is high school, after all, and you were not yet 18 most of that time). Then you can blame them.

Quirky et Diversus

College students can relate, except that graduate school or a job is on the line, you have a professor, and if your scoundrel of a roommate opens the mail, you can blame someone else for the grade. Post-docs don't know if the paper is accepted or not, especially when others are known to be submitting on the same topic, so can relate through an analogous situation. Is it better to blame ourself for taking the measurement or to hope your partner is curious and takes that blame? Tough choice.

The author offers thanks and homage to David Griffiths, Introduction to Quantum Mechanics 2nd edition 2005. p 430-431

Speed of Light Experiments Revisited - Post 3 (2012-01-24)

Classic (and incredibly precise) experiments on the speed of light show that the orientation of the light bouncing back and forth does not affect the time needed for the round-trip. This has been taken as proof that the speed of light in an inertial reference frame is constant. The Kennedy-Thorndike experiment with differing path lengths showed that the FitzGerald-Lorentz contraction, which calls for all objects to physically contract along the line of motion, would be false unless the predicted time dilation is correct. The kinetic interpretation was considered ad hoc until Einstein described that physical contraction as kinematic, due to changes in space and time.

The *mnp* Model suggests that matter moves only by dilating its own measurement of time and compressing itself along the direction of movement, that space can be seen as a uniformly static/expanding/contracting Euclidean stage on which movement takes place. Light, fields, the rotating constituents of matter, and the random constituents of the vacuum potential all move at the speed of light in the one and only reference frame. How could that possibly be consistent with the round-trip experiments done with such great precision?

At rest, one might expect light bouncing between mirrors L distance to take $2L/c$. If there is only one reference frame, in a frame moving at v, light moving between mirrors perpendicular to v would take $2L/(c*sqrt(1-v^2/c^2))$ to make the trip due to a longer path. Light moving parallel to v would take $2L/(c*(1-v^2/c^2))$ to make the round-trip due to a longer path parallel to movement and a shorter return path. The difference in round-trip times is a factor of $sqrt(1-v^2/c^2)$.. But all the experiments done in the last 120 years show light taking the same time to make the trip at all orientations. Pause for dirge music on behalf of the single reference frame.

Look a little closer. If the clocks in the moving frame all move slower by $sqrt(1-v^2/c^2)$, the perpendicular to travel case shows the round-trip time as $2L/c$. In the parallel to travel case, the clocks are still slow. But the length L is measured with rulers that are shorter parallel to travel in the moving frame as well. So the moving frame sees the round-trip time

parallel to motion as $2L/c$ as well. So the gloriously precise round-trip experiments have made physics and the speed of light in an inertial frame safe for two options: one theory (Special Relativity) and one type of diametrically different model (*mnp* Model or cousins, with a single reference frame).

The difference in the travel time forward and backward has not been fully examined, as far as this amateur can discover. That should not be a surprise or a criticism. The apparent galactic motion compared to the Cosmic Background Radiation is "only" 627+-22 km/s, or .002c. The time dilation would be only 2*10-6. True one way experiments might be diffraction of a known extra-terrestrial source such as the Cosmic Background Radiation at different orientations. Care with interpreting the width of the slit, the distance to the receiver, wavelengths, and the time over which photons are counted is needed. If the source is terrestrial, care with mirrors (and smoke) will be needed.

So, admitting that 100 years of tradition has had glorious success, the author agrees with the professional physicist's judgment. That's nutty. Really nutty. Yet kernels remain to be found.

Thought experiments like the *mnp* Model might even have some.

Neutrinos at the OPERA - Post 2 (2011-12-12)

The OPERA results of neutrinos traveling slightly faster than light have virtually all physicists rooting for the speed of light (and for the researchers to find a mistake.) The results affected the development of the *mnp* Manual (for the worse, but at least the author was thinking) as well. Only with the attitude "surely it is wrong" could I create the image of how *mnp* rings move and have momentum without depending on the surrounding field. Time dilation as a byproduct of that movement was a surprising development.

With movement and momentum understood in the developing the *mnp* Model, I could then ask the question, "Well, how could the neutrinos arrive slightly early?"

The explanation (if needed) is that the *mnp* Model sees neutrinos as not really quantized but as dual rings of *n*'s/negatives and *p*'s/positives rotating opposite each other. The neutrino could be recruiting *n*' and *p*'s at the front edge within the tiny range of influence that the basic entities have. The neutrino would be growing at the front, as a tube. If the experiment is showing the "front edge" which is equivalent to something like an electron neutrino with the bulk of the energy and balanced charge following, arriving at the speed of light, then no further explanation is needed.

If the massive neutrino appears "all at once" then the *mnp* Model explanation gets more convoluted and ugly. The *mnp* Model would need to consider "collapse" of the extended tube of the neutrino as a result of the figments of the front rings being turned or the front part of the tube being pulled apart. When the leading rings are no longer circular and balanced, they collapse. Traction (the attraction of figments of nearly the same spin perpendicular to the native speed of light travel) would pull in the figments around the tube. As they turn, Traction pulls the trailing figments in as well. Finding that the neutrino arrives over the course of 18 or more meters travel at c would lead to the simpler explanation. (Ugly!)

We have not heard the final song from OPERA. I applaud the researchers' diligence and care, and look forward to hearing more.

Fortunately, the slow switch was found and the speed of light remains a constant, c. The *mnp* Model, based abjectly on that constant, does not need to postulate recruitment at a leading edge or some greater implausibility.

mnp Model Introduced as a New View of Elementary Particles and Forces - Post 1 (2011-11-14)

What would it take to explain gravity and the other three forces? Can a model simpler than 34 elementary particles exist? Can the explanation be based on units that interact only over short distances?

Those questions led to the *mnp* Model, which suggests that three entities can account for gravity, light, static charge, magnetism, and the elementary particles. All entities travel at the speed of light. The three types differ by "spin" axis only. All entities attract others, repel others, attempt to match "spin", and attract strongly if "spin" matches over a tiny distance. Entities can travel through each other

The *mnp* Model is descriptive and does not calculate quantities at the present time. See `http://www.worldlyte.com/physics/mnp`

Light is a photon (a line of oriented m-figments/mediators) which causes electric and magnetic fields to appear by reorienting the random entities in space. Those fields then affect the photon a little and following photons to a greater extend. The double slit experiment makes intuitive sense in the *mnp* Model. Static charge fields are caused by the charged body redirecting like charge entities away from the surface of charge, which then recruit m-figments to form a field parallel to the surface, which then directs incoming like charges to move more parallel to the surface and opposite charges more toward the surface.

Matter and mass are based on quantized loops, not rings, of charge entities. Those rings are not combined with a ring of the opposite charge rotating counter to the first, forms a neutrino. Electrons, positrons, and quark units or bulbs are seen as "spheres" formed of rings of one type of charge all rotating the same direction. The rings move when the entity's direction of travel is changed to include a lateral component. Time dilation (slowing of the rings) results from this redirection at velocities a fraction of the speed of light. It appears that length dilation is required for time dilation to match exactly the predictions of relativity (more slowing occurs if length dilation is not present).

Electrons are a surface of rings. Standing waves at deBroglie wavelengths do not cause disappearance of the electron but adjustment to a stable orbital. The electron around a nucleus need not be orbiting, but waves and perturbations will travel across the surface at approximately $2c/pi$. Around a nucleus, an electron has mediators/m-figments flowing on the surface. Mediators/m-figments released through rings no longer parallel to the orbital surface when the orbital shrinks may organize themselves as a photon.

Quarks are seen as having structure, but with five models and counting, the exact form at "normal" conditions is not decided. Quark units and their connectors (and electrons in shells) recruit the third type of entity (mediators aka m-figments) to flow over the surface and act as glue at the connection between string and unit. At relativistic speed, the *mnp* Model predicts that more mediators/m-figments will be recruited over the surface of the quarks. The quark units, covered with mediators/m-figments do not act as strongly charged surfaces. The covering attracts other covered surfaces with compatible spin. The covering of the connecting strings probably recruits charge units to form rings which could lead to quark change (or repair).

Gravity is stochastic. All three basic entities act as gravitons. Since the entities behave differently and combine into structures differently, gravitational calculations at an astronomic scale become astronomically more complicated.

The author does not contend that the *mnp* Model is complete. With not 4 forces and 4 or 5 degrees of freedom in how each of those forces interact, but 3 entity interactions and 4 or 5 degrees of freedom in how those effects manifest, the computational work is formidable before the *mnp* Model claims to model the real universe.

Side note on the blog

The blog topic description on mnpmodel.blogspot.com has not changed for a decade:

A new Model is proposed to unify everything in physics: the four forces including gravity and the hundreds of elementary particles. Time, relativity, and gravity result from the interaction of the basic entities at a tiny scale.

The author's self description on mnpmodel.blogspot.com has not changed for ten years either:

Decades of programming, documentation, lighting analysis, architecture, and search for simple explanations and consistent design leave Gregg an amateur physicist several courses shy of a BS in Physics. Though that last phrase can now be retired.

Appendix E

Questions Posed and Comments Posted in scienceforums

Introducing Myself (2012-03-02)

Entering the community of scientists requires "the mastery of at least one of the crafts of a scientific subfield to the point where you can independently produce work judged by other members to be of high quality. The second criterion is allegiance and continued adherence to the shared ethic." (Smolin, 2006, page 302)

My claims to meet the first criterion are tenuous at best, since many would not consider illumination research or computer science "real science." On the second criterion, I hope to be a good citizen.

As preparation for citizenship, I have looked at the `http://math.ucr.edu/home/baez/crackpot.html` Baez Index (1998). I fully intend to reduce my CI of 950. Are there any scripts/programs/websites out there that measure the 20 or so easily identified issues? Underline the offensive phrases? No, seriously, I'm joking. Sort of.

Note: This discussion had the benefit of attention from salad spinners too: `http://www.thescienceforum.com/`

Does a clock in free fall through a gravity potential run faster? (2012-03-05)

`http://www.thescienceforum.com/physics/27374-does-clock-free-fall-through-gravity-potential-run-faster-than-clock-held-gravity-potential.html`

Or are clocks slowed by the gravitational potential independent of their acceleration?

General Relativity's Equivalence Principle posits that the viewer in a closed box in free fall will see no difference from being in an accelerating box away from all large masses, even if the clocks are slowed?

The muon storage/acceleration experiments show muon decay time (measured in the lab frame) depends only on the speed of the muons, not the acceleration.

The Vessot Gravity Probe A must have dealt with/predicted/answered that question when their maser was in several hours of free fall, but I find little more than abstracts and summaries on the internet.

Of course, in the initial question, clocks will be slowed by the velocity attained in free fall. Clock effects are multiplied, though at low speeds and potentials addition is a good approximation (??).

> yes it is independent of their acceleration

Gravitational Time Dilation Between Two Masses? (2012-03-11)

`http://www.thescienceforum.com/physics/27558-gravitational-time-dilation-between-two-masses.html`

The Shapiro radar ranging experiment finds that light slows when passing a mass, and is considered the fourth proof of general relativity. In trying to understand that slowing, the following question "pops out:"

If light is passing midway between two equal masses, does general relativity suggest that the gravitational potential at a mid-line between the masses is zero so that an external observer would see light can travel at c along that mid-line or at least in that little region at c, or does the presence of "lots of potential" have an effect even if the net curvature along the mid-line is essentially 0?

2012-03-15 Response

So the original question should be translated to something like: In general relativity,

at the first Lagrangian point between two equal masses (L1 would be midway between them), how curved is space at L1 along the geodesics perpendicular to the line between the two masses?

2012-03-18 Response

Thanks - the Two-body Problem article is useful.

I was hoping to understand more about the Einstein field equations by posing a theoretical (and physically impossible) question imagining two masses not moving (with symmetries axial and across one plane) and determining the amount of curvature and shortening of space between them and also perpendicular to the line between them. The answer: it's complicated, and requires a good educated guess to start.

So the education continues.

Has the One-Way Speed of Light Really Been Tested? (2012-03-16)

Note: This discussion had the benefit of attention from salad spinners too: http://www.thescienceforum.com/physics/27569-has-one-way-speed-light-really-been-tested.html

Have any experiments really tested the one-way speed of light?

Many experiments claiming to be one-way tests have either been shown to be really two way tests or to be compatible with theories postulating that all matter undergoes length compression and time dilation, according to the Wikipedia article "One-way speed of light."

Tom Roberts list of tests still contains many one-way tests. I have found some of them compatible with Lorentz-Poincare universal-reference-frame theory. Mossbauer type anisotrophic tests miss time dilation affecting emitter and receiver. Cole Very Long Baseline Interferometry misses contraction in the baseline and the angle of the celestial body.

Is anyone familiar with Zhang's work reviewing the "one way" tests or with the four test theories of Special Relativity?

2012-03-31

The speed of light in a vacuum seems well established. The two way speed of light in any inertial frame seems well established by experiment. That a one-way speed of light would be identical in all inertial frames seems to be the first and most important step on the road to abandoning all causality and the first and most important step to becoming a physicist in the early twenty first century. It seems to be a major source of philosophical writing and confusion, too. Hence the original question.

Yet frame independence should be testable.

Is it becoming possible to test length compression? (Not yet, it seems) Is it becoming possible to run tests from frames moving fast, at least with respect to the Earth? What do the GPS satellites see of the clocks on Earth? Corrections for the differing gravity potential seem to work well for Earth views of the satellite clocks. Has viewing Earth clocks from the satellites been predicted or measured?

Do pictures taken from satellites, preferably minimizing lenses, show a narrower earth or shorter distance between cities as suggested by Special Relativity with corrections for General Relativity effects? Speeds may be too slow, ... Can sensors on a rotating platform be moving fast enough to measure distances in the Earth frame?

2012-04-05

Regarding tests of length compression,

> Actually it is possible, because length contraction is intimately connected to time dilation. The classic observation here is atmospheric muon decay; those muons can only reach Earth's surface if the atmosphere is length contracted from the point of view of the muon itself.

Or the muon would reach Earth's surface if its "clock" is actually slowed by its movement through a universal or local frame. That view is admittedly out of favor.

Regarding "Is it becoming possible to run tests from frames moving fast, at least with respect to the Earth?"

> Can you specify what you mean by this. If you are referring to labs onboard spacecraft which move at a substantial fraction of the speed of light, then the answer is no.

Yes, the hope is to actually know what the frame moving fast (with respect to the Earth) sees rather than surmising as in ...

> If you mean in general, then the answer is yes - any particle accelerator experiment qualifies. The above mentioned muon decay observations are also a good example.
>
> Any GPS device adjusts for the difference between the two clocks; we know the results are very accurate, so I don't really get what your question is hinting at.

If the GPS satellites were looking at clocks broadcasting from Earth, what corrections would they need? Corrections on Earth allow for Special Relativistic effects (due to movement and signal travel) as well as General Relativistic effects (gravitational potential), and are considered strong proof of Relativity. If corrections on a satellite require seeing the Earth as moving (for the movement part of the corrections for Special Relativistic effects), I'd consider that strong proof of inertial frame independence.

Regarding relativistic effects on pictures taken from satellites

> No, because the effect is far too small to be detected/observed in this way.

Regarding sensors on a rotating platform be moving fast enough to measure distances in the Earth frame?

> Not sure what you mean by this.

Can a rotating platform with separated sensors record when it simultaneously sees separated emitters in the Earth frame, with the emitters' position adjusted until simultaneity occurs?

> In addition to the muons, there are other indirect verifications of length compression.
>
> Length contraction - Wikipedia, the free encyclopedia

Good reference, the article offers detail and insight into current and historical thinking. Comments on Penrose-Terrell Rotation regarding taking pictures are interesting, though spaceships are currently not fast enough to take pictures that would show relativistic effects. (Reference article by Baez notes that the idea of taking snapshots arose in the late 1950's).

Thanks too for noting that the verification is indirect.

Mostly New Physics - Yet Another Theory of Everything (2012-04-01)

`http://www.thescienceforum.com/new-hypotheses-ideas/27785-mostly-new-physics-yet-another-theory-everything.html`

On this most auspicious day, may I introduce my nutty proposal *mnp* as a proto Model of Everything.

The basic motivations for the *mnp* Model are: the speed of light is an absolute limit, the laws of physics do not seem to be changing, at some small scale knowledge of absolutes becomes impossible, physics should make sense, and physics should be fundamentally simple. This led to a Model that helps (at least me) understand some of the difficult issues in physics even if "no one is thinking like this."

Why this forum? A real physicist (by definition, someone who makes a living at physics) sent a post from this forum that I found to be gibberish but which the talent here treated with apparent respect. Great. Attention from physicists AND respect. Just what we all want, especially those of us with a BCI of 950 whose salad days are over.

Questions “What is the simplest explanation for gravitational forces?” and “What is the simplest model for matter and energy?” have been with the author years. This led last year to “Can all interactions including gravity occur only over tiny distances?”

The result, months later, is an unvisited web site, an unvisited blog, and a 100 page summary. The *mnp* Model is descriptive, so does not yet satisfy physicists wanting to verify calculations and predictions.

The *mnp* Model is offered as a question rather than an answer:

Can existing experiments be described in the following simple framework?

One Flat Three Dimensional Universe

Two principles: All basic entities move the same speed. All basic entities have a constant property called spin that determines how they interact.

Three entities: n's spin clockwise to motion, p's spin counter-clockwise to motion, and m's spin with axis perpendicular to motion.

Four effects: Existence is the repulsion between very near entities, perhaps only those with similar spin and direction. Proximity is the attraction of a entity to other entities that “see” it nearby (Proximity is imbalanced or intransitive). Spin is the tendency of similar spins to align and the repulsion between opposite spins away from alignment. Effects in the direction of travel have no effect, since entities have a constant velocity. Traction is the tendency of very nearby entities with the same spin to pull together. Traction and possibly Existence are the only effects that can act perpendicular to the line of travel. Entities can only exert (and receive) a limited amount of the effects over a given distance of travel.

What can these building blocks create?

Matter: rings of n's or p's are somewhat stable. Rings of counter-rotating n's and p's are stable and behave like neutrinos. Spheres of rings of n's or p's rotating the same direction form electrons and positrons, where the basic spin of the rings leads to the spin of the field around the electron or positron and allows another electron or positron with opposite spin to exist nearby.

Light: lines/linear masses of m entities form photons. The front half of the line has spin oriented in one direction, the second half the opposite direction. The two halves need to be separated by the short distance of interaction, hence a minimum wavelength for light and a minimum resolving power of light.

Fields: all fields are recruited from the free random entities that exist in the region, and are imbalances of various types in the otherwise random “vacuum”. For example, magnetic fields orient m entities with spin parallel to the charge movement and direction of travel away from the charge but slightly in the direction of the charge movement. Static electric fields are combinations of charge material (n's and p's) away from like charges or toward different charge, with m entities moving more parallel to the charge surface with spin away or toward, depending on n or p charge.

Glue: Spheres of different charge rings joined by cylinders of n's and p's that can stretch attract m entities to be “glue,” though the quarks have currently five different images in the model, and the mathematics of spin combinations and glue recruitment are not worked out.

Movement: matter moves by reorientation of the entities in the basic rings, so the velocity of movement is the sin of the angle from pure ring motion of the entities at c. The angle leads to energies at low velocities, at the speed of light, and time dilation. Length contraction follows so that the rings stay coherent. So the Model depends on one (at least local) preferred reference frame, hence the author's questions in this forum about frame invariance.

Electron shells: the Model sees electron shells as physical entities, with Dirac spin having a physical origin. The mathematics of angular momentum from quantum mechanics should apply directly, though in a physical rather than probabilistic domain. Ohanian's description of spin applies.

Time: only exists as measured by the rotation of rings and the oscillation of electron shells, though time can be mapped and converted to distance.

Diffraction and Polarization: The separation of photons and waves seems to explain many experiments and effects. Waves behave as physics describes them. The “electrical” portion is made of n's and p's, the “magnetic” portion is made of m's, the field exists in 3 space and changes with time, does not have momentum itself, and attenuates. The field is created by photons and guides (trailing) photons and the trailing half of the photon in the Model. The author sees the explanations available in the *mnp* Model and the ability to picture fields as a strength of the Model, but recognizes much work needs to be done in simulation and visualization before that potential is convincing.

Gravity: The author hoped gravity might flow directly from Proximity in the Model. Accounting for time slowing and for matter and photons moving less due to gravitational potential rather than gravitational acceleration has slowed progress and lead to less movement on the Model. The resolution seems to be that gravitational potential causes sideways movement by the figments without affecting the spin axis with the net speed remaining c. The axis of spin is no longer parallel or perpendicular to the line of travel. As with movement, this leads to time dilation and length compression.

Separating experiment and observation from theory requires the author to learn more about General Relativity and gravity before making "final" pronouncements. "Reference frame" has been very useful in Special Relativity and the "Equivalency Principle" has been essential to General Relativity. As the Model explains time as a result of entity movement and matter's geometry, so the hope is that all observed gravitational results can be explained as effects of entities, without needing to posit long distance changes to space or time.

So *mnp* is a "hidden non-local variable" Model in the framework of Bohm models, though there are three conceptual layers between entities and measured spin Sz and between entities and the (pilot) waves that cause photons to bend in diffraction experiments. The *mnp* Model sees not only no spooky hidden action at a distance, but no action at all at measurable distances.

The *mnp* Model asks itself the question "Can we explain everything interesting in physics?" The author has no illusions about answering that affirmatively and inclusively any time soon. When the *mnp* Model can be used to calculate, when electro-magnetic fields can be visualized as entities or as potentials over time in three space, when gravity has been included, and when the *mnp* Model starts making interesting predictions, then it can be called a Theory.

Some of the suggestions of the *mnp* Model: time dilation and length contraction as a result of geometry, movement based on geometry in a preferred frame, recruiting as forming fields without diminishing the instigator, and rest mass as going down with velocity while momentum goes up, may be useful to other approaches to Theories of Everything. As Oliver Wendell Holmes wrote, "take it, you're welcome, no extra charge."

The education continues.

2012-04-02

> Here's where the problems start, because there is no such requirement in nature.

Yes, nature is not simple and doesn't always make sense and the more we learn the less sense it seems to make. As an explanation of nature, the perhaps vain hope is that physics' explanations could become simpler and maybe even more intuitive.

> What are your "basic entities" ?

The "basic entities" are tiny and have a tiny range of the four effects. I have sometimes called them figments. Others may find preons a useful name. They are assumed for now to be countable and have the same effects so they might be considered for now to be quantized. Discrete entities are easier to draw and discuss, though a mature model would not need such shortcuts.

The basic entities are too small to be seen, in the realm of Planck length. The Model sees photons and fields being made up of entities too, so direct visualization is out as a proof.

> Is your spin the QM spin, or the classical spin, or something else entirely?

The "spin" is entirely different from quantum mechanics and classical definitions and perhaps I should use another term to make that clearer. A property of the entities called "axis" would lead to n's with axis parallel to movement, p's with axis opposite movement and m's with axis perpendicular to movement. The effect of entities within the range of influence to align their axes might be called "Axis coherence" or "Axis alignment," getting rid of "Spin" and "Spin coherence" as the name for the third effect. In the Model, this tendency of entities to align axes leads to electrical and magnetic forces and fields and also to rings and spheres and strings and shells.

2012-04-05

Regarding the questions

> What are your "basic entities" ?
>
> and

> So can you answer the question? What are they?

The term "preons" comes from the 1980's and predates "strings." "Figments" seems appropriate for the basics of a thought model.

Try #1: Three types of preons with one shared attribute, movement at the speed of light in a vacuum, and one differing attribute, axis.

Try #2: The three basic entities are the building blocks of a hypothetical model: imaginary sub-elementary particles of three types that move at the speed of light in a vacuum. This movement is the only source of movement in the hypothetical universe. Geometry and short distance interactions between the entities are intended to account for inertia, forces, measured distances and speeds and frame effects, the effects of gravity, and the experience of time and space as measured by observers in that universe.

The intent is to eventually meet the Stein criterion for alternate or "complete" theories to an existing, successful, accepted theory. To relativity:

> an alternative will only present itself if someone succeeds in constructing, not simply a different empirical criterion of simultaneity, but an essentially different (and yet viable) theory of electrodynamics of systems in motion. No serious alternative theory is in fact known. (H. Stein. On relativity theory and the openness of the future. Philosophy of Science, 58:147–167, 1991.)

The *mnp* Model is not a theory yet and does not include enough math to satisfy, so it can be considered:

The Quixotic Quest for a Radically Reduced Instruction Set for the Universe

So April 1 was an auspicious day for a fool who takes the universe seriously.

To the poster who quoted the original post in its entirety, and added

> And a happy April 1st to you, as well!

Thank you, though I would rather not take up bandwidth by repeating myself at length.

2012-05-04

Special Relativity posits that gravitational fields for a mass moving at constant velocity are seen elsewhere in that inertial frame as arising from the instantaneous position of the mass, not the position when the "gravitational information" left the mass. Same for charges moving. This leads (with attendant irony) to a much better formulation for gravity in the *mnp* Model. The original documents on the website have not caught up with that insight.

Many changes result: Picturing the effects of gravity on a photon (which is seen as an instigator) and on electric or magnetic fields becomes easier. Length "contraction" due to gravity runs counter to intuition and theory. Contraction is seen as transverse to the field, with some length expansion vertically in the field. Differences for the measured speed of light on earth compared to a vacuum with no gravitational field are well within current error bars of experiments.

The Shapiro Radar Ranging experiment gets a new interpretation. As light travels near a mass, it is directed more toward the mass, but after light passes the point where its travel is perpendicular to a line to the center of the mass, it will be directed more radially away from the mass. The travel will not be symmetrical as most diagrams of light passing a mass indicate. In the Shapiro radar ranging experiments, as the reflecting body gets closer to being eclipsed by the massive body, the reflected radiation must come at an ever higher angle from the reflecting body. Light will need to travel further to arrive at the observer.

Yes, I know this is not well enough explained to be understandable or persuasive. Just "progress" notes.

The *mnp* Model is attempting to provide an explanation for the experimental effects of general and special relativity based on the behavior of matter and energy rather than the structure of space-time. That such an explanation has not been created in 107 years does not stop fools from trying.

The Quest Continues

Time Dilations for Gravitational Potential and Escape Velocity are Equal? (2012-04-07)

http://www.thescienceforum.com/physics/27897-time-dilations-gravitational-potential-escape-velocity-equal.html

Gravitational potential and escape velocity are of course highly related. In General Relativity, at least for the simple case with one large mass such as the Earth, it seems that the time dilation due to the gravitational potential equals the time dilation that would result from movement at escape velocity.

escape velocity = $sqrt(2GM/r)$ for a Lorentz factor of $sqrt(1 - v^2/c^2)$ or $sqrt(1 - 2GM/rc^2)$

From the Schwarzchild metric for a massive symmetric sphere, not rotating, proper time is coordinate time times $sqrt(1 - 2GM/rc^2)$

Is that equality obvious, or an obvious result of the kinetic energy to escape equaling the gravitational potential energy, or a result of the Equivalence Principle, or is it something deeper?

Future Questions:

If a centrifuge in a cold vacuum had a material (a hemisphere of frozen hydrogen?) that could be excited to give off light at a frequency, would sensors to the side, "front", and "rear" see different frequency photons and would those photons have different energies?. Issues of not having stray light emitters, and of direct sensing without lenses or mirrors would need consideration.

Appendix F

Unsolved Problems in Physics

Back in 2011 and 2012 the author took a hurried look at the Unsolved Problems in Physics. That exercise was useful for focusing thought on interesting questions while offering hope of explaining something new or anew. Many of the unsolved problems early that decade are now believed by the physics community to be solved. Some, for example the Pioneer acceleration anomaly, may still benefit from thoughts from the *mnp* Model. Some of the responses here are wrong, some do not reflect the current *mnp* Model, some are downright embarrassing. All await editing and review.

The following collection of comments is inspired by the Wikipedia article on the Unsolved Problems in Physics. Some of the Unsolved seem to find easy explanations in the *mnp* Model. Some make the Model or the author appear clueless.

The second column is the date on which the comments were written. Most have not been reviewed since the reformulation of gravity as the tendency of figments to align travel direction in 2012 May nor the recognition that fixed size loops of charge structure material form electrons, positrons, quarks, and other particles except perhaps for small neutrinos. The right hand column includes the author's assessment of the usefulness of the *mnp* Model in explaining that particular issue. Enjoy.

Based on `http://en.wikipedia.org/wiki/List_of_unsolved_problems_in_physics` 2011-11-04.

Category/Issue	Date	Comments	Confidence
Quantum gravity, cosmology, general relativity			
Vacuum catastrophe	2011-11-05 2012-08-19	The "energy density of empty space" - 10^14 GV/m^3 (the energy of 1.96x10^18 electrons per cubic meter) measured by spacecraft Voyager - is of interest to the *mnp* Model since that number will relate to the number of figments in free space in our area of the galaxy and available for recruitment in gravitational and electro-magnetic fields. (10^-9 Joules is also mentioned) Understanding the experimental number is important to *mnp*. The theoretical calculation of 10^121 GeV/m^3 from quantum field theory has little relevance until *mnp* is making calculations on fields, at which time experimental results will still be more useful than theory.	low
Quantum Gravity	2012-08-19	The *mnp* Model has ambitions to provide an explanation for matter, forces, and gravity that recognizes quanta of matter, but has no assumptions about quanta of gravity, since the tiny figments that transmit forces over tiny distances are seen as much smaller than matter and current quantum. Fields will exist as quanta when the matter causing the field is quantized. Regarding gravity, the *mnp* Model suggests that objects appear lighter to heavier than terrestrial gravity would suggest as follows: black holes appear lighter (and lighter yet from other galaxies), terrestrial objects appear "normal" at intermediate distances but lighter at inter galactic distances, emissive objects like the sun appear heavier than terrestrial objects at all distances, but may appear "lighter" as the distance increases, and massively emissive objects such as super novas appear much more massive than they (were). Gravity spreads at the speed of light (and less).	high

Category/Issue	Date	Comments	Confidence
Black Holes	2011-11-05 2012-12-11 2022-01-30	The "thermal" radiation emitted by black holes is mostly *m*-figments, which are recruited, directed, and emitted as gravitons. Excess *m*-figments may escape. "Information" in the number of *m*, *n*, and *p* figments remains, so mass and charge and momentum are conserved. Angular momentum may not be conserved, spin certainly will not be. 2012-08-19, particles entering at less than the speed of light or less than perpendicular to the black hole surface are seen as being pulled apart. Neutrinos may well survive their transit of a black hole, though greater contents may reduce the odds of transit. The neutrinos emerging would be mediators of (long distance) gravity as well. 2012-12-11 Quantized loops of *n*-figments and of *p*-figments remain intact. Breaking n or p loops apart would require incredible focus of effort unlikely in a black hole. But particles and quarks would very likely be pulled apart. Whether reforming occurs inside black holes is open to speculation.	medium high
Extra dimensions	2011-11-05	NO except perhaps for hiding the Axis (aka Torque neè Spin) of figments so that it does not "run down" asynchronously (if spin and speed run down uniformly, not sure we could tell)	high
Multiverse	2011-11-05	Unlikely to encounter other universes, given that no other universe has been seen within the visible universe. The *mnp* Model offers no assurances that ours IS the only universe.	medium
Cosmic inflation	2011-11-05	Early expansion had no time: *mnp* Model sees a fundamental inability to measure time when nothing is interacting and no matter has been created from which to measure time.	fairly high
Cosmic censorship hypothesis	2011-11-05 2012-12-11	Singularities are highly improbable in the *mnp* Model (including in black holes), given the Separation effect in which all figments resist being exactly in the same place as another. The prevalence of left handed fermions and of up/down quarks is seen as a matter of recruitment, selection, and building rather than of destruction.	fairly high
Chronology protection	2011-11-05 2012-12-11	The *mnp* Model provides explanations for spontaneous generation of positron-electron pairs, the rare recruitment of existing hidden charge loop material to form particles, and an image of "virtual photons" as neutral quarks and unformed collections of charge loop material that may organize into identifiable fermions within high energy events. Weak and Strong Forces are seen as unified. No true "backwards" events are expected. Events in the *mnp* Model may be backwards from current physics theory, but all interactions are expected to proceed "forward". Certain "circular transformations" in particle physics seem suspect from the start.	medium
Arrow of time	2011-11-05	*mnp* would suggest no exceptions to causality - the present is the result of local interactions in the recent past	medium
Locality	2011-11-05	Absolutely no non-local phenomena in the *mnp* Model. Quantum entanglement is interesting only if it is possible to determine without affecting the result whether an entangled particle has discovered its "nature." If an observer cannot determine "does it know it's state" without causing it to know its state, then the two particles can stay entangled as long as circumstances allow without threat to the Model.	high
Future of the universe	2011-11-05 2012-03-27	The *mnp* Model suggests that a grand regathering will not take place, but that a Big Freeze is not imminent, that gathering and concentrating will go on far longer than a linear model would suggest, and that the edge of the universe is expanding but getting ever less dense. Calculations of an "increasingly expanding universe" seem suspect, given that gravity in the *mnp* Model is complicated. Light (fhotons in the *mnp* Model) is not seen as indivisible in the Model, so fhotons could undergo change over vast distances and over changes in gravity.	fairly high
High energy physics/Particle physics			
Higgs mechanism	2011-11-05 2012-08-10 2022-01-30	Huh? With 3 entities and structure, the *mnp* Model has no need for the Higgs mechanism. The Higgs particle, at one or two energies or more, exists. The *mnp* Model suggests it is NOT the mechanism for much of anything but a meson of quarks related to bottom, much as strange is a close relative of down and not part of another family.	high

Category/Issue	Date	Comments	Confidence
Hierarchy problem	2012-12-11 2022-01-30	Gravity is not so weak, it just works over tremendous distances with figments that travel at the speed of light (and return, so the effect of gravity is partially retarded). The Travel Alignment effect that causes gravity is stronger than the Axis Alignment effect that leads to electrical effects, but since gravity does not create any lateral effects so that fields linger and reinforce, it appears weakest. Yet the Travel Alignment effect, reinforced by Axis Alignment, accounts for the loops of quanitzed charge structure that are the basis for matter. Travel Alignment is stronger than Axis alignment, so quarks can contain loops of both charge materials. Competition between quarks for the charge material in a third quark accounts for the persistence of protons and also accounts for the string that binds quarks together into nucleons. So the weakest force and the strongest are different manifestations of the same effect. Since all figments are moving at the speed of light, gravity can essentially never be stronger than somewhat above the forces achieved in the coiled strands that make up matter. So the *mnp* Model sees no heirarchy problem, just a heirarchy of effects and results.	high
Magnetic monopoles	2011-11-05	the *m*-figments that make up fhotons, glue, affect positives and negatives in opposite manners and form magnetic fields and static charge fields, but do not seem to be monopoles. The *m*-figment is pictured as causing alignment with other entities of similar Axis and divergence with other entities whose Axis (aka torque neè spin) axis in space is more than 90 degrees. This effect, called Axis Alignment in the Model, would be a monopole if it did not lead to divergence as well. The main effect that leads to gravity, called Travel Alignment, acts to align figments approaching AND departing so all figments are essentially monopoles in the gravitational sense.	high
Proton decay and unification	2012-12-11	Quark and decay models are well developed with the charge loop structure of matter and the unification of weak and strong	medium high
Supersymmetry	2011-11-05 2012-12-11	"Super partners" - *mnp* sees some fermions and bosons as related, some are mis-categorized, and the whole mass/gravity business is different. None of the "elementary" particles is seen as elementary, my dear Watson. The modes of acting and the structure of the various particles and the absence of mediators (except as created large composite particles) makes partners uninteresting in the *mnp* Model. Some of the more interesting aspects of the universe, as the triplets that form durable protons, exist only because they have asymmetries.	high
Generations of matter	2012-12-03	*mnp* sees "generations" as a convenient shorthand and not as a necessary part of the Standard Model. Some "elementary particles" are mis-categorized (muon neutrinos, electron neutrinos). Strange and d' are seen as variants of down in the first generation. Charm and Beauty are the second generation. Generations would be structural entities rather than fundamental in the *mnp* Model, and in fact the jumps in mass may all be structural	moderate
Fundamental symmetries	2011-11-05	More "matter" than "anti-matter" is a result of a recruiting and building process that seems to prefer small electrons, big protons, and perhaps left handed spin. Antimatter is seen as regular matter with opposite signs and matching spins (leading to complete loss of structure as gamma "particles" that retain the quantized charge material loops which travel slower than radiation and neutrinos) or opposite spins (leading to neutrinos also)	high on recruiting, low on balance
Neutrinos	2011-11-05	Neutrinos are not what they seem, they may not all have exactly 0 charge, they may be complicated, and they are not "quantized"	medium high
Nuclear physics			

Category/Issue	Date	Comments	Confidence
Quantum chromodynamics	2012-12-03 2022-01-30	The picture of quarks is fairly settled in the *mnp* Model after a year of alternates. Transitions would be reasonably pictured as transfers of charge loop structure with attendant field changes. The *mnp* Model has a picture of why the quarks group in pairs or triplets to form multiples of the elementary charge rather than acting as anyons with multiples of 1/6 of an elementary charge. With three quarks, either all have the same spin or one has a differing spin. Only the one with differing spin can approach the surface of the other two, combine nearby coils, and potentially trade filament loops. At times those filament loops traded may be different charges, leading to quark change. Proton decay would have two up's of opposite spin occasionally forming a positron and and anti down. Oops. There is not other decay possible in a proton, since no combinations of up and down leads to six units of the same type. What happens when a quark of all one type is formed is that it becomes tiny since the strand is more flexible and the coils can be tighter. It is no longer available for combining so it pops out. "Quarks" of one type of charge material are electrons or positrons. There may be significant inhibiting factors from the other quark related to charge loop trading and to spin. In neutrons, maybe down is bigger, stiffer, and so more easily combines with another down to form an electron and a neutral pion. Again, the inhibiting effects of the other quark may reduce decay. Decay may require that additional charge structure loops be available for recruitment. Perhaps only if two up quarks of opposite spin were squashed together by other forces would they combine enough to exchange charge material and possibly decay?	Medium
Nuclei	2012-12-11	The strong force is the tendency of compatible quarks to attempt to share charge material loops which is interrupted by the bound third quark. Gluons appear as a result of that movement of charge material, but the attachment is the filaments that fail to be exchanged and revert to being part of the coiled strand of 6 charge material loops in each quark.	moderately high
Nuclear astrophysics	2011-11-05	The *mnp* Model sees the constituents of electron shells and fhotons as "promiscuous" and could probably see the 6 unit quark model as "fluid" as well	moderately low
Island of stability	2011-11-05	The models for quark and nucleon structure may be useful when the residual strong force is better understood	none
Quantum chaos	2011-11-05	wave functions are not seen as collapsing, since the "wave" has a coil based structure (for electrons, quark shells) and the wave function leads to expansion or contraction via oscillation until stability is found. Fhotons are seen as particles or potential realized or recruited from organized *m*-figments.	moderately low
Physical information	2011-11-05 2012-03-27 2012-12-03	Black holes are seen as not only stopping all clocks that enter but tearing apart any that enter at speeds lower than c or at angles less than straight in. Black holes need not be increasingly dense inside. All entities as figments have speed c and the Separation effect, so gatherings of entities into incredibly high densities is unlikely. Neutrinos may survive and exit. Almost all other higher level or derivative physical information, like spin and baryon count is lost.	2012-03-16 high
Wave function collapse	2011-11-05	Out of sync wave functions for electrons and other structural elements (quark units) are seen as correcting and correctable. Electron/positron "annihilation" lead to loss of information (gamma "particles" which are NOT fhotons), but events such as neutron decay suggest recruiting/creation of particles also occurs and a mechanism (recruiting by glue covered string) is presented	moderate
Theory of Everything	2011-11-05	*mnp* is a Theory of Everything but currently explains no fundamental physical constants unless we count one speed of light, quark charge fractions, quark triplets, and charge balance for protons, neutrons, and electrons. . The few constants do not vary over time, ALL elementary particles are structured, ALL elementary forces are the result of the basic effects in the *mnp* Model.	Quantification - none, comprehensiveness moderately high
Gauge Theory	2011-11-05	*mnp*, with its structural view of the particles with mass and "fhotons" vs any random energy photons, is so different from a "particulate" view of the universe that other than redefining the W- and W+ and Z bosons, the *mnp* Model has little to say	moderate

Empirical phenomena lacking clear scientific explanation

Cosmology

Category/Issue	Date	Comments	Confidence
Existence of the Universe	2011-11-05	*mnp* makes no direct prediction, but one model of the order of creation is contained in the related "Origins" story on the blog and the blog Appendix. The cause of all causes is not posited, but a quieter growth oriented start to the universe is pictured, with no grand annihilation.	low - very high entertainment value
Baryon asymmetry	2011-11-05	*mnp* rephrases the question not as "why more matter than antimatter" but "why are the positive charges more prevalent in large form (nucleons) and why are the negative charges more prevalent in small form (electrons)?" Recruitment to match early structures is the likely explanation.	none: why asymmetry high: reframing the symmetry question
Cosmological constant problem	2011-11-05	*mnp* does not see a true vacuum as anything other than 0 energy. Since figments are likely to be everywhere in the known universe and are the mediators of gravity, nearby space should be teeming with unformed/unstructured energy. (2012-03-27) The author (and Model) hope to understand gravity well enough to explain it as the result of the interaction of figments.	moderate (going down as of 2012-03-27)
Dark Matter	2011-11-05	Figments and (mostly) quantized loops of charge material which if not structured as matter, travel less well then the mediators (which make up fhotons, glue, charge and electromagnetic fields).	moderately high
Dark Energy	2011-11-05	*mnp* Model is not ready to accept any recent cosmological calculations, including accelerated expansion, yet, since the "gravitons" in the Model (which is everything) travel differently and at different speeds.	moderate (high, except that the Model challenges so much scientific history)
Dark flow	2011-11-05	*mnp* would answer that flow would be a response to something that arrived at the affected galaxies. A massive outburst of neutrinos into a massive cloud (and perhaps leaving some mass at or near the center) would lead to (multiple) waves of gravitational effect. As "gravitons" pull uncommitted figments toward the "mass" they left, they continue (or accelerate if neutrinos) . If the mass pulled in encounters no mass at the center but only other figments heading in toward that center, they may reinforce each other by traveling through that center without getting distracted by a mass remaining. There's a great science fiction story about the civilization that was worried about the end of the universe, so decided to make sure there was at least one concentration of matter that would last another 5 billion years. But I haven't written it yet.	none
Entropy	2011-11-05	*mnp* sees all that is in the interaction of figments, and sees time as starting only when matter was created. The initial expansion of the universe (all figments repel each other at a very short distance) and the achievement of light speed by the figments ("whenever" that occurred) insure that there is no going back.	moderate to none
Horizon Problem	2011-11-05	The *mnp* Model says nothing about the homogeneity of nearish space, but the *mnp* Story suggests that figments existed, then expanded until they had satisfied the "Separation" urge, perhaps achieving light speed in the process. So at that point, when the universe had an "existence" diameter, it may have been fairly homogeneous and the entities of which the universe is still made quite uniform. The universe might have been a hollow shell, if all entities started with 0 velocity, when the initial expansion stopped. The *mnp* Model sees time starting only after further expansion, when matter was formed.	moderate to none
Ecliptic alignment of CMD anisotropy	2011-11-05	The *mnp* Model might speak to direction and redirection of microwave radiation, to the tendency of light from a source or a galaxy to direct other light back toward that source (and vice versa), so that an elliptical distribution of light would influence incident radiation to "backtrack" that elliptical distribution. Light acts as gravity, as do neutrinos and magnetic fields and protons. The galaxy as a center weighted light outputting disk would, if it is not too opaque, put out more light along the plane of the disk, since gravity will be pulling light output at medium low angles closer to the plane of the galactic ecliptic? (To be calculated by better physicists than I). The percent of increase in light output is presumably greater than the increase in cosmic radiation seen in the plane of the ecliptic. The ratio of that increase in light output to the increase in cosmic radiation along the ecliptic may suggest how much of "near interstellar gravitation" is due to light, at least for our galaxy. The bending of incoming light may also lead to difficulty sensing "where the background radiation" is coming from?	none to moderate or better(!)
Shape of the universe	2011-11-05	The *mnp* Model sees figments moving and interacting and attempts to posit no other basis for space or time, so guesses that the universe is spherical but not dense at the edges.	none

Category/Issue	Date	Comments	Confidence
Inflation	2011-11-05 2012-03-27	From the beginning, nothing has been able to move out faster than the speed of light. The *mnp* Model now sees the edge of the universe as expanding at the speed of light (the speed of figments) but thinning. Since no light or information will be coming back from that edge, it can be thought of as "created space" lost to followup. The more interesting outer "edge" is the limit of protons and atoms which could give off light. The "outer matter" might see enough figments from the center to eventually return. (2012-03-27) The *mnp* Model is currently agnostic about the behavior of space at an intergalactic scale, but hopes to continue to explain experiment as the result of figment interaction.	low
High energy Physics/Particle physics			
Electroweak symmetry breaking	2011-11-06	The *mnp* Model does not see W and Z particles as extrapolations of a set of rules that seem to work for other gauge bosons, but as results of a very different process with quarks which have a very different structure than leptons but the same type of coil based/ charged scaffolding as the electrons and positrons. The Alfred E Neumann approach: "What symmetry" or "What, me worry?"	very low (due to the long and successful history of the Standard Model), fairly high that quarks and fhotons/gluons and gamma particles are different.
Left-handed Preference	2012-12-11	The *mnp* Model sees nucleons as prefering left handedness in at least our region of the galaxy because of an early predominance of left hand spin among early quarks, with subsequent recruiting reinforcing that predominance and quark interactions and stability maintaining that predominance. Revisiting the spin preference to different latitudes is seen as an important experiment	fairly low
Neutrino Mass	2011-11-06 2022-01-30	*mnp* Model is a structural model that describes neutrinos as rings of basic charge units that are capable of "standing still" though usually do not, and so have rest mass. Actually, as masses of mediators with no effective net Axis direction.	moderate except very low in that neutrino morphology is a mess and the electron neutrino and anti-neutrino do not have a fixed mass (and may have a slight charge) and so the *mnp* Model is challenging some experimental interpretations.
Inertial mass/gravitational mass ratio	2012-10-18	The *mnp* Model sees inertial mass and gravitational mass as related and possibly the same thing. Inertial mass is the number of figments structured in the mass, which essentially have a uniform velocity v and a structural velocity around the coils and rings of $sqrt(c^2 - v^2)$. Gravitational mass depends on the orientation of the figments making up the mass, so light and neutrinos at c will respond slightly differently than matter.	low (not much proof), moderately high by the nature of the Model
Proton Spin Crisis	2011-11-06	*mnp* sees a need for the quarks to be able to recruit rings, coils, and filaments, partly so electrons can be repaired and partly so the positive "near field" entities sent out are in rings, coils, and filaments and will be seen by the electron shells, so further recruiting would make sense. "Glue" and how it spreads and attaches to the charge shells or rings that provide the structure for quarks I part of the *mnp* Model, but its patterns and depths are not fully described. (Quark itself is limited by the smaller lobe surface area in how much "glue" it can attract. The larger area of the larger globes together can attract much more glue)	very low (partly since the concepts of recruiting and repair are new and unaccepted)
Quantum Chromodynamics (QCD) in the non-perturbative regime	2012-12-11	*mnp* has now described the "room temperature" nucleus and provided reasons the three quarks are constantly active in the absence of outside influence	medium high: missing residual strong force
Confinement	2012-12-11	*mnp* has an effective picture of quark structures	medium
Strong CP problem	2012-12-11	*mnp* sees weak interactions as exchange of charge loop material between quarks, electrons, and positrons and the strong interaction as the blocked partial exchange of charge loop material. Charge material is conserved, though it would be possible for some particles to remain and some revert to loose charge material loops in a reaction. Spin might not be conserved after loops separate (called "virtual photons" in particle physics) and then reform, though if twelve loops form a positron and an electron, they likely have opposite spins if they separate enough to survive..	medium
Hypothetical particles	2011-11-06	*mnp* has little interest in hypothetical particles and little need for them since it suggests three entities can explain existing particles. *mnp* has described the Strange quark and posited that Charm and Beauty/Bottom are in the same generation, but has no single image of those higher generation quarks.	medium

Category/Issue	Date	Comments	Confidence
Astronomy and Astrophysics			
Pioneer anomaly	2012-12-11	*mnp* sees gravitational fields becoming unstable at a low limit, so that if an object tries to pass that limit, its own gravitational field provides structure for the field being left, and the gravitational pull remains fairly constant as a result. From 2011-11: *mnp* sees neutrinos and light as acting like gravity, so the "G" of an emitting object is higher than a non-emitting object	medium high in the *mnp* Model, low due the perceived novelty of seeing all entities as gravitons and potential for readers not understanding the anomaly
Ultra-high-energy cosmic ray	2011-11-06	The *mnp* Model imagines that particles are accelerated in a gravitational field, that the rays are not just interacting with the cosmic microwave background, and that those "gravitational fields" become very directional near galaxies or even solar systems. Since *mnp* is a structural Model, it looks for recruitment and initiator structures rather than "spontaneous" creation. If the entities needed to recruit are not present, recruitment will not occur.	moderately low due to a lack of details
Condensed Matter Physics			
High temperature superconductors	2011-11-06	The *mnp* Model sees the possibility that electrons of opposite spin would attract each other (weakly) in what it calls "Dirac binding," though this is seen as acting locally (unless the electrons are spread, in which case bonding could occur at any points of overlap. The *mnp* Model sees electrons as physical shells made of coils of filaments or strands of charged entities which can "slide" to cover larger or smaller areas. Strands filaments and coils are not "labeled" as belonging to one electron or another, but the processes of electron capture in the earlyk Universe lead to the Quantum "size" of an electron	low due to the lack of details and quantification in the *mnp* Model
Problems Solved			
Solar neutrino problem	2011-11-13	Oscillation in neutrinos is not currently described as such in the *mnp* Model. The mechanism for mass increase is recruitment of n and p *m* figments by the dual ring of opposite "charge" entities described by *mnp*. Muon neutrinos have a mass of 1/3 of an electron since they start as 2 "full rings." Electron neutrinos are small and have a mass related to how they were created, but that mass is not believed to be a quantum or fixed. The basic diameter and ring shape is believed to be consistent. Once neutrinos are in motion, they will accelerate in mass.	low for oscillation, very low for the dual-ring nature of durable neutrinos
Topics Chosen By the Author			Unsolved in *mnp*
Fractional Quantum Hall Effect	2011-11-10	Some experiments are finding evidence of "fractional electrons" that carry currents in special low temperature magnetic fields. That coils of *n*-figments could be held and spread in a magnetic field is no surprise in the *mnp* Model. (http://en.wikipedia.org/wiki/Fractional_quantum_Hall_effect)	moderately high in concept and structure, low on the reasons for filling factor ratios
Electroweak interchanges and W and Z bosons	2012-12-11	*mnp* sees charge material exchange in the Electroweak Force as a surface or proximity effect that needs no huge short lived phantom mediators, but does need spins that differ and so are compatible for "weak" charge exchange. Additional energy may be needed if some results are a little bigger or more massive than the entering particles	medium high
	2011-11-05	*mnp* differs radically in how it sees quarks as having a charge structure with recruited "all-purpose" mediators. The *mnp* Model looks at the charge and kinematic requirements of reactions. *mnp* sees the W initiator as the same amount of charged material as an electron, but evenly divided negative and positive plus perhaps a little charge as needed to "bind" the quark units. The Axis of the *n*-rings are opposite the spins of the *p*-rings if the W initiator is to act as an intermediary (spins would all be the same if the intermediary were acting as a quark in the loose or tight binding). Since the n and p figments must rotate in rings or coils to stay organized, the W intermediaries are particles very like a tripled muon neutrino. Being made of figments arranged in coils, they have mass. Period. *m*-figments "have mass" when they are arranged in rotating layers over the charge structure of their quarks (or inside muons, or ...) If the W must indeed be so massive, the need is to have *m*-figments present sufficient to strip the glue from the quark being changed and break the strings that bind quark units (no easy task). *mnp* sees the gamma particle as semi random collections of positive and negative charge (moving at less than the speed of light) and not as proper fhotons at all.	

Category/Issue	Date	Comments	Confidence
		Some diagrams show W as result. As a result, W- is nnn nnn and a left over quark sized *p*-ring. What went IN was pppnnn plus 2 quark sized *n*-rings (easily recruited in a nucleus with electrons, probably recruited/formed around a string) plus whatever energy is needed to break 3 strings (or 9 in the tight binding quark model). A W+ is ppp ppp plus 1 quark sized *n*-rings. What went IN was pppnnn plus 1 quark sized *p*-ring (probably recruited/formed in the nucleus around a string) and enough energy to break 3 strings (or 9 in the tight binding quark model). The Z boson may well be the W intermediary with no extra binding (so the difference between its mass and the W- and W+ mass is the energy actually used to break the bonds.) Spin issues: if W has spin 1, that means half the n units have spin opposite the others. The spin on 3 must be reversed (flipped in, in the 6 sided box model) before the electron or positron can form. The *mnp* Model sees some gamma rays as streams of n's and p's (if they are needed for quark binding or came from electron-positron annihilation) For the future - the mass may be a Figment of the energies freed quickly. Referred to Wikipedia article http://en.wikipedia.org/wiki/W_and_Z_bosons	
W and Z Decay depend on the Initiator	2011-11	If W bosons decay to an up-type quark plus a down-type quark, their initiating particle was different and twice the charge size as the nnnppp that leads to an electron or a positron. The result is pppppn and nnnnpp (so the initiator is equivalent to 2 downs to become a W+ and 2 ups to become a W- that will decay into an up and a down). To become a hadron, the W initiator is essentially the size of 3 quarks. The Z boson decay to electron neutrinos makes little sense in the *mnp* Model. 3 muon neutrinos from a nnnppp Z boson? To decay into a fermion/anti-fermion pair requires the Z to be the charge size of 2 electrons, essentially 2 nnnppp units (probably with spins opposite so they don't immediately decay). To decay into a baryon, the Z must be the size of 3 quarks or essentially a hadron itself. nnnppp nnnppp nnnppp rearranges itself into 3 quarks for a neutron: nnnnpp nnnnpp pppppn. To decay into a meson, the Z must be the charge size of 2 electrons. If W- is what is left after down becomes up, the *mnp* Model is interested in what went into the reaction as much as what came out.	very low
The nature of Strange	2012-12-03	The *mnp* Model sees the charge structure of quarks as being coiled loops of *n*'s or *p*'s 1/6th of an elementary charge, called charge units in *mnp*. These 1/6ths of one type form a strand with 5 others of the same or different charge type. Down is 4 n loops and 2 p loops, with the p loops together in the strand <!– cross section –>. Such a strand is stiffer than the Up, which is 5 p loops and a single n loop. Strange is like down except that the two p loops are on opposite sides of the strand, making for a stiffer strand, a larger sphere, and more interaction with *m* figments making for a large effective mass. The author has suggested that literature review or experimentalists might find another short lived quark of -1/3 charge near Strange in mass, and that the three are all in the first generation of quarks. Charm and Beauty (which has variants that Charm does not) are the second generation.	medium
Weak vs. Strong Forces	2012-12-11	The weak force involves completed charge material exchange between fermions. The strong force involves that same process interrupted by the presence of a bound third quark. The Model sees them as unified and "surface" effects related to the spin of the quarks. The recruitment of up and down quarks, the early building of nucleons, and early selection for left handedness are all related.	medium high
Right Handed Neutrinos	2011-11-05	The *mnp* Model sees neutrinos as rings or the basic charge entities, so does not even consider "right-handed neutrinos" since the handedness would merely be a function of which way it is traveling. At less than the speed of light, neutrino handedness starts to be relevant. The author almost wrote "starts to matter" but thought better of the pun. The *mnp* Model does object to the mixing of electron and muon neutrinos, and lack of care with electron neutrinos' tiny charges.	very low (except for the challenge to "established" neutrino morphology)

Category/Issue	Date	Comments	Confidence
Pions	2011-11-05	pi+ antimuon and muon neutrino. First cut pppppp nnnnnn pppppp and np is not very likely. Second decay very unlikely is to electron plus electron neutrino (opposite). pi+ as pppppp with (3?) n quark ring connectors in quark form. Differing spins keep it from becoming a positron right away. Folding into the other makes the spins match. Now what is the big result: an up and anti down: pppppn and ppppnn makes for an ersatz muon pppppp nn pp and an np neutrino? This would unlikely become pppppp and pppnnn or a huge neutrino not what I'd call an electron neutrino. pi- as nnnnnp and nnnnpp giving an ersatz muon nnnnnn pp nn. pi0 might be nnnnpp ppppnn or nnnnnp pppppn which would have different masses due to different bulb sizes and decay is annihilation into gamma "particles" of the n and p figments.	low due to the challenge to pion morphology and the suggestion that two types of pions exist with different charge structures and the existing suggestion that some muons are kinematically equivalent to two electrons and a positron and the appearance of "diminished" muons from pi decay
Quarks	2012-12-11	Quarks are now well described in the *mnp* Model, as is the weak force and the strong force. The Residual Strong Force is not described.	high
Quasiparticles and Phonons	2011-10-29	Looking at the Wikipedia phonon article, the suggestion that Fourier analysis proves quantum effects strikes the author as a tautology. A finite Fourier transform on a finite field will only yield wavelengths as integral multiples (or rational fractions at best) which when inverted will leave continuities out of the picture. Fourier analysis is very useful for calculation and maybe for understanding "points of view" and possibly for finding valleys or peaks in potential. The author is not comfortable with discrete analysis creating quasi particles that then interact with electrons. Maybe better left unsaid in professional company.	medium low
Non-decay of Protons	2012-12-11	Proton durability in the absence of z's ("neutral quarks") is well described. The unexplained Residual Strong Force is expected to provide an explanation for shielding the neutron.	medium
	2012-11-26	The original SU(5) may be a viable theory if it were to take into account the effect of surrounding electrons and other protons on the decay rate of photons. Unfortunately, that removes the "easy" test of looking for proton decay.	medium-low

- unreviewed 2012-08-12
- slightly reviewed 2012-10-18
- slightly reviewed 2012-12-11
- minor formatting no review 2022-01-20
- minor review 2022-01-30. A surprising percentage survives. A fair amount has been deprecated, as shown with gray type. A few terms of art may still elude understanding by the author.

Appendix J

mnp Model's Journal of Negative Results

"Journal of Negative Results" is an idea that has been floating around for years (forty, for the author). While the collection here will not pass peer review, the results seem negative enough to be moved out of the main paper.

Since these results are HIGHLY deprecated, they will be shown as faint with modern commentary in black.

The first "Negative Result" is an investigation of a Registry for Experimental Methods and Data, initially drafted as Appendix G and recently published as blog Post 45. Modern tools apparently make such a Registry unnecessary, though a simple tool with a short learning curve might be attractive to some. From Blog post 45:

Lightweight Registry for Experimental Design and Data

Abstract

Saving designs before experiment and data before analysis and publishing and then (lightweight) publishing of negative or inconclusive results, are encouraged. A proposal for a lightweight registry of experimental designs and data may be more effort than it is worth, given current tools for timestamping and electronic lab notebooks.

Tenth Anniversary

On the approach of the tenth anniversary of the idea to register experimental designs without disclosing those designs publicly, the author is pulling that registry idea out into the light of a blog with single digit readership by updating the one page proposal, Appendix G from 2012, to account for the "new" internet. The registry is seen as an extremely lightweight method of recording the existence of files. Those files remain with the user and can later be shared privately or publicly at the user's discretion.

The proposal will be placed directly in the Appendix *mnp* Model's Journal of Negative Results since the existence of free timestamp servers (see page 248) and well reviewed free electronic lab notebooks (see page 249) makes this proposal less attractive. One minor advantage of the proposal is that a creator can send a number or a line of data rather than a cryptic file to a receiver, though in all cases the original file will eventually need to be sent if verification is important.

For reference, here is the revised proposal for a registry of methods and data.

Lightweight Registry Proposal - Deprecated

Initially intended to be a registry of experimental designs in physics with no requirement to publish the designs themselves, the concept could be applied more widely. Proving that one did a body of work by a certain date is useful for academia in general, to prove prior experimental design but also to prove that a body of data was gathered by a time and maybe to prove drafts were done by a certain time. Registering lab notebooks occasionally at least puts a "seal" on the work, though dates and times between submissions are not "proven" by the contents of the notebook.

Outside academia, copyright in general is an effort to establish authorship and time. Establishing time of ideas for patents and prior art is relevant to some, including academia. The author's imagination is neither unlimited nor fast, so further ideas are welcome.

So proposed here is a fast lightweight method of proving a timeline for data that might be kept private or made public.

Prior Art

The need to prove that something existed at a certain time was handled in the past by mailing it to oneself in a stamped envelope so that the post office would postmark the package (thanks, E). One had one chance to open the package to prove the contents, after that the contents were out of the bag. The advent of photocopiers meant one could also use the materials before opening.

Notaries could be paid to put stamps on documents and record when that stamp was applied. This was a fairly heavy investment and depended on users keeping the documents unchanged. Without sealing the documents inside a container (see the previous paragraph), this might not be considered reliable.

Current Art

An industry buzzword is RFS 3161 compliant timestamping. The commercial services take information (as suggested here) and create a hash of the information and the servers credentials and send that file back as a timestamp token, which is stored by the creator of the information. No need to store the timestamp remotely. Other services store the original document remotely and create the timestamp remotely. Some free timestamp services exist, though finding them and verifying them can take time. And using them can require programming.

Not itself a lightweight solution.

Certainly the author is not introducing a completely new concept.

Putting anything on the internet is considered by many to be permanent. Photo owners who let their account lapse sometimes discover otherwise. Depending on reference frame, portions of the internet may become beyond the event horizon. Time of publication is an issue. Establishing that something was published at a certain time seems problematic. The author wishes material put on the internet DID have a date visible, that search results had a creation or substantive edit date. He has had the experience of reading material and documentation only to discover that it was written years ago about prior versions. Or written for completely different audiences, as when tax information addresses "you" but applies only to business owners.

If a blog post is considered proof that it was created on a certain date, blogging can be used. If the dates are not maintained or can be adjusted, this is not so reliable.

Creating a project on github maintains the commit date (thanks E and 2018 notebook entry) for all to see. The project name and author is publicly known, as is the contents. Github might not be amenable to keeping millions of projects whose single file consists of length, CRC32, and SHA-512 for free. Naming conventions might be established. Or not. All project names are unique to that author, so conflicts are not an issue.

NFT's, if the author could ever understand them, probably do not contain a date resistant to spoofing or counterfeiting.

Even heavier or more expensive solutions include:

ISO 9001 general quality control requirements can include keeping track of documents and dates. Costs.

The US Food and Drug Administration (FDA) has requirements for tracking work. Probably very heavyweight, given the profits and human safety issues involved.

Timestamp Servers

Direct timestamp services exist on the internet. Timestamp servers take a cryptographic hash of an existing file and return an encrypted file containing basically proof that that hash was submitted at a certain time to a trusted server. Many cost. Some are free. Most require programming.

Free Timestamp Servers

A list of free timestamp programs can be found in `https://gist.github.com/Manouchehri/fd754e402d98430243455713efada710`. The list was last updated six months prior to January 2022 review. The discussion can reveal changed experiences and new servers found by others. Some servers are limited to 100 per month or 5 per day or 10 per day or 20 in 20 minutes or non-commercial use only. Finding and using a timestamp server requires either knowledge or a program, some of which make creating timestamps invisible.

Electronic Lab Notebooks

Electronic Lab Notebooks exist. Most cost. The idea has existed since the 1950's. Implementations started to be feasible twenty or thirty years ago. Most Electronic Lab Notebooks have improved (or been impemented) in the last ten years. Searching those three words turns up many reviews and sources. Reviews may include 40 products in the list. Many are industry specific. Many are large. Even searches adding the word free turn up reviews of mostly fee based services. For example, SciNote is accepted by the FDA, NIH, and European Commission, includes inventory tracking, standard operating procedures management, and project management. Most do much more than just provide timestamps for information.

Free Electronic Lab Notebooks

For electronic lab notebooks, two references might be useful. A review article relevant to academic research from *Nature Protocols* (2022-01-14): Higgins, S.G., Nogiwa-Valdez, A.A. & Stevens, M.M. *Considerations for implementing electronic laboratory notebooks in an academic research environment.* Nat Protoc (2022). `https://doi.org/10.1038/s41596-021-00645-8` runs ten pages in two columns. The short story: implementing ELN's is hard and requires knowing the lab's needs. ELN's offer advantages of searching, archiving, and sharing but have a learning curve.

A free, open source electronic lab notebook is eLabFTW `https://www.elabftw.net/` It can be run locally or hosted by organizations centrally or remotely on the web. Installation normally uses Docker, so is moderately complicated or moderately easy depending on ones experience. To run locally, half a day for setup by a moderately savvy user is one estimate. The existence of such notebooks and timestamp services allows the author to put this Lightweight Registry for Experimental Design and Data on hold.

Deciding to use an electronic notebook after researching options and requirements takes some time. Using electronic lab notebooks might be useful for many.

Advantages of a Registry of Methods and Data

Without creating any stigma, having a registry for methods and data might make submitting to a Journal of Negative Results easier. If the methods are already packaged and the data can be packaged for delivery to responsible reviewers, then only a summary of results may be needed for submittal to a JNR.

Introduction to the concept of Journal of Negative Results

Regarding a public Journal of Negative Results, which attempts to create a repository for failed experiments and ideas, there have been many efforts. Motivations for a Journal of Negative Results include the oft cited 2005 paper by Ionnadis in *PLOS Medicine* which has a medical focus and suggests most published findings are false. At least that synopsis gains attention. It also suggests that negative studies in some fields, if published, might appropriately lead to abandonment of the field. Again, note the medical focus. Citation: Ioannidis JPA (2005) Why Most Published Research Findings Are False. PLoS Med 2(8): e124. `https://doi.org/10.1371/journal.pmed.0020124`

Mentioned in `https://www.aje.com/en/arc/negative-results-dark-matter-research/` are

- *ALL Results* `http://www.arjournals.com/ojs/` encourages negative results as valuable pieces of information in science, including Nano `http://arjournals.com/index.php/Nano` and Physics `http://arjournals.com/index.php/Phys`, The website supports late editions of Internet Explorer 7, shows the current physics journal from 2011, and announces the creation of the Phys section in 2012-06-26. Appears moribund, sigh.
- (Mega) publisher PLOS takes, since 2015, inconclusive or null or negative results if the results make a contribution to the field as *Positively Negative*
  `http://blogs.plos.org/everyone/2015/02/25/positively-negative-new-plos-one-collection-focusing-negative-null-inconclusive-results/`
- F1000Research `f1000research.com`
- further from physics is BMC Psychology `http://www.biomedcentral.com/bmcpsychol` which has created data notes as a shorthand method of making data available,
- PLOS One, *Journal of Negative Results in Biomedicine* `http://jnrbm.biomedcentral.com/`

The dark matter article notes that negative findings, in the rare event of being published, are less likely to be cited `http://www.plosone.org/article/info:doi/10.1371/journal.pone.0054583`. The author suggests a lack of citation

may not be a measure of utility; researchers benefiting from negative results by avoiding an area or even a field may not cite, but still benefit by redirecting their energies. Measuring those intangible benefits is not easy. The article raises the question "Would you take the time to write up negative results if there were a simple template and some credit for your efforts?"

Registry Proposal Details - Deprecated

Now that the reasons to create a registry are seen as transitory, the proposal itself is included here but not fully rounded out.

Data to Store

Perhaps timezone, but don't worry about spoofing. Perhaps URL, but do not worry about spoofing or VPN's.

Data Required

Hope to work without cookies. Hope to work without having the website re-written or spoofed.

Design Parameters

For a designer whose experience includes

- working on the Camp Fire response, which burned an area bigger than the Bay Area,
- using 16K DRAM chips from manufacturers claiming the rare errors were from cosmic rays
- upgrading to hard drives with 10 Megabytes of storage
- graduating from (shared) dial up to ADSL
- moving from ADSL to fiber only recently

the author retains an acute awareness of storage space, storage reliability, bandwidth, minimal resource demands, privacy, user effort, and user learning/knowledge requirements.

One concern, of course, is the user reaction "do I really have to learn something new?" Another, similar to modern reaction to email, "That looks really old." "Like last year." "Why do you use green rather than blue? It's ugly."

Storing the data is the easiest part of this proposal. Keeping it secure is more work. Retrieving it is yet more work. Making the user interface pleasant is work. Making it secure and resistant to denials of service and tampering is a lot of work.

Limitations on Use

To limit the denial of service by a/some users creating a lot of entries: Set a limit on number of submissions per day? Use captcha or something similar to assure human use. Though the author finds that irritating.

If we really do not want commercial or vanity use, restrict users outside .edu addresses.

Responsibilities of the User

Primary is keep an exact copy of the file from which the record / time stamp / identity stamp was created. This applied to copyright applications since the advent of copyright, so will not be unfamiliar. Still, the author has at times struggled to keep archival copies locally or not so locally and keep them findable. Storing encrypted files on the net is fine. The user still must retain the key and assure the encrypted file remains accessible.

Personal Notes on Keeping Notebooks

Keeping directories constant has been virtually impossible; single files are more manageable. The author has found it hard not to go back to electronic records of thoughts and do spell check without changing the substance. If I were really concerned, I'd know where the original was kept and what its name was. As an old time user of computers, I DO have a lot of backup copies. Just finding the version I want is tough and of course the contents COULD be spooked or changed.

Responsibilities of the Keeper

Keep the information as append only, do not go back to change previous entries, just allow additions. Backup the data in multiple manners, save the encryption key for those backups, have a succession plan, try to avoid Hollywood scenes of kidnapping or rubber hose steganography, Succession plans: does the community take over decisions, do we worry about privatization of the data. If backup is kept off-line (or on) bit-rot

Challenges

The start of bulletin board systems was accompanied by science fiction that worried about nefarious use of encrypted communication. There are so many ways to communicate, in the open and in "private" that I will not worry about that.

Naming

A catchy name is needed for new (or old) concepts hoping for acceptance. Meme's welcome.

- **Container**
- time capsule
- cache
- vault
- registry
- notary...
- store
- registry
- repository
- **What stored**
- plans
- myplans
- experimental time capsule
- experiment registry
- my notary proposal (note the favored *mnp* acronym)
- notebook repository
- lab notebook snapshots
- file
- methods
- **Combined terms**
- methods cache
- experimental methods
- journal of pending results
- registry of experimental design and data (redd)
- **Bare terms trying to be memes**
- knox no locks
- I did it
- I got it
- Proof
- 200 Proof
- prior art
- been there
- done that
- remember when
- back then
- my history
- keeper of the flame
- whats your plan

We want to go viral if we want lots of attention and use. More relevant for advertising or other money making ventures. And a dot com name, not a dot org name.

Academia, not so much.

Meditations on the Statistical Physics of Information Storage

The details of the proposal for a Lightweight Registry remind the author of the interesting proof from Introduction to Statistical Physics. That proof suggested (the initial fumble fingered typing had that phrase as the prof suggested) that information storage need involve no energy. But retrieval does involve energy. And changing existing storage also requires energy to clear, to read and revise if necessary.

In like manner, a lightweight record keeper need keep no state or extra information. When limitations like number of requests per day or time between requests are placed, the programming energy costs go up, sometimes a lot if security is involved. Keeping cookies is work, and may require permission from the user, depending on reference frame. Again, increasing transaction energy and cost.

The original proposal from 2012 is included here. Since it too is outdated, it is mostly shown in lighter text.

Original Journal of Future Results Proposal - Appendix G
Journal of Future Results also known as Future Results Journal - (2012-02-01)

If researchers in a field were to file their methodologies and predictions prior to experiment with a registry, the subsequent results should have more power and respect in that field.

Required submission: length and one ormore checksums (and perhaps proof that a human is submitting)

Optional submissions: Topic, Title, Author, Contact Info, Date, Keywords, Text. Any information can be kept "private" for a period of time chosen by the submitter.

The subsequent papers on that experiment would quote a submission number and length and checksums and provide the document that matches. This would allow readers to know the methodologies and predictions at the time of submission to FR Journal (jfr.com is taken).

The registry would take no view on the reliability of the checksums or the information submitted, only that the submission was made with the data provided. The users would decide how much to trust. For example, if it is subsequently found that a 1M file with a CRC32 and an SHA-256 is easily modified while maintaining length and sums, then the value of the submitted information would go down.

The data would be stored off-line after a (short?) while, rather than being maintained only on-line. Verifying old submisions might cost and be a minor profit source. Or bringing an old submission up for public view for a while might cost.

The Future Results Journal may be more relevant in fields with more and smaller experiments and in fields where variation is greater such as medicine, sociology, economics, biology, environmental science.

The initial idea stems from seeing medical research performed "to significance." Which has significant negative results.

mnp Model Summary (2012-12-12)

These main chapters had lurked for nine years in the main pdf. n's and p's have swapped axis orientation in keeping with physics original mistake in labeling positive charge and current. Figments are no longer pictured as spheres with their own spin around an axis; the axis is just a direction. Here, the good, the bad, and the ugly from 2012:

The *mnp* Model architecture makes no reference to a structure or curvature of space, but posits that electromagnetic and gravitational effects are local attractions between entities. The architecture uses discrete entities of uniform size, energy, and Axis (aka torque neè spin) for didactic purposes but neither insists nor disproves that the entities be discrete.

The Model depends on a (at least local) Universal Reference Frame, an orthogonal, unchanging Minkowski space-time. These orthogonal four dimensions are the only dimensions in the Model. These orthogonal four dimensions provide the basis through which the basic entities move, always at the speed of light.

Lorentz transformations are described as inherent in the structure and movement of matter, light, and fields. They affect matter's experience and measurement of space and time but nothing structural. Gravitational effects are described as interactions between entities in fields and matter. Geodesics result from that interaction. Measured clocks and oscillations result from the structure of matter and from movement and interactions with gravitational fields. Length measurements result from the structure of matter and from movement within the Universal Reference Frame and the distortions of gravitational fields. Fields are pictured as moving or not, always in the Universal Reference Frame.

The Model can be described as having two concepts of time: Universal or Minkowski time and local time. The Model can be characterized as having two concepts of measurement: Universal or Minkowski distances and local distances.

Therefore the Model must examine carefully the experimental proofs of existing, accepted theory. The examination of proofs of Special and General Relativity is ongoing.

The Model explains The architecture uses three dimensions (plus time for anything that changes direction and is capable of remaining at one location), has posited rotation and speed and energy to the entities that cannot be changed, but makes no other reference to other dimensions.

Principles

Every entity moves at exactly the speed of light and has "Axis (aka torque neè spin)" proportional to its energy/mass. For didactic purposes, all entities are the same energy/mass, the same range(s) of interaction with other entities, and same magnitude of "Axis (aka torque neè spin)."

Entity Properties

In addition to sharing the fixed properties, each entity has a location, Travel direction and Axis (aka Torque neè Spin). Travel direction and Axis direction determine entity type. Earlier descriptions of the *mnp* Model used Spin instead of Axis (aka Torque neè Spin), but that term conflicted with Quantum Mechanic's spin.

The three "entities" are

- m - Axis perpendicular to direction of travel
- n - Axis along the direction of travel
- p - Axis opposite the direction of travel

m entities can travel very long distances in groups at the speed of light. m entities give rise to magnetic effects, charge effects, gravitational effects. Single m entities can travel long distances, but are more affected by other entities. To be stable, n and p entities must rotate in a ring or coil with either a paired ring of the opposite Axis (aka torque neè spin) moving the opposite direction, or rotate in a closed coil in a closed surface (think an orbital). n and p entities make up "matter" that has a rest mass. m entities are "energy" unless trapped by electrons and quarks.

Effects

As of 2012-08-20, entities interact in three ways:

- Separation: Figments VERY close to completely overlapped repel slightly. This repulsion may be significant only if the entities are traveling the same direction. Possibly, having nearly the same orientation of Axis (aka Torque neè Spin) and Travel is required for the effect to be noticeable.
- Axis Alignment: Entities attempt to align Axis with that of nearby entities. This gives rise to electrical, magnetic, electromagnetic, weak forces.
- Travel Alignment: Entities attempt to align their Travel direction with that of nearby entities. This gives rise to gravitational effects.

Travel Alignment in combination with Axis Alignment leads to the structure of matter. Separation leads to matter not collapsing.

The Three Basic Entities, Known For Now As Figments

Figments

- m (Axis (aka torque neè spin) axis perpendicular to direction of travel),
- n figments have Axis (aka torque neè spin) axis parallel to travel (Axis (aka torque neè spin) right hand?),
- p figments with Axis (aka torque neè spin) axis opposite direction of travel (left hand?).

The Axis (aka torque neè spin) direction is shown as a disk for teaching purposes only, the direction of travel as an arrow. If the figments are approximately spherical if we could ever ask them to slow down, at rest observers might see them all as disks traveling along their axis, the way n and p figments are drawn, if that rotation and the size of the figment is not hidden in another three dimensions.] We will never see figments. We will probably never be able to see the basic coils that "slow" figments by organizing them enough to become matter, except perhaps in their extruded form as strings.

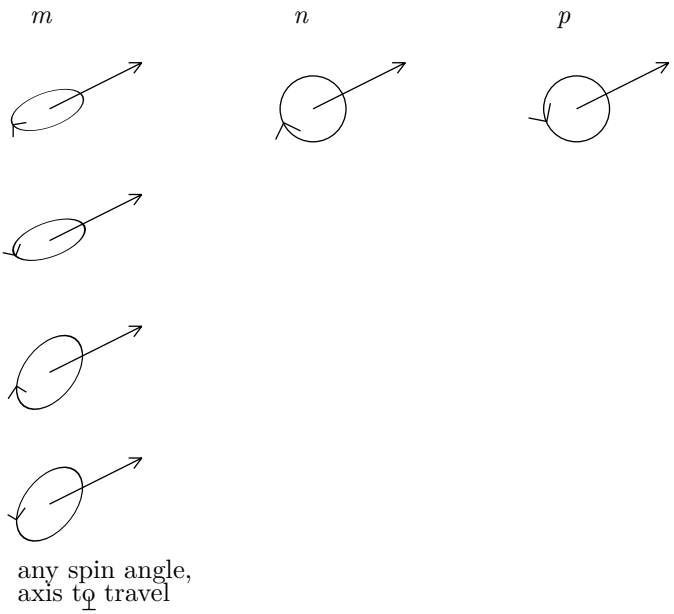


Figure J.1: Figments m n p

So far, all figments look like "energy." How do they form "matter" that can stay in one place? The simplest and now deprecated picture illustrates some of the basic concepts. n's and p's approaching each other at a slight angle will cause each other to change direction toward each other.

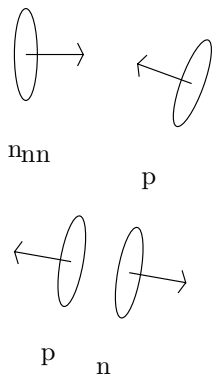


Figure J.2: Figments of Opposite Axis (aka Torque neè Spin)s Approach and Redirect

If enough n's and p's are lined up in a curve to effect the opposite figment, the n's and p's could form rings, parallel to each other. Hence an np ring (which the *mnp* Model no longer sees as a neutrino).

mnp Building Blocks

At one time, rings seemed like a useful way to organize matter. Neutrinos might then be rings freed in interactions and decay. That model did not travel well. A tiny "spin" was attributed to the basic entities as a way to picture or produce an axis. Now the *mnp* Model just uses that axis as the "charge" related property of the basic entities.

n or *p* Ring

A ring of just *n*'s or *p*'s is not stable unless paired next to the opposite ring or possibly surrounded in a closed "plane" by the same type of ring. These unstable rings illustrate the first steps toward stability and staying in one place.

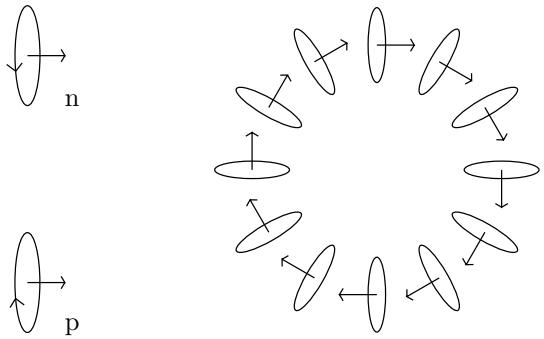
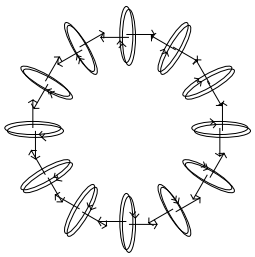


Figure J.3: Ring - *n* or *p* Figments

np Rings

Pairing of opposite rings confers some stability and was the early *mnp* model for a neutrino. Each ring provides enough turning force to the other ring (by Axis Alignment effect) to make all the figments rotate 360 degrees. The Separation effect keeps the figments from spiraling inward indefinitely. The Travel Alignment effect is probably not be needed to prove stability, though Travel may keep the rings together in addition to the turning inward supplied by Axis Alignment. The only difficulty is that as the *mnp* Model developed it became clear that such a construction needed to be moving a constant speed (ideally 0) when it formed and could not change speed without flying apart (2012-10)

So rings are now considered some of the training wheels for the *mnp* Model, useful for development but to be taken off once the Model learned how to use the concepts, so that the Model could travel. (2012-12)



n's shown counter-clockwise
p's shown clockwise

Figure J.4: Dual Ring of *n* and *p* figments

Visualizing and Drawing Figments

So far, figments have been shown as "equators" or disks often with Axis (aka torque neè spin)direction shown. Another method of visualizing figments might be points with a circular arrow showing "Axis (aka torque neè spin)" and an arrow showing travel. Another is a gray sphere showing the limits of effect or interaction for the figment, with an equator and an arrow showing travel. A three dimension image might be a sphere, darker at the equator and graded from lightest to darkest in the direction of "Axis (aka torque neè spin)." For now, images will be chosen in an attempt to be clear. Eventually, images will be chosen depending on the best mathematical model for figments. If the interaction strength decreases from a point out to some radius, the point form may be best. If the interaction is constant within the range of influence, the gray sphere may be best. If the interactions are best modeled as occurring in a sphere at the limit of iteration (as if surfaces were interacting, the shaded sphere may be best.

Filaments

The effects of Axis Alignment and Travel Alignment will keep figments of the same type and orientation in a line, while Separation will keep them from getting too close to each other. The balance of these three effects will lead to the formation of filaments that are somewhat stable.

Filaments and the necessary behavior of filaments suggest the alignment effects are slightly "forward" looking, so that a figment is slightly more affected by those in front of it. Alternately, the effected center of the figment could be seen as displaced slightly forward in time or space.

Filaments made of *n*'s and *p*'s would then, if bent significantly, coil in on themselves until the Separation effect balanced the coiling effect. The coil radius may become a fundamental dimension in the *mnp* Model.

Filaments could encounter themselves when coiled the maximum, limiting the length to be a loop. Since a single filament is believed to be unstable, the current model of filament loops is that based on the stability of electrons and positrons, which are seen as strands of 6 filaments, coiled with a half twist per coil, until the coil encounters itself. These quantized loops, perhaps though torn from each other during the early era of the universe, are seen as the basis for quantization when combined in sixes to form the charge structure of electrons, positrons, quarks, and other particles including W+- and Z.

Even traveling close to c, loops need to stay intact even though the traveling direction does not match the Axis and so the integrity of the loop may not be as strong. So the effect of Travel Alignment side-side is strong. This suggests that extra coils may be attracted strongly too? For further development.

Electrons and Positrons

As of 2012-10, free electrons and positrons are seen as a coiled strand of six filament loops looping across the surface of a sphere, quantized by a shortest filament and "smallest" sphere that offers allows the filament to close on itself.

The old image of electrons and positrons as adjacent rings attracting and repelling but discrete is not as effective in explaining shell expansion and contraction nor in explaining why electrons continue to exist as one unit when they move.

Principles

- Figments move at constant speed in their direction of inherent travel (c).
- Figments have a constant Axis (aka torque neè spin).

Some corollaries of the principles:

- Figments cannot be created or destroyed and are ageless since they are "always moving at the speed of light".
- Figments may be influenced to change direction and *m*-figments may be induced to change Axis (aka torque neè spin)axis.
- Figments may or may not influence those that influence them.
- Figments can pass through each other, often with little effect on each other.
- All movement comes from the speed of the figments.
- Velocity results from changing orientation of figments in matter.

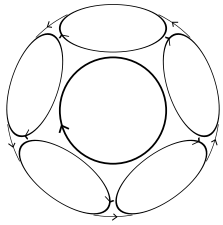


Figure J.5: Point Charge - Old Image as Twelve Rings

The second principle could be rewritten as "Figments have one other constant property that determines how they affect and interact with other figments." The author hopes that by using "Axis (aka torque neè spin)" we are not misled into thinking too narrowly about that second constant property.

Effects

Separation: Each figment wants to be separated from its neighbors. This need not be a strong effect. All the figments had overlapped at one point in their history, so they are capable of doing it again if two are headed virtually straight for each other. They only need to repel enough to maintain a relatively fixed distance when arranged as figments in coils or bunches with matching Axis (aka torque neè spin)not moving much relative to each other (fhotons and designer m-rings) or moving in loops at the same speed with other like figments (n and p, forming the quantized loops that *mnp* sees as the structural basis of matter). This operates over a very close distance as repulsion between two figments in the direction away from the other figment. All figments within range see each other, independent of travel direction (from 2011-09- but if travels are essentially parallel and concentric, there may be no effect.) (added 2011-10-01) Separation is only needed when the figments are traveling virtually the same direction and are very close, and may operate only perpendicular to travel. Separation is probably a symmetrical effect. Separation might not affect travel directions. Current thought (2012-12-02) is that Separation only affects direction, though consideration of the universe origins suggests it originally had other effects perhaps including a contribution to the speed of light.

Each figment can exert some amount of influence in a given distance traveled (or a given time), which influence is exerted shared by all other figments in the range of the effect. Conversely, a figment may be capable of receiving only a finite amount of influence in a given distance traveled (or a given time).

Separationis part of the foundation of *mnp* , a fundamental effect in the *mnp* Model, but currently has more degrees of freedom in its computational definition than the other two effects.

Fields and Traditional Forces in the *mnp* Model (JNR)

The introductory material from this section is still somewhat relevant and can be found page 59. The figment shown would move more to the right. For larger turns, the angle of change is θ and the magnitude of change is $sqrt(sin\theta^2 + (1 - cos\theta)^2)c$ or $sqrt(2)(1 - cos\theta)c$. For a complete 90 degree turn (either from "rest" in a ring or to "rest" in a ring or just a 90 degree turn), the rotation is $\pi/2$. The effective difference in velocity has a magnitude $sqrt(2)c$.

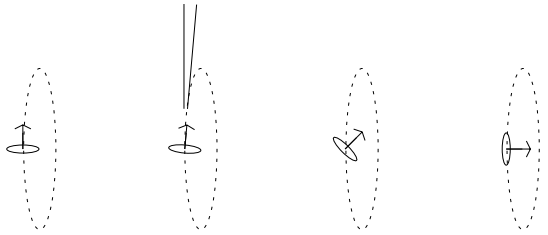


Figure J.6: Figment and Motion

Rings are now (2022) used as shorthand for looking at the geometry or mathematics of a tiny section of the coils that make up a filament loop. Rings are NOT a central part of the *mnp* Model geometry of particles or neutrinos any more.

In a ring, movement is easiest to picture for a ring rotating at rest, then moving perpendicular to the plane of the ring. For movement v, the figments in the ring change direction by an angle $\theta = asin(v/c)$.

Rings not perpendicular to the direction of travel also have their figments reoriented, but that orientation is more complicated. For a ring whose plane is parallel to the direction of travel, the figments vary in angle around the ring. Shown below is ring movement to the right, with the ring plane parallel to travel.

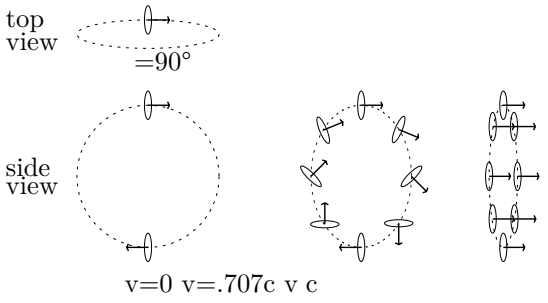


Figure J.7: Ring with α= 90

For any angle of the ring plane to the direction of travel (called here the alpha angle), the ring must maintain its essential closed form or the *mnp* Model ceases to function.

Mass

Mass in the *mnp* Model is seen as the number of figments (nfig?) with, for now, each figment having a relative mass of 1. At some point, perhaps Hauser's number will represent the number

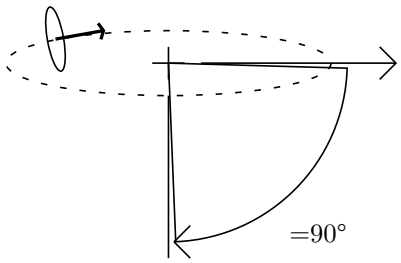


Figure J.8: alpha 90

of figments in a kilogram. The *mnp* Model 2012 is not close to such a determination. Fhotons have no rest mass, but they are made up of a countable number of figments, which represents their energy. Electrons, positrons, and quarks attract and interact with m figments are a function of their size, leading to the concept of effective mass. This is not fully described yet in the *mnp* Model.

Rest Mass (2012-12-12)

Rest mass comes from rings and coils that "stop" figments by rotating. The rotating coils recruit and direct m-figments to also rotate, at larger and varying curvatures, across the surface of the three dimensional structures. The organized figments are the components of rest mass, and can be thought of as nfig.

There is a gap between the rest mass of the loops that form coiled strands that provide the structure of particles and the experimental evidence for higher rest mass of basic and larger quarks. For quarks, which seem to have higher rest mass than electrons, some explanation is called for. If recruited m-figments take the form of filaments that parallel the strand and have a coherent Axis alignment 90 degrees to the Axis alignment of the strand, the figments in those filaments can redirect as the particle moves and so stay with the n and p loops. The attachment to the loops is only by Travel Alignment. The coherence of the m filaments is by both Axis and Travel alignment. Since m-figments Axis does not align with Travel in m filaments, the Axis can be redirected with no change of direction. This makes m filaments unsuitable for structure but m filaments may be the explanation for the gap between charge structure mass and total rest mass for patricles, particularly the massive fermions.

This image of fellow traveling m filaments may or may not be helpful in picturing photons released by electron shell change. Given that 14.6 is so much less than the 511,000 of the electron structure, it is unlikely even one filament is following the entire strand of the electron unless m figments are much smaller than n and figments. Yuck.

Older material: How the m-figments that are hypothesized to make up gluons respond to travel is not entirely clear (as are the details of quarks as structures of n's and p's with m-figments as gluons on the surface). Whether at high speeds the m-figments which are traveling more and more perpendicular to the line of travel are being recruited by Axis Alignment to stay with the traveling m's or are being constantly recruited in greater quantity and constantly released, and whether the Separation effect is involved in compression is not established. Or might m-figments eventually just move forward with the n's and p's? Could m-figments can change Axis (aka torque neè spin) direction (essentially the energy or mass goes up as the tangent?? or $sqrt(1 - v^2/c^2)$??) which is why they don't become n's and p's any more? Then they could go around the bulbs and be Axis (aka Torque neè Spin) attracted still. How would they not give the energy/mass up spontaneously? Why would they be willing to be changed that way? Unanswered questions about glue and nucleons and relativistic travel remain.

Random note on lepton movement

Neutrinos and electrons and positrons do not drag glue with them, so this discussion of n and p figments is fairly pure. With the m-figment glue in nucleons which might contain balanced

amounts of n-figments and p-figments, the picture is more complicated (and incomplete for now.)

Parallel Moving Charges Attract (2012-02-03)

Since the magnetic field from a moving charge is skewed, a neighboring moving charge (of the same sign) will see a force toward the first moving charge.

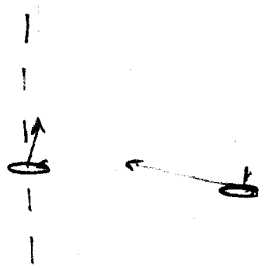


Figure J.9: Parallel Moving Charges Attract

Fields From a Half Wave of a Fhoton (2012-02-03)

The electric field (moving n's and p's) and the magnetic field (moving m's) from the first half of a fhoton will be complicated and a beautiful exercise in modeling and presentation. Basically, the fields are not discrete (as shown to high schoolers and underclassmen) but the charge n and p's are constantly influencing the m's and vice versa. As long as the vacuum potential has a reasonable amount of the three entities, the three dimensional distribution of fields will extend out and back from a fhoton or fhoton group and gradually attenuate in space behind the fhoton. The following half wave of the fhoton will reverse both fields, which reversal will spread out and back from the following half wave. The concept of "intensity" is actually physical. The field strength (fhoton energy and count) will affect a cross section of figments in space with the lateral radius of attenuation related to the square root of the fhotons' energy.

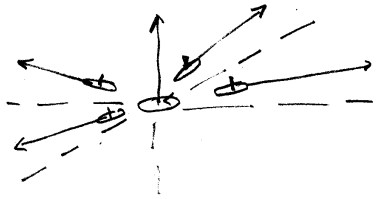


Figure J.10: Field from Moving m's Aligned as Half Fhoton

The fields form a sort of cone behind the half fhoton. Polarization balances to match the Axis (aka torque neè spin) axis of the first half, but the axes of entities around the path all point slightly forward and toward the center of the path. The n-figments are preferentially above the plane of travel (in the direction of the half fhoton's Axis (aka torque neè spin) axes). The p-figments are preferentially in a plane away from the half fhoton's Axis (aka torque neè spin) axes.

Fields from the First Half of a Fhoton Guide the Second Half (2012-02-03)

The following half fhoton, with m-figments with Axis (aka torque neè spin) axes 180 degrees from the first half, is guided by the Axis (aka torque neè spin) axes of the figments in the field left by the first half fhoton toward the center and the line of travel. Since the polarization of the field matches the first half fhoton, the second half fhoton Axis (aka torque neè spin)s will be pushed toward 180 degrees as long as they start more than 90 degrees from the first half fhoton. This will be relevant to modeling the emission of light by electron shells.

Interference (2012-02-03)

When two electro-magnetic waves interfere, most of the interference is a result of the n and p figments canceling the electrical field effect. The m-figments do not interfere (much) with each other, so magnetic fields superimpose (more or less). The diagram shows two half fhotons passing each other out of phase, so that n's and p's counter-balance each other and an electric field does not form.

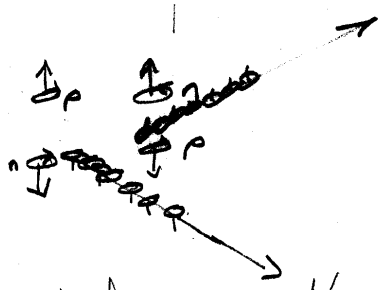


Figure J.11: Fhotons Passing Out of Phase Produce No Electric Fields

Double-slit Explanation (2012-02-03)

So in interference situations with areas of field reinforcement, there is a stronger field to guide the fhotons in the areas where the electric fields reinforce, in much the same form as the fields from the first half of a fhoton guides the second half. As the distance from the slits get large, the travel of a single fhoton will be guided by successive points of reinforcement (x's and boxes in the diagram). Only at large distances are the composite interference fields of essentially the same wavelength as the fhotons. Near the slits, a certain amount of chaos can be expected if interference is present. Where the electric fields cancel, there are no guiding fields in those regions and fhotons will move toward the centers of the guiding fields. The diagram is a "snapshot" taken at one time showing maximum (negative then positive) electric fields, so each two circles is a wavelength. x's and boxes mark constructive interference. Arcs crossing without an indicator would be destructive interference, where no electric field is formed and hence no m-figments form guiding fields.

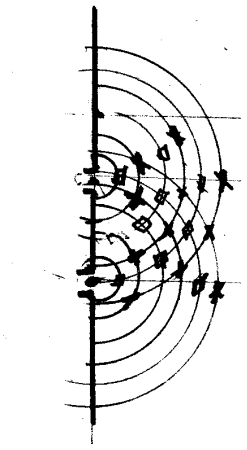


Figure J.12: Double Slit Interference

Single slit diffusion should pose no mis-matches between wavelength and diffusion pattern. The first fhoton through a slit goes straight, but the fields left behind spread out near the slit and will guide subsequent fhotons in different directions, depending on the next fhoton's position in the slit and its exact position and phase in the existing field. Modeling edge and tunnel effects will be interesting.

Charging On

Electro-static charge has posed a challenge to the *mnp* Model from the beginning, with a number of unsatisfactory explanations. November 11, 2011 finally provided a reasonable explanation. Happy palindromic date! Axis Alignment is the major influence of charge, and a coil of p's with right hand rotation shows the same Axis (aka torque neè spin) as a coil of n's with left hand rotation. Therefore, the coil itself does not influence figments differently. The coils must therefore be shedding and recruiting figments constantly. The net effect of this shedding is figments traveling away from the charge, though how that (net) path becomes perpendicular to the surface is not clear. Perhaps the shedding is from the inside of the electron so that a far surface does the directing. The fine grained constant might be related; perhaps the fine grained constant is related to the difference in radius between the inside and the outside of a coil.

Once figments of the charge type are directed away from the surface, they influence m-figments to travel and orient parallel to the surface, with Axis (aka torque neè spin) axis away from the surface if negative, toward the surface if positive. Once the tangential magnetic field exists, it will reinforce the travel of charge figments (away if matching, toward if different). As with magnetic and electric fields in other situations, the effect is not absolute but stochastic. Net movement, net Axis (aka torque neè spin) direction of all figments out of all the figments present is what leads to the fields.

As the charge figments spread from a "point" source at the speed of light, their density across that expanding sphere goes down as the square of the distance, so the magnetic fields they create go down as the square of the distance. This model suggests that electro-static fields leak eventually, since a region of charged space may become devoid of figments of the same charge and collect figments of the opposite charge. While the charge structure of the electrons or positrons

would not be diminished, the field strength will eventually diminish if there is not other movement in the region. This bears further thought, since it suggests that regions of unbalanced charge will not exist for long in the universe.

In all of these descriptions of fields, a field in free space is an ordering of the random figments that are in space, with the amount of ordering proportional to the instigator. In all cases, there is no net movement or spin applied to the field so their is no diminution of the instigator unless an interaction or measurement is taken. At least one part of Quantum Mechanics is not just safe from the *mnp* Model but explained by it.

Fine-Structure Constant in the *mnp* Model

The fine-structure constant relates the "elementary charge" to magnetic fields, electric fields, and the forces between moving charges. The *mnp* Model sees the electron as having its charge material (the *n*-figments) on the surface rotating in coils that cover that surface, so that the charge is not all "working" when the electron moves. When moving, the electron has the net effect of causing *m*-figments to orient their Axis (aka torque neè spin) axis more in line with the moving charge by the Axis Alignment effect (one of the three basic interactions between the figments that are posited to comprise all matter and energy in the *mnp* Model.) That field will then transmit a net effect to a receiving (moving) electron in the same manner. Examination of the fine-structure constant from the *mnp* perspective suggests that it is close to 4pi times 4pi, but the square root is 6.8% lower than 4pi. Since the *mnp* Model sees electrons as made of coils, not true spheres, the regular polyhedral were investigated for the ratios between surface area of the coils and a sphere. A dodecahedron with a midsphere of radius 1.902 times the radius of the coil inscribed in each face leads to an excess area (sphere to coil area) of 7.467% compared to a flat coil while the other regular polygons are quite different. (Tetrahedron 21%, cube 14.6%, octahedron 9.2%, icosahedron 3.2%, with areas between the coils ignored for now). No call to pass out cigars.

Second Correction Attempt

Rather than documenting a wart "with areas between the coils ignored for now", try assuming the area between the coils is similar to the sphere. For a dodecahedron, the surface area correction for the 12 coils is 6.69% based on surface area between the coils assumed spherical. (For an octahedron, the surface area correction is 6.73%, though the author is biased in favor of 12 coils which have lower angles to each other and 10% of the total area between the coils rather than 26.5% for the octahedron) Though coil thickness is no longer "determined", this second correction seems much more appropriate, even though further corrections await the computations of the exact interaction of *n*-figments in electrons and *m*-figments in the field

Rather than think of the square root constant as "less than 4 pi squared," we might see the electron as "slightly more efficient at causing magnetic fields" and "slightly more efficient at responding to magnetic fields" than a sphere surface of random moving charge. Another example: if the electron's charge were a cylinder with axis parallel to travel, the fine-structure constant might be closer to quantity two pi squared.

The author is confident that these results are presented with much more precision than accuracy, but suggests that the possibilities are interesting and warrant further investigation.

Electro-Weak Force in the *mnp* Model (2012-12-12)

The *mnp* Model currently sees electro-magnetic forces as arising from fields created by the charge loop structures that form the basis of particles. Since weak and strong forces are unified as contact or proximity interactions, the Model does not see electro and weak unified the same way the Standard Model does. Since *mnp* sees three effects as forming all the observed forces, the Model sees no single number representing a grand unification. Perhaps someday the number of figments in a loop which is one-sixth the size ofan electron.

Earlier on Why Fermions Have Integral Charge, Second Explanation (prior to 2012-12-09)

At this point, the author becomes less confident of how the charged triplet decays, but offers the deprecated explanation for the reader's enjoyment and edification. If the result is not neutral, further quarks may be attracted. The two possibilities, with the binding quark second, are 2/3 -2/3 -1/3 and 1/3 2/3 -2/3. The first will attract either 2/3 or 1/3 quark, the second either a -1/3 or -2/3 quark. The fourth attracted quark will have spin compatible with the binding quark or the other two. The quarks will arrange themselves as a three pointed star or a rhombus. If the net charge for the foursome is 0, the author would expect leptons and perhaps a pair of z's. If non-zero, leptons and a quark or a lepton and

three quarks. Obviously incomplete. The second explanation could apply if there was a time when charge attraction did operate but not enough separation between nucleons existed for the Residual Strong Force to form a protective surface for the triplets. A different narrative would be needed if the Residual Strong Force were effective or most effective only for neutrons or neutrons and protons and predated or coincided with charge attraction. All the more reason the author prefers the first explanation.

This narrative suggests that neutral triplets will be the early stable form of quarks. The neutral quark will outlast the free quarks, enabling conversion of neutrons to proton/electron pairs later. When the +-1/3 charge quark that is not the binding quark combines later with a z to leave the proton or anti-proton, both up or anti-up quarks will have the same spin. Note the z would NOT be expected to combine with the binding quark, says here.

This scenario is the first the author has pictured that would work in a moving, expanding universe once some spacing has been achieved and electric fields of *m*-figments with a few free *n* and *p* figments operate effectively.

Earlier on Why Left or Right Handed Preference (prior to 2012-12-07)

Earlier the author had been more tentative. It may well be that in our galaxy or our universe, the building of quarks process at some point happened to favor left handed spin for the up quarks and right handed for the down quarks, since this would allow exchange prior to cooling or separation into nucleons. This would lead to an apparent preference for left handedness in "electro-weak" interactions. Whether quarks can turn inside out or whether right handed up quarks would have been destroyed (and re-formed until they were left handed) is not clear, but the "recruitment" in the *mnp* Model is more consistent with the balance of apparent and dark matter in the universe than a "all the balance was destroyed and only the imbalance remained" model. End of tentative thoughts.

Important to this question is whether ALL or almost all or most of the up quarks have left handed spin. Either could be compatible with the *mnp* Model, since protons seem to have been stable for millennia. If the left handed preference were local to our solar system or our galaxy, that would not lead to a boundary of high energy the way a localized preference for up and down would. ?

Proximity was the effect that lead to Gravity

We hypothesize that proximity is not a reciprocal effect, since incoming *m*-figments cannot go faster. Even wilder speculation: This just might lead to left-handed preference.

Getting it Backwards

(2012-10-18) If some events happen "backwards", that only happens when figments are pulled perpendicular to travel due to an effect earlier *mnp* versions had called Traction. That effect is currently out of favor in the *mnp* Model. The snap of a string or the collapse or expansion of an electron shell come to mind. Even if measured, the author suspects the "increase in speed" seen is small, related geometrically a hypotenuse of a triangle with one side c/time. The amount of "time saved" is hypothesized to be (the distance traveled minus the distance that would have been traveled without the boost from traction) divided by c, but this conjecture is not automatically true even if intuitively obvious.

How are Neutrinos Formed in the First Place?

Figments must have been dense enough for oncoming opposite figments to turn each other a little closer to the path of the oncoming figment, with enough figments around in just the right direction to be turned again. The forming strands would not need to be round initially, just at some point the front would need to meet the back of the filament. A single filament pair might then recruit other figments to be strands until the neutrino ring is stable.

Strings and Stretching (and Electrons)

Cylinders of np pairs will naturally attract *m* figments to run along the cylinder by Axis (aka torque neè spin)coherence, up to some "I'm full" amount [to be determined]. This may account for the (varying) mass of cylinder based structures (rings or looped strings or cylinders ending in something that sends the *m* figments back) compared to "planar" structures (the electron and positron). *m* figments are postulated to be everywhere, so *m* figment capture is an automatic healing process for loops or cylinders with an effective reflector. There will be some minimum radius that cylinders are capable of bending *m* figments, which may or may not be related to the radius of the rings. Subsequent work has not shown a need for looped structures.

How are Electrons, Positrons, and Quark Units Formed in the First Place?

Forming a full sphere of one type of figment seems far less likely than forming neutrinos. Some conditions under which neutrinos stretch to strings, then a bolus of charge of the opposite type inside the ring causes it to balloon out into thinner rings which then recruit more filaments of the same type? Imagination fails for now.

Momentum cannot be explained as simply the attraction of space - Numerical Experiment Nov 7

Calculations of whether space filled with random entities could support travel by masses at or near the speed of light showed that, in most models of the Proximity effect, there was an effect perpendicular to "native travel at the speed of light" proportional to the lateral speed. But in the Proximity descriptions so far (where the proximity effect is based on the near figments seen in the direction of native travel of the figment of interest), that effect was 277 out of 3985. That does not seem like enough imbalance side to side to account for light speed travel perpendicular to the direction of intrinsic travel.

The answer lies in allowing the intrinsic motion of the figments and the "angle of attack" to determine velocity. Ironic - designer rings of n's and p's are real at c.

Ring Model Travel - Difficulties Diagrammed

The following drawing, based on rings in a plane traveling at .707c in that plane, shows the orientation of figments in nearby rings. In the "flat" portion of the ring, the figments are oriented at up to 90 degrees to each other and have little effect on each other. At the "top" and "bottom" of the rings, the Axis Alignmenteffect of figments in neighboring rings is greater. Balancing the effects involved will be an important effort in establishing the *mnp* Model. The terms "normalizing" and/or "re-normalizing" are already taken.

So the *mnp* Model has not yet proved that length contraction is a result of the effects of the figments and the ring structure of matter, but suggests that the "special properties of space-time" may not be needed.

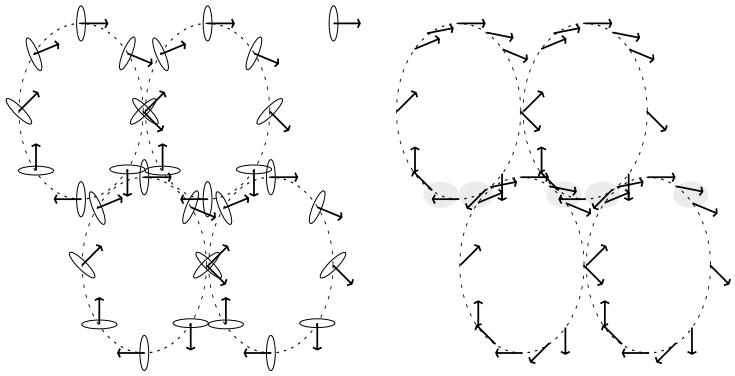


Figure J.13: Rings traveling at .707c

What does a Very High Speed Proton Look Like? - Short Answer #3

Spreading of mass when protons travel or collide may occur. When protons travel, the "charge" structure portion is front and center. The collection of m's/mediators/m-figments/glue that make up the increase in mass at relativistic speeds may spread out as cones behind the 18 quark units that make up the proton. At a point and time of initial contact/impact, the mass will be spread back as far as c(diameter of the quark unit)/(c-v) and will take up to (diameter)/(c-v) to fully arrive at/pass through the center, longer to arrive away from the center of travel since those m's/mediators are traveling as always at c. The distribution of mass should be predictable from the model. (The author is not yet happy with this explanation.)

mnp Model suggests that "arrival of mass" IS a gravity wave. (But then *mnp* sees fhotons, neutrinos, and free space protons as gravity mediators too.)

What Happens When a Very High Speed Proton Hits Something? - Long Earlier Answer

In essence, when a high speed proton encounters another object with mass, it passes through. There may be a small charge effect, from the charge/ring structure of the 18 units, but since that closed surface structure made of rings is mostly retaining m's, only "electro-weak" forces remain. The effect due to charge is proposed to be small. The larger

effect will be from the m's that make up the relativistic mass of the 18 quark units, which pass through essentially over time. Conceptually (diameter) / (c - v) where diameter refers to the quark unit size. Since the m's were not all moving along the path of the proton when they left the surface of a quark unit from the point of view of the observer/cyclotron, they will spread out in a cone shape around the path of the proton. This might look like a wave of mass arriving. Since the m's had been moving over the surface of the unit, with spin axis tangent to the surface, they carry no net charge effect (perhaps a magnetic effect as if the charge were moving perpendicular to the travel of the proton, tangent to the surface of the cone, but spins might be oriented both directions and hence cancel??) but by Attraction will pull on whatever is in their path before passing through. So this wave may be considered a gravity wave.

If this "gravitational" effect pulls on a quark unit, that pair may be pulled out of the nucleon encountered. So "impact" leads mostly to pulling toward rather than the intuitive bouncing off.

From the reference frame of the high speed proton, the encountered object looks like it is moving at v and the effect on the traveling proton will be felt over time, and from that reference frame the oncoming proton will have a "gravity wave" (or look like its mass is spread over time and lateral dimensions <!– cross section –>, though its charge will be concentrated at the point of that cone.)

When a dense collection of nucleons encounters a dense collection of nucleons, a "long" collection will experience more effects than a "short" collection. The m's (which are glue as well as the constituents of fhotons, the mediators of charge and magnetic fields and a major mediator of gravity) will be easily redirected by the n's and p's as well as by other m's. There will be a surplus of "glue" in any plasma created. If the collections are too short, m's continuing through the collection would act as "gravity" or an increase in mass as seen from the front or back of the collection.

The author is still not satisfied with the relativistic descriptions. Most such descriptions lead back to the square root of 1-v squared/c squared, but do not yet handle "as viewed from a different frame of reference." If a high speed proton encounters a "stationary" proton, the results should look mirrored from the point of view of the high speed proton. Since m-figments are available to be recruited and since most effects, at least Separationand Axiscoherence, are transitive, spin effects and recruitment should be seen in all reference frames.

More Thoughts on Electrons

Cooper Pairs of Electrons

"Dirac binding" is a made up term in the *mnp* Model for when, with overlapping shells of n-rings in electron paired shells (or p-rings in positron paired shells), the shell of right handed rings is offset from the shell of left handed rings and the rings are traveling the same direction at some tangents and so attracting at those tangents.

If electrons combine, one with right hand and one with left hand Axis (aka torque neè spin), into a slightly expanded 12 ring two layer structure (or bigger), using the Dirac binding (mnp term) of opposite Axis (aka torque neè spin)ning rings in closed surfaces at 1 or 2 or 3 of the overlaps, does that explain Cooper pairs of electrons (or positrons)? The resulting Axis (aka torque neè spin)would be 1 rather than 0 and such pairs might be more willing to be close to other pairs, though Separationinsists pairs not be too close. Loose n's and p's would still be influenced as in electron shells.

This kind of pairing of electrons could also work if the electron shells are spread (perhaps as much as the descriptions of "hundreds of nanometers apart" for low temperature Cooper paired electrons?)

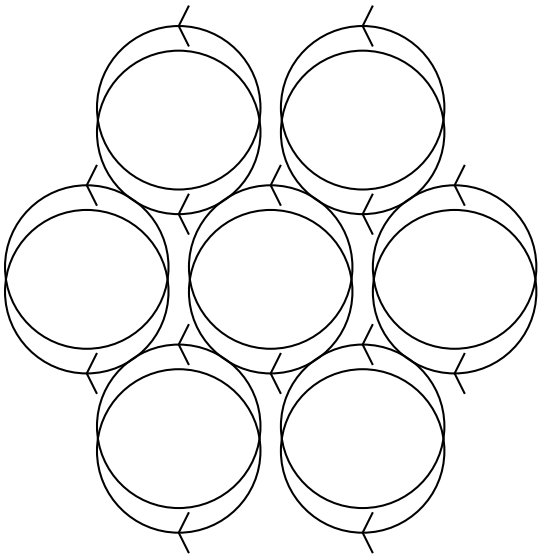


Figure J.14: Cooper Pairing

Do the 1s shells of H3 attract in like manner to the posited paired electrons? *mnp* would see that attraction as close up as well, not as a distance effect. Surely "Dirac binding" is not part of most attractions - a direct attraction of two sphere shells of opposite Axis (aka torque neè spin)s so that tangent rings are rotating the same direction if the surfaces get close enough to not be sending n-figments and m-figments back and forth to repel each other will be stronger.

Molecular Bonding in the *mnp* Model?

Shells could bind a little with "Dirac binding" but a stronger bond might be direct overlap of shells, with right coils form one shell matching left coils in another shell over some area of the shell. Seems like it would be smaller than most of the other bindings between molecules (Van der Walls, ...)

Electron Double Slit Experiment

11/07/11 Questions to ask: what % of electrons get through with one slit. Two slits. Any aiming by the experimenter or device? Could the electron go either way based on long enough dimensions from the source/heater. Magnetic aiming or just boil off and hope? If the percentage getting through is near 100% in both cases or near equal in both cases, I'm at a loss. If less than 100% and near double, the electron is being sent out as a large sparse set of filaments, which can go both ways,and which reassemble wherever (sometimes).

Protons capturing electrons

11/05/11 pppppn becomes nnnnppp by capturing half an electron and giving up half a positron. If a W particle and 2 quark binding rings or *p*-figments are provided, a positron pppppp and 1 quark binding ring of *n*-figments will be created. So a quark binding ring of *n*-figments is an electron neutrino? The extra *m*-figments for binding the two regions of *p* in the down quark may be recruited or may need to be present to drive the exchange.

Quark up/down Mass

11/05/11 Down quarks have two areas of different spin (2 *p*'s). If those are arranged opposite, there may be need for more "binding" *m*-figments. This would suggest that at the measured energy level, the glue in down might be twice that in up. The masses might then be not 1:2 but .511MeV constant plus one or two "quanta" of glue. So 2.4MeV and 4.289MeV or 2.6555 and 4.8MeV.

Quarks From The Top Down

The rotating ring structure of charge figments *n* and p, strings to bind, and a willingness of *m*-figments to flow along strings provide the basis of quarks and glue in the *mnp* Model. The exact image is not clear and the Model already has five images of quarks. For now, the author is ignoring the insistence of experiment that no structure has been found in quarks. The scale of the *mnp* Model is (mostly) much smaller than 10-18m. The reader may wish to skip the quark models and speculations for the Fields and Traditional Forces in the *mnp* Model (page 22).

The basic structure for quarks is probably a pair of bulbs connected by a "string" with *m*-figments flowing the length of the string and around the bulbs to return along the string. Some models have multiple pairs per quark. One basis for quantization is the need for the glue to make not just one loop but to come back to the string with the proper spin. If returning on the other side of the string, the spin axis of the leaving *m*-figment needs to be 180 degrees from the axis when arriving at the bulb, suggesting a torsion of 3/5 or 5/7 or 3/7 to the travel across the bulb. This will lead to spin of bulbs in quarks. Ideally, the paths would not interfere with each other by being nearly tangent. The mathematics of waves of incompressible fluids on a sphere of varying depths might be useful.

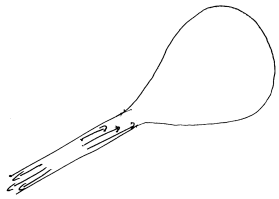


Figure J.15: Quark Unit Bulb

Quark Charges

As of 2011 November 8, quarks have 3 new images, including one based on a single pair of bulbs of positive and negative, in whatever size the charge structures determine. The multiplicity of images suggests an unsettled image of quarks.

Quarks - Model 0 - Quarks Isolated May Be Six Rings in a Cubic Form

If "small quarks" in their compressed or isolated form are 6 rings, there are 6 numerical possibilities for n and p-ring combinations. Two have a charge magnitude 1, one is neutral, and the other four have charge fractions of 1/3 or 2/3 (There are some more geometric possibilities, which are probably more or less stable.)

nnnnnn (electron) (1 form)
nnnnnp (anti-up) (1 form)
nnnnpp (down) (2 forms: pp adjacent, pp opposite)
nnnppp (precursors to W's and Z or some big "neutrino"??.
(2 forms: ppp all together or 2 pacman c's. When expanding, tends to look like 2 hemispheres in both cases?)
nnpppp (anti-down) (2 forms: nn adjacent, nn opposite)
nppppp (up) (1 form)
pppppp (positron) (1 form)

n rings would have the same spin, p rings the opposite spin to bind at the edges.

This would account for the lack of "near misses" in charge between protons and electrons in the universe. Coming out of a plasma with 5/6 or 1 1/6 of an electron's charge may be unstable enough that it doesn't last long. Certainly 6 units making up one positron or electron amount of charge seems to be a universal constant.

Why would the rings be a single size? Geometry of the strand <!– cross section –>, the balance of effects that hold a large ring together but do not allow more filaments or strands to be held reliably. The balance of Separationand the Spin/Proximity effects determine the ring diameter.

Quarks - Model 4 - Two Bulbs and a String

If the larger of ring types in the box go through and out the other side, then that larger set of rings types are inverted in spin and can combine using strings to the other rings. Pairs of cubes could combine by strings without inverting any or by turning a whole cube inside out, but a troika of quarks for a nucleon needs either partial inversion or creation in pairs with 6 quarks. This picture becomes attractive as a prelude to the 2007 finding that protons seemed to have positive charge on the outside, negative charge in the middle, and positive charge on the inside.

The m-figments traveling over the quark shell come off the string with spin one way due to the spin direction of the string. They need to travel over the quark surface, bonding at near or far sides of each ring, and coming off the surface with spin axis either the same if they come off the same side of the string they went in or with spin axis opposite if on opposite sides of the string (or some combination at 90 or whatever). All the m-figments may need to come off with an equal displacement, and need to trace a path that does not interfere with other "streams" of m-figments. Sounds like a wave (somewhat incompressible entities) on a spherical shape) and like an opportunity for deBroglie quantizing. If traversing a sphere with intent to pass through the starting point but going the other direction while doing a constant "bend" do we wind up with two prime numbers or mutually prime numbers, differing by 2 (or an even number more?) representing how much of an equator we travel in every half circle? 3/5 seems the smallest, for 2 traversals of the sphere, 5/7 for 3 circumferences.

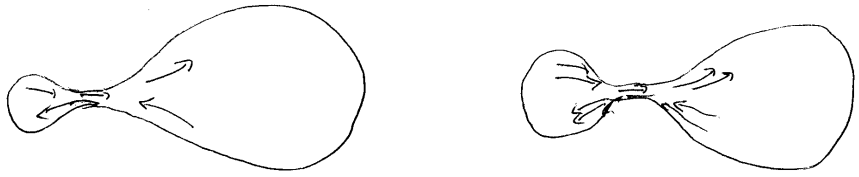


Figure J.16: Quark as Two Bulbs and String

The proton fits together fairly well, though the diagram does a poor job of flattening the 3-d structure.

Speculation: The m's flowing along the string could recruit n's and p's to flow around the string. The diameter might be somewhat bigger than the diameter of regular rings, but this might be a mechanism for creation of rings and for rebuilding electrons and for sending filaments out to the electron shells..

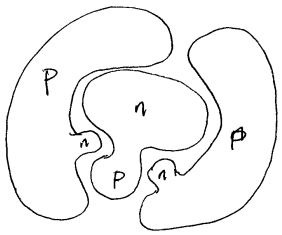


Figure J.17: Quarks in Proton

Quarks - Model 3 - One globe knit together with glue

Does the compressed form of a quark expand as a shell? Obviously the electron and positron forms do. Could quarks be a single sphere with one or two patches of opposite charge and opposite spin? Whether the other forms of quarks expand as well or prove to be fragile at the np boundaries will await computational experiment. 1) The m-figments flowing over the surface either skip both rings going the same direction at an np boundary or interact with both. Ring strands/filaments cannot mix across the boundary on expansion, the way they can shift around if the adjacent rings are all n's or p's 2) We might expect a pppppn or nnnnnp form to be more stable than ppppnn or nnnnpp just based on fewer boundaries and more structural integrity of the 5 matching rings.

This model attempts to suggest that down, with two patches different from the rest of the quark, might need twice as much glue as an up, with one different patch, leading to something like a doubling of mass. since the .511MeV of mass in the charge structure is constant, this suggests the up and down are not exactly half and twice as massive as each other.

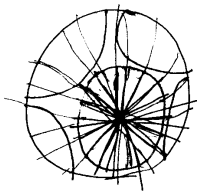


Figure J.18: Quark as Ball of mixed n's and p's

The author has difficulty seeing this as an effective model.

Quarks - The Simple Unit Pair Model

The 6 units of a constituent could be arranged on orthogonal axes angles, with an axis of rotational symmetry either through the 1 neg or the 2 pos. Pairs would be connected by joined rings, extruded.

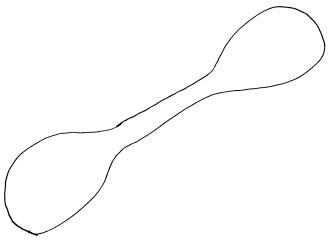


Figure J.19: Quark Unit Bulb Pair

Three pairs to a quark:

There would be conceptual room for three of these constituents (quarks?) to exist nearby or in the same space if the axes of the symmetry are different. Different axis == different color.

18 units in a proton or neutron. If the units are approximately spheres, there are (only) 3 times as many n and p rings the "net charge" part of a proton or neutron as in an electron or positron. A lot more mass would be in something else.

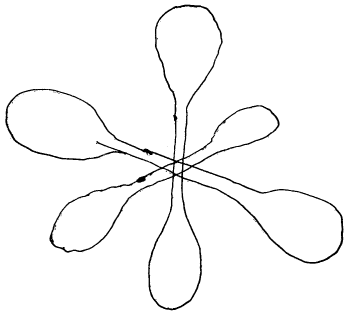


Figure J.20: Quark as Three Pairs

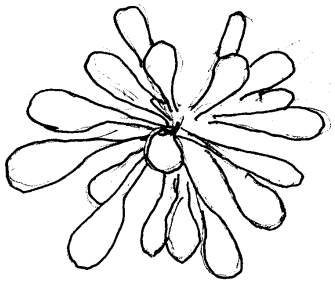


Figure J.21: Nucleon as 18 Bulbs

(10-1 m-figments captured in the units and on the string between them).

Units Stick Together in Pairs to be Part of Quarks

Tubes on np rings connect "spheres" 1/6 the size of an electron, m-figments run along the surface of the tubes, spin lined up with the center of the tube. When they get to the attachment to the "sphere", the sphere is deformed to be shaped like a horn. The rings in the "sphere" next to the cylinder get narrower, so the n's and p's make a sharper turn than in a sphere, and could not make that sharp a radius just with the np ring effects. The spin of the m's help the n's or p's of the adjacent rings of the sphere at the attachment point to make a sharper turn, the n's or p's pull the m's out to the surface, so the two bulbs at the end of a string are shaped like raindrops and the unit pair looks like the a baton. The sphere has to have enough rings that the m's make the 180 plus (it would be 540 if no elongation took place) degree trip without flying off, explaining a minimum sphere size. The sphere will be bigger than a hypothetical free space (1/6) electron/positron if the rings' strands slide into another multiple of the basic free space ring structure.

How convenient that the cylinder is flexible in length! Strings have an even number of rings (for dissimilar ends) or an odd number of rings if the "charge" of each end matches.

The Simple Unit Pair Model can also be seen as "The Quiet Model."

For an explication of the Unit Pair Model with more diagrams, see the separate paper "Quarks and Nucleons in the *mnp* Model, Unification of Relativity and Quantum Mechanics, 'Ring Theory' as a Subset of the *mnp* Model"

Quarks - The Tightly Bound Model

Quarks may also be more tightly bound than pairs willing to stay together, as non-binding triplets binding with the other type of triplet.. A ring of three quarks could bind/connect strings as long as the three were arranged with alternating triplets. Why three would be a magic number is not clear.

A discussion will require some notation and an understanding of the spin and connection issues.

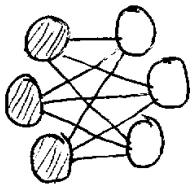


Figure J.22: Quark as Six Units TIghtly Bound

Quark Unit Notation, Second Try

Quark units (the closed surface/spheres made of rotating rings of n's or p's that are 1/6 the charge of an electron or positron) come in 4 types: p's/positives/p-figments with rings rotating right (italic p sub r) or rings rotating left (italic p sub l) and n's/negatives/n-figments with rings rotating right (italic n sub r) or rings rotating left (italic n sub l). Each unit type can connect only with 2 other types and not its own type.

nr with nl or pl

nl with nr or pl

pr with pl or nr

pl with pr or nl

So in the Loose Quark binding model, in which pairs of compatible "spheres" are bound by a single string, the pairs can be of four types: nr-nl, nr-pr, nl-pl, and pr-pl.

In the Tight Quark binding model, triplets of non-binding units bind with triplets of the other binding type. For example.

Up can be nr pl pl - pr pr pr or nl pr pr - pl pl pl.

Down could be be nr nr pl - nl nl pr (if there is only one form of Down, that may prove interesting) or

Down could be nr nr nr - nl pr pr or nl nl nl - nr pl pl. In the latter 2 types, the second triplet matches the first triplet noted for Up. On second thought, the two latter forms of Down may be the only common forms.

Quarks - The Tightly Bound Model - Part 2

If 6 triplets of 3 units with alternating binding type arranged in a ring to make up a nucleon, the exact pairing of adjacent triplets may not be important, in fact the triplets may oscillate between proximity to the two adjacent triplets.

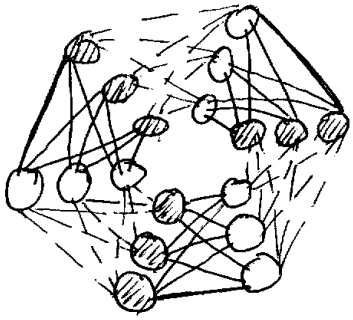


Figure J.23: Nucleon as Three Tightly Bound Quarks

So a tightly connected quark has up to 9 strings connecting 2 triplets of compatible spins. It could attach to compatible triplets of other quarks. Why 3 quarks might be stable or capable of forming a ring while 2 or 4 quarks are not so stable is not yet predicted by the *mnp* Model. If some 9 connections are tighter than alternate 9 connections, the oscillation of triplets might look like color exchange.

How do Quark Units Change Spin?

If connected only as pairs, quark units would change spin as a pair by going through each other: inverting, probably along the connection and probably shedding *m*-figment glue. Both units would change spin. Easier if connected just as pairs. More difficult but not impossible if tightly connected. Tightly connected groups of 6 might invert all together?

The Uses of String

String with the *m*-figments flowing along it may recruit *n* and *p* figments for form strands, rings or filaments. Strands would be thing rings, filaments thin long curved lines of *n*'s or *p*'s, Rings the full thickness rings that represent 1/6 an electron's or positrons charge. Whether rings or filaments are created, whether they grow with time and break off or break through or are part of the change process in nuclei is not clear.

The *p*'s sent out by the nucleus may go not as individuals but as strands or as looping filaments . This would allow the sparse (ring based) electron in a shell to see the *p*'s without missing the 99% of singles that might slip through the rings.

Muons From the Top Down

Muons Might Start As 3 Down Quarks But Not For Long.

Very careful experiments show that the muon has no inner structure. It does not interact with other matter, so it must have no magnetic moment. The simplest structure containing the charge of 2 electrons and one positron would be three concentric spheres, positive in the middle. We might repeat the classic question "Who ordered that?"

Earlier *mnp* Model speculations suggested the muon would be simply made up of 3 down quarks. Since it is clearly NOT, the next question is how could three concentric spheres come into being.

A confounding issue with this discussion is the conflict between comments that "the muon is kinematically equivalent to two electrons and a positron" and that muons can arise from 2 quark units, which in the *mnp* Model would suggest leaves 1/3 positive and 1/3 negative charges inside the -1 charge exterior. For now, a story:

A Muon Creation Story

Muons come from neutrons (see below) and start life as 3 down quarks. Due to charge and spin, 6 of the n lobes position at right angles "outside", the 6 p lobes position themselves in the middle, and 6 n lobes position themselves in an inner "orbit." It appears that 6 lobes making an electron or positron "complete" is a very strong tendency in nature (the *mnp* Model will need to account for the stability of electrons and positrons when magnitudes of the basic quantities are determined, as it will need to account for the "almost stable" quark units 1/6 the size of electrons and positrons). Each of the 6 lobes join to become a single sphere. Some *m*-figments (energy) would be lost (maybe no more then 1/3 of the *m*-figment glue if the outer quarks combine first, though if the inner quarks combine, most of the *m*-figment glue will be lost) along with enough rings for 3 neutrinos and 3 *p* rings. The muon would rather quickly recruit the *m*-figments (glue) needed by the outer and middle spheres, even if most was lost in the initial restructuring.

That's the second half of the answer to "Who ordered that?"

Where Do Three Down Quarks Come From: One Recipe

Start with 4 neutrons. Mix 3 neutrons. Take the 6 down quarks to be 2 nascent muons. Left with an unbalanced 3 up quarks, introduce another neutron to trade a down for an up. Yield: 2 muons, 2 protons.

So we have the first half of the answer to "Who ordered that?" Or at least the answer to "Once ordered, how did they cook THAT one up?"

Muons tried to be the third "nucleon" but could not hold it together.

This "story" is based on muons being kinematically equivalent to 2 electrons and a positron. Other suggestions that muons come from pion decay (quark pairs) leave inadequate material for the three quark picture painted here.

From the *mnp* Model, it seems that muons are not a "big electron" though the surface acts like one. Muons found orbiting a nucleus will necessitate reexamination of the muon structure (or its ability to spread out into a hollow shell).

String and the Formation of Paired Units in Quark

Since breaking up or recombining quarks releases only moderate numbers of neutrinos, this suggests that string is not made up of extra rings. A unit may just attach to another unit at one ring on the surface if of opposite charge. A loose ring may attach to a unit of opposite charge, which then becomes a possible attachment point for a unit of the same charge. We may find that units in quarks carry extra rings of opposite charge (or perhaps just 1). We may find that when 6 units of like charge combine to form an electron or positron the structure is stable enough to throw off those opposite charges. Rings can only stretch into cylinders when a ring of opposite charge is present. When stretched, the charges should overlap into concentric or intertwining cylinders. This explanation has the benefit that we do not need to describe how strings of np pairs would form. The experiments on np tubes would center around "do neutrinos attach to each other or to single rings to become magnetically balanced but electrically charged? "

Principle: Quarks must be capable of being formed in nature, at least at some time and/or location, and must be inherently almost stable.

Isn't nature wonderful.

Hypothesis On Prevalence of Strings, Thoughts on the Unit Pair Quark Binding Model

Unit pairs are the only place cylinders/strings/structural glue is needed. The 3 pairs in a quark dance around each other around their shared center influencing loose *m*-figments that then repel other units of similar charge in the quark. The quark won't be a sphere, since the 6 units of charge are not spherically symmetrical. The 3 quarks with their different axes coexist probably with a common center, with the 9 strings stretched somewhat, and only showing up as quarks when something major happens to knock them apart, at which point they can only be stable for a short time as up or down. So the protons, neutrons, and muons normally exist as an 18 unit sphere with 9 strings. Color and gluons are not really needed but have been fantastically useful for talking about what is happening.

In the initial 18 bulb model, the author suggest the 18 units of a nucleon are relatively peaceful if we leave them alone. When unit pairs break apart, neutrino np pair(s) may be released with a storm of *m* figments (perhaps many in the designer ring configuration ready for long distance travel.) If only one neutrino is ever released per unit pair breakup, this suggests the string is a single stretched np pair (with perhaps an extra ring if the two units are both neg or both pos) (10-1 even fewer neutrinos are seen, so no "extra" rings are present. Either none or the one required by like charges)

The BIG Guys, Strange, Charm, et al

Are not addressed here.

Electrons, Strands, and Regular Sized Rings

Rejected thoughts on strand/filament counts in an electron are in the "Journal of Negative Results" Appendix page 247.

An electron may be able to "heal" itself if adjacent rings send some of their strands to "fill in" and the strands have a propensity to pick up free *n*-figments to join existing strands (which may be available in large number on planets and suns) Such questions await computation and simulation. Certainly identifying self-healing and stability will be a large part of the quantitative work on the *mnp* Model.

The *mnp* Model does not see electrons around a nucleus as discrete particles. When freed, electrons seem to insist on being their unique quantum size, and the mnp Model will need to account for the size of electrons.. When shared, there may be no reason for electrons to be any more discrete than the *m*-figments that make up fhotons. ... Dirac spin thought: shells of rings with opposite spin repel if the rings are directly lined up, but will attract if offset so that 2 out of the 6 "nearby" rings of opposite spin could attract somewhat. This also keeps the trajectory of the ring away from lining up with the other (5) "nearby" rings of the opposite spin. The two sets of rings might even move slightly relative to each other rather than being static. Hypothesis: paired electrons are more stable and less willing to leave orbit than an unpaired electron?

Thoughts on Limits and Stable Sizes

If rings are needed in the *mnp* Model, the size of rings (diameter) will be related to the distance of Axiscoherence effects. The distance from the ring along a line drawn 45degrees to the tangent to the point of a logical enclosing hexagon is perhaps the maximum range. Needs drawing.

The crosswise diameter an n ring or a p ring is related to the balance of Separationand Axis Alignmenteffects (at least for proof of concept purposes) Travel Alignmentwill enter final calculations, since the figments are together such a long time that Travel Alignmentwill act.

The surface area of a quark unit may not expand as much as an electron shell because the string connecting the units is a fixed diameter and can hold only a certain amount of m-figments per unit length along the string going both ways. So while the string might lengthen and allow more m-figments along its length, a fixed (more or less) quantity of m-figments would be inside the bulb/sphere of a quark unit.

The ratio between the mass of "glue" (m-figments) in nucleons and the quark structure itself provides a hint about the diameter of the ring (large) compared to the diameter of the stands that make up the ring (small) since the thickness of the "glue" layer may be similar to the thickness of the strands making up the ring, and the mass of the glue is about 700 times that of the charge structure.

If experiment shows that nucleons have a fairly consistent mass, the *mnp* Model is bolstered. If the variation is known and small, that provides a hint of how much the connecting strings vary in length and (in combination with some other measurement yet to be discovered) could hint at how big the ring/string diameter is compared to the the surface area of the quark units.

The difference in proton and neutron mass may be related to the greater length of the strings in nn unit pairs in the neutron compared to the more numerous np and perhaps pp unit pairs in the proton.

Electron Shells - Thoughts, Developments and Dead Ends (late October 2011)

Expanding an Electron

How does an electron expand into a shell when it encounters a proton or a nucleus? The m-figments moving across the surface of the nucleus have spin and travel tangent to that surface. If the rings of a (free space) electron encounter those m-figments, some strands will be pulled tangent to the electron (sliding away from the original ring?). The electron may even adopt a concave form. Some of those m-figments will then travel with the electron when it has been spread enough. If the electron encounters a proton and winds up with the opposite spin, then the leading half of the electron has been pulled half the way around the proton while the trailing half has gone through and turned inside out. (Or the leading half has been pulled all the way around while emptying the electron.) Experiment?

Keeping an Electron Together

The new picture of electrons as a single filament in coils, closed on itself, gives the electron a great deal of stability and freedom to expand into shells. The necessity to have the shell closed in the real coordinate system (thank you Quantum Mechanics) will lead to the stability of known shells.

Questions remain (19oct2011)

How does the electron come to surround the nucleus (does it break continuity? Pop like a soap bubble but reform before all structure is lost? Spread to more than half way around then the rest goes through the center?) Same issue with shell changes and letting out a photon (and some of the more esoteric even discontinuous electron shell shapes!). (Sorta answered 24oct)

Electrons Really Are a Cloud

The *mnp* Model need not see electrons around a nucleus as discrete particles. When freed (or stimulated by light of the right amount), electrons seem to insist on being their unique quantum size, and the *mnp* Model will need to account for the size of electrons. When shared, there may be no reason for electrons to be any more discrete than the m-figments that make up fhotons. In the *mnp* Model, an m-figment in light is not labeled as part of "the 9:30:000123 photon" and a filament is not labeled as part of "the cesium 7:45:000456 electron 1s1"

Dirac spin thought: shells of rings with opposite spin repel if the rings are directly lined up, but will attract if offset so that 2 out of the 6 "nearby" rings of opposite spin could attract somewhat. This also keeps the trajectory of the ring away from lining up with the other (5) "nearby" rings of the opposite spin. The two sets of rings might even move

slightly relative to each other rather than being static. Hypothesis: paired electrons are more stable and less willing to leave orbit than an unpaired electron?

(24oct2011) Nuclei may be directing free *n*'s and *p*'s while keeping the *m*-figments moving along the surfaces, as may the electron shells. The net positive nucleus would direct *p*'s more perpendicular and *n*'s more tangent to the surface (where they might get involved with the *m*-figments flowing along the surface, hence less leaving the nucleus overall?). The negative shells would direct *n*'s out more perpendicular, the *p*'s more tangent (again, where they might get involved with the *m*-figments flowing along the surface, perhaps even being sent back toward the nucleus?) Since the electron shell is a much bigger surface than the nucleus, the difference in orientation effect on outer shells would be more noticeable.

(24oct2011) A general principle for *m*-figments on a quark unit surface and for other mediators and their influences: a surface or entity does what it can to affect the entities around it and passing through, but no more. If a shell only influences some of the *p*'s coming out (or has a net effect on the *p*'s, the *p*'s will pass through affected "only so much"). When a *p* comes from the nucleus, if it sees an *n*-figment in a ring it will tend to redirect that *n*-figment toward the nucleus while the *p*-figment will be directed more tangent (and backwards) to the *n*-figment and the *n*-ring. When an *n* comes from the nucleus tangent to the nucleus (it won't make much difference to the first shell, which is thousands of times as far from the nucleus as the nucleus diameter, so *n*-figment capture must be going on), it will tend to push the *n*-figment out. For subsequent shells, the *n*-figments coming out more perpendicular and the *p*-figments coming out more tangent to the surface will influence electrons in those other shells (eventually the *p*'s influence will be "used up" and there will be no more attraction to electrons to stay in an outer shell). The interplay of *p*'s and *n*'s will also influence the esoteric orbitals, keeping the orbitals relatively independent (24oct) If atoms in deep space tend to lose their electrons, that may be due to the lack of free *n*'s and *p*'s in deep space, so the charge mediators of orbitals are unavailable to be recruited and eventually the electrons are not held by the nucleus and revert to being free space electrons. (Counter-intuitive suggestion: atoms actively depend on being surrounded by other atoms)

Particle Physics - Musings (late October 2011)

m-Figments Moving on Surfaces

When *m*-figments move across the surface of an electron shell or a quark unit, why it curves is not settled (19oct). The *m*-figment's Axis (aka torque neè spin)axis is tangent to the surface, as is its travel (more or less).

On string, ALL figments spin is the same while moving both directions. I can't notate "left" or "right" because there is not "forward" or "backward" on the string.

When moving over the sphere, the near or the far side of each coil has compatible spin, but the other side of each coil has the opposite spin. If T works only by attraction and not repulsion and T acts perpendicular to spin, then *m*-figments can change direction but maybe *n* and *p*-figments do not. That might allow *m*-figments to flow effectively over a sphere without being pushed away by opposite sides of each ring. (S acts on the spin axis only)

Musings About Beta Minus Decay in the *mnp* Model

For 14C6 to become 14N7, the *mnp* Model would see neutrons in a pair of Carbon nuclei exchanging two down quarks becoming or exchanging for two up quarks. If a positron is captured, then an electron can be emitted by the pair. Neutrons are ppp ppn nnn ppn nnn ppn in the tight binding quark model, Protons are ppp ppn ppp ppn nnn ppn, so one triplet of n-units is replaced by a triplet of p-units. Where that positron comes from (or the two up quarks) to do the exchange is a mystery.

Musings About Pions (Tight Binding Model)

Pion+ ppp ppn and ppp nnp

Spins prprpr plplnr and prprpr nrnrpl or reversed. Net spin matches a positron with r (or reversed) spin. So plplplnrnrnr or reverse is an "anti electron neutrino"

Pion- nnn ppn and nnn nnp

Spins nrnrnr prprnl and nrnrnr nlnlpr or reversed. Net spin matches an electron with r (or reversed) spin. So prprprnlnlnl or reverse is an electron neutrino. Looks a lot like an anti-electron neutrino, with mass similar to an electron. How that half positive half negative charge structures as an electron neutrino (or what division is a muon and a muon neutrino

isn't clear either, since a muon can break into an electron and energy that looks like it could have been a positron and an electron.)

Pion no charge: ppp ppn and nnn nnp or nnn ppn and ppp nnp Spins prprpr plplnr and nlnlnl nrnrpl or nrnrnr prprnl and plplpl nlnlpr Note that the spin total is 0 in the no charge pions is balanced left to right.

In the *mnp* Model an "anti-quark" has the intermediate triplet as nnp rather than the ppn of the up and down quarks. While the *mnp* Model posits that the figments are available for recruitment wherever there is mass, the appearance of full structures as needed for interactions discomfits the author.

Musings About Pions (Units Pairs Model)

Pion+ pp pp pn (up) and pp pn pn (pn from a down.

Leaving from a proton pp pn nn or pn pn p.

Pion- pn pn nn (down) and pn nn nn (extra nn from a down.

Leaving from a neutron pp pp pp and 2 broken/rearranged pairs(ouch)

Some pions decay to just an electron or positron and the "opposite" electron neutrino. This is a low probability occurrence. The author suggests that the pions involved are smaller than usual, with just the charge structure of one quark, as two lobes of the same charge but with different spin. The decay is one lobe folds over the other so that the spins match, and the electron or positron pops free of little neutrino that had joined the lobes. The positive needed to bind a little pi- might take n equivalent negative charge with it, since the coils are tightly bound.

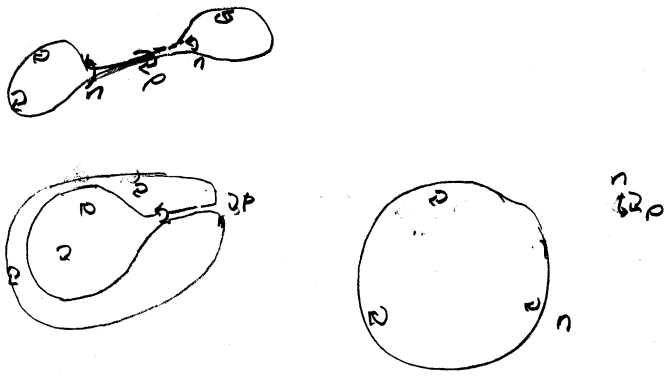


Figure J.24: Pions as Tightly Bound

Musings About Quarks as Tiny Entities

So if quarks need to be tiny, at least when chased into a box 10-18 in size, let them be a 6 sided closed surface, with compatible spins. So up is prprprprprnl or reversed. Down is plplnrnrnrnr or reverse. If a box crosses itself, all spins reverse. Pion+ is two boxes prprprprprnl and prprprprnlnl that can't combine or plplplplnrnr that can but don't balance. Connections between quarks don't work well, spins don't sum to multiples of 6, ... Nice try.

Preon Models - Musings (late October 2011)

In the *mnp* Model, a number of issues much discussed and debated are hypothesized to be moot, other issues considered settled a few decades ago are hypothesized to be complicated, and other issues seem settled by geometry rather than higher mathematics. Moot: matter-antimatter issues and "missing" anti-matter particles, gravitational singularities. Complicated: gravity at inter-galactic (and inter-stellar) distances. Obvious benefits: Spin, quantization of electron shells, mass of quarks vs first generation leptons at relativistic speeds, models of quarks that can be visualized, gravity is an integral part of the Model.

Ruminations on Modeling and Picturing *mnp* Rings

Rings are made of a huge number of "strands" of rotating n or p figments. Those strands are not physical, in that a n or p figment moving in a strand may not make the same circuit twice, it might at times "step over" and follow another figment.

For early modeling of stable structures, we can probably think of the rings as single entities and handle them computationally that way.

Early "Stability" Computations

For experimental computation, designer m rings are easiest to handle. Start with a ring of m's perfectly spaced and oriented. Using E and S, they should remain stable. Then tweak one or more positions, orientations, spin axis, and see if they sort themselves back toward that perfect ring. Add P, encounter many figments on one side of the ring, and see if the m ring settles into a path bent by that encounter.

Whether that spin attraction acts on all figments within a distance, as the square of the distance, as dependent on "space/time" in proximity, as linear with distance but integrated over "space/time" is not clear. Model: it doesn't matter for purposes of establishing stability of the m ring, only the ratio of spin attraction to "Separation" repulsion is important to stability. [Suggests that if rings of m's traveling in parallel are stable, that designer rings might exist in some range of diameters. If designer rings are someday encountered in nature, a prevalence of the ones we see may be merely due to the natural ring size of n and p rings somehow "generating" them. [9-28 if a string breaks suddenly, the m figments traveling along the string might leave in exactly that configuration]

The attraction from the similar spin of the figments on both sides balances in the plane through the axis of the ring and its travel, so the spin stays the same direction, with a slight inward component on direction of travel so as the figments travel they try to get closer to each other. The innate "Separation" effect that doesn't want them to be in identical places keeps the ring from collapsing.

We only need to compare energy/mass of figments and number of figments in a ring and the magnitude of the attraction (or if spins are in opposite directions, repulsion) when trying to figure what would be stable for np ring pairs or spheres/orbital shapes made of n rings or p rings.

For planes or shells of rings, a figment in a ring should see enough figments in the opposit.

Ruminations on Modeling and Picturing *mnp* Rings

Details of strands will need to be thought about and computed when strings and electron shells are needed.

Very fine computational balance is required by quantum loop gravity type calculations, which try to cover a huge range of scales and so easily have floating point and round-off issues. Difficulties are congruent with the very different scales that work in the universe. Current vs movement of electrons involved in that current, fields in the overall random vacuum potential, movement at low velocities compared to c for all figments. Someday the computations will need self correcting natures if the small but consistent scale of entities is not sufficent for computational stability. (Fourier series, for example, create their own stability.)

Experiments

If a star with a steady source of light can be measured for a given amount of time as a satellite (or the earth) approaches it and as the observer recedes from that steady source, is the amount of energy from that star the same or is the number of fhotons the same (by diffraction/scattering - how dense does the image of contacts become). Hypothesis - the amount of energy stays constant, that red-shift affects the perceived frequency, not the number of m-figments.

Speed of Light - Musings (2012-02-06)

Two way experiments of the speed of light agree with the *mnp* Model.

One Way Experiments of the Speed of Light - Preliminary (2012-02-05)

Regarding one way experiments of the speed of light, ...?

A cursory review of the astronomical tests using VLBI - Very Long Baseline Interferometry (Cole 1976) suggests that the hoped for 1-v/c effects posited (and not found) would not be expected in the *mnp* Model. The largest reason is that the clocks along the baseline will be more or less slowed by the earth's movement through the reference frame, so at most a $sqrt(1 - v^2/c^2)$ difference would be expected to be seen locally in the one way speed of light. The baseline D would also be shortened if not perpendicular to the "Movement through the ether," depending on the orientation of the baseline to the movement with respect to reference.

Preliminary thoughts about "microwaves in a box." If a side of the box starts vibrating and then ceases to vibrate, has a great deal of attenuation occurred? If not, then rotating the box will not affect attenuation as the dimensions change in the reference frame. If yes and rotating the box does not show attenuation, then a closer look at reflection, electron shells (which have undergone both time dilation in any orientation and length compression parallel to travel), and increased energy held by the moving shells even though one dimension is shorter all need to be investigated.

By 1990 reports of one-way speed of light experiments thankfully use "hypothetically universal rest frame" rather than looking for the presence of "aether" The dipole anisotropy of the cosmic microwave background is mentioned. Two hydrogen masers 21 km apart , with clocks synchronized and then slowly separated, analyzed their difference and additive data and used the test theory of Mansouri and Sexl as a means of comparison. (Krisher 1990) A "straight line propagation" assumption seems troubling. The *mnp* Model might expect the frequency of the masers to vary (diurnally) from the point of view of the universal rest frame. It does expect clocks to vary slightly diurnally, perhaps in like amount to the masers emission frequency. Earth clocks might see no frequency variation except for subtleties due to the slight difference in direction in travel across the universe at each of the two sites/ends of the experiment. 3m wavelength, 29 km of travel covering 21 km through fiber optic cable, comparing phase differences every 10 seconds (sampling every 100th measurement). Phase data differences varied up to 25 degrees, so less than .27m in propagation, or up to 10^-5 variation in the "speed of light" both ways. The mnp Model might expect to see diurnal variation in the one way speed of light due to the rotational speed at the equator of about 460 m/s added to or subtracted from 62.7 km/sec of the earth's movement apparent movement in the cosmic microwave background. Length dilation (between the stations) would vary +- 3x10-9 at the equator (maximum). Over a year, the *mnp* Model would expect a variation of +- 2x10-7. LENGTH IS NOT SPEED. So the Krisher tests are experimental tour-de-force and wonderful use of existing high quality commercial equipment, but may not be able to resolve light speed differences between SR and models such as *mnp* that see time dilation and length contraction as real effects. TO BE REVIEWED.

The test theories of SR are supposed to make analysis of experiments easier by categorizing the experiments. A number of test theories exist. One or more of the test theories might be a fruitful avenue of comparison with the *mnp* Model or of ideas for tests, but the low speed of the earth makes one way speed tests incredibly difficult..

Further investigation is needed.

Many theories of everything or almost everything would benefit from not needing to explain that light, in SR, is measured as moving the same speed in any viewers frame, moving toward or away from the light. String theory, quantum loop theory, quantum mechanics, would all benefit.

Magnetic Fields from Moving Charges fixed (2012-02-03) Traction Yet Again - Rejected

The Traction effect (when figments with spin in the same direction are very close) may need to work perpendicular to travel, if only at distance only a little greater than Existence. This might help with the explanation for parallel charges attracting, though the large scale operation of charge may be explained by effects on the surrounding figments.

Other sections moved out to save space and bandwidth:

- Special Relativity - Old Thoughts
- Relativity as Four Separate Explanations in the *mnp* Model
- Rejected: Crucial Difference in Mass Between Classical Relativity and *mnp*
- Unified Model
- Quantum of Thought - Electron shells as countable rings of rings

Sections removed from Ancillary and not repeated here:

- Black Holes
- Keeping an Electron Together

- Free Electrons As a Cube?
- Quantization of Stable Ring Thickness
- Calcs on Electrons (revised)
- Filaments of n-Figments and p-Figments (2011 oct 23)
- Rings Slide and Snap?

Appendix L

Last Words

Future of the *mnp* Model

The *mnp* Model has passed one set of experiments: the two-way speed of light experiments. Investigation of the "one way with clock propagation" speed of light experiments will be important. Other relevant experiments need to be chosen, worked through, and understood so other experiments can someday be designed to actually test this or other entity based models.

The *mnp* Model has not undergone simulation to investigate the interactions between the 12 plus or minus degrees of freedom in the effects between entities. While 12 sounds like a number similar to the empirical 20 quantities in the Standard Model, some of those freedoms involve functions rather than numbers, so the degrees of freedom may seem more like that of string theory. The author hopes the *mnp* Model will have fewer degrees of freedom than "needed" so that it will not suffer the non-holonomic status of some other theories of everything.

The *mnp* Model does not met the Hauser criteria nor the Big Five posed by Smolin.

Cosmology and *mnp* in the Future

Someday, cosmologists may calculate that if all figments started at a point, by the time they were all happily separated they had all accelerated to the speed of light and we would know the mass of the universe, the angular momentum of the universe, the size of the figments, the number of figments, and the reason c is what it is.

Final Notes

Ruminations on Matter In Space

If material with mass is speeding up as it comes toward us on earth, the universe is a scary place without an atmosphere!

That makes earth getting material from supernovae more plausible and understandable: at least it is coming almost as quickly as light and not decaying on the way.

Perhaps an awareness of the importance of the atmosphere IS the only useful application of the *mnp* Model. If respect and care for that protective layer develops among humans, the species may survive longer.

Author's Comments

The author's lack of professional physics experience can be seen as a detriment, a curiosity, an impediment to communication, a cause of mirth, or perhaps as a strong proof of concept. That results similar to those known to professional physicists fall out of the predictions or speculations of the *mnp* Model might be an indication that the Model, or a model like it, is useful. In experiments, when the researcher or evaluator does not know the expected results of the experiment or test, the results are considered stronger.

Author's Apologies

The author, in resuming his physics education, is becoming aware of the gulf between the minimalist structural *mnp* Model and current orthodoxy in physics. Trying to explain the "why" of so many beautifully described results seems quixotic even to the author. The author sees the effort as a modest thought experiment with the goal "What is the simplest way to explain _" and admits that the attitude of "Don't make it complicated until you really have to" or "Don't add to a model until cornered," will make the quest seem dogmatic. Such seeing and admitting seem the only way for the author to continue exploring and developing the *mnp* Model consonant with learning, sanity, and flexibility.

Seeking mechanism or why when "it just is" suffices at the highest level of physics may be foolish, but Feynman is quoted as suggesting that current models describe what is and should not be confused with explaining why.

The good news, according to one physicist, is that nobody is thinking this way so there is no hurry.

The author is finding certain branches such as optics, Quantum Electro Dynamics and Quantum Mechanics more understandable with the *mnp* Model than without, though he is not yet proposing the undergraduates be exposed to yet more possibilities of confusion.

The author is finding that separating the well accepted models from the measured facts is a challenge. The author is in no position of power, eminence, or pedigree to demand that physicists separate measurements from calculations from models from principles, so he has much to learn. That the separation may help all theorists or duplicate the effort of each theorist is not a concern the author can press on the physics community.

So the author agrees with the professional physicist's judgment that the *mnp* Model is nutty. As a thought experiment, in October 2012 when it became loopy as well, it still seems to have some interesting kernels.

Words in the Beginning: the First Nomenclature

The physics community should choose a durable vocabulary for the *mnp* Model. Of historical interest: Figments were previously called fragments. "Points" was deemed confusing, though speaking of "all the points of the universe" had an appeal. Before that, 0-branes or No-branes gained no traction. The community can decide on naming, "essential entities" "basic particles" "elementals" "basics" "things" even "figments." Fhotons deserve a name separate from the multiple concepts of Optics, Quantum Dynamics, the Standard Model, and Particle Physics.

Thanks to the Giants

The author would like to thank the giants who have done so much careful experimentation and the giants who have worked to explain the experimental results and who have provided the vocabulary, grammar, and mathematics to describe those results. If the *mnp* Model cannot eventually confirm those experimental results and predict others, its conceptual beauty will be for naught.

- Gregg Hauser

Appendix V

Version Release Notes

Coming soon, I hope:

- Drawings of how charged matter creates electric fields
- Drawings of how electric fields affect charged matter
- Drawings of the influence of electrostatic fields on shells
- Drawings of how gravity influences the coils of matter, showing why the divergence of the field is important to gravitational acceleration.
- Hint of how gravity, in an early universe that had matter but had not yet expanded, would act as expansive until early gravitons returned to balance and be recruited. The author does not see his way clear to understand why matter could exist (at subluminal speeds including 0) while the mediators at c speeds would not already be gone. Perhaps if the mediators were bound to super big particles or extremely long loops, especially if not yet coiled.
- Discussion of the degrees of freedom in electron coil movement, shells, preferred shell transitions, particle movement, energy capture, and muon and tau creation.

Rough Draft 26: 2022-01-31

- Appendix A updated with found experiment notes, now 12 pages long, page 75.
- "Instigator" used instead of "propagator" when the *mnp* Model sees a particle as the source of a field. "Spread" will be used instead of the verb "propagate" and the noun "propagation" for in-Model phenomena such as the lateral movement and spread of influences and fields.
- Appendix F, Unsolved Problems in Physics, revised to deprecate (show in gray) old material.
- Tightening up some lists reduced page count to 286.
- Updated tex engine and tools adds better fonts, no visible differences I hope.

Rough Draft 25: 2022-01-25

Thoughts on experiments the author would like to do or find already done well, added as Appendix A, page 75

Rough Draft 24: 2022-01-23

Appendix G, Journal of Future Results, expanded into blog post 45. Investigating current tools leads to deprecation of the proposal but promotion to the start of the *mnp* Journal of Negative Results with an explanation of saving designs before experiment and data before analysis and publishing and then (lightweight) publishing of negative or inconclusive results, page 247.

The internet criterion added to Criteria for Success, page 11.

This draft is being pushed out because the Post references the changes to Appendix J, the *mnp* JNR, of the pdf.

Rough Draft 23: 2022-01-20

First round of editing completed on the main Document. Much remains to be done. Blog post 44 on quark and particle structure grows out of Appendix B's 18F09 Beta + Decay paragraph. Incorporated into the main document. Gathering

the experiments proposed by the author into a new chapter remains.

Rough Draft 22: 2022-01-12

Blog posts and other thoughts are being incorporated into the body of this document, toward "bringing it up to date."

In deference to the particle physics term of art "cross section" as probability of a specific nuclear reaction, terms like braiding, stranding, and lay/layout have been used instead of the architectural or civil or mechanical engineering meaning of "cross section."

Very Rough Draft 21: 2022-01-06

MANY years have passed, many blog posts have been posted, many thoughts have accumulated, many courses have been taken. Some changes to the *mnp* Model have been incorporated here. The blog posts have been included. Draft 21 has been "compiled and linked" but not "debugged." Much needs to be reviewed and changed.

Increased mass of quarks is seen as fellow traveling *m*-filaments. These additional filaments add to the strength of strings as strings straighten.

The increase in electron energy in shells is seen as possibly fellow traveling *m*-filaments.

Fhotons (the real particle and instigator of fields in the wave-matter duality that makes up photons) are seen as dense bundles of *m*-filaments that get wider as the square of the mass and energy goes up and hence shorter by the inverse of the energy. Preexisting filaments in the electron shell make formation of a fhoton faster than recruitment of loose *m*-figments would allow.

Compton wavelength begins to have a real, physical, explanation.

Notes on computations needed by the *mnp* Model are expanded, still not encyclopedic in coverage.

The digression of the February 4 blog post on geometry, topology, and combinations is included.

The *mnp* Model is at another ecological narrowing, similar to that posed by the earlier Ring Model which did not move or accelerate well. The coiled loop Model evolved to save the concept of simple sub-structure from that philosophical challenge to the Model's existence. The author is comfortable with the qualitative explanantions for most phenomena.

However, the current challenge to the Model is posed by the single photon interference experiments. How Bohm's pilot wave travels fast enough to be strong enough to affect the single photon is not clear to the author. While the explanation is the next "crux move" as the *mnp* Model attempts to scale the heights of understanding, that explanation may need time to emerge. No emergency. In the scheme of things, other developments can proceed. The universe will still be here, and the sun will rise whether or not we can understand quantum effects in strong gravitational fields.

Draft 20: 2012-12-12

Weak and Strong Force unified as the completed and interrupted charge loop exchange respectively. Blog post 2012-12-11 in Appendix C also addresses quark selection, why certain triplets of quarks are stable, why left handed spin, why up and down predominate. Not yet fully integrated with the body of the paper.

Changes to some Unsolved items, Appendix A, which still needs major review.

Draft 19: 2012-12-03

Abstract updated, hopefully removing unfounded claims.

The November and October 2012 blogs (page 93) have Model shaking changes and thoughts that have not been entirely incorporated.

Separation is the new name for the tendency of the basic entities to stay separate.

Chapter "Thinking in *mnp*" (page 45) now starts with a discussion of the mental leaps required for a theory, for any structural theory, for understanding *mnp*, for developing and adapting *mnp*, for physics, and for being human.

Electrons are pictured as coiled loops of charge material makes quick expansion, shell changing, and tiny free space sizes conceptually plausible. Rings were a useful stepping stone in the development of the Model, but do not move well enough to be retained.

Quarks and quark generations are understood differently. Each generation of +- 1/3 charge has three (or more for the larger quark) variants while each generation of +-2/3 charge has one variant. Strange is seen as the third variation of Down. Charm and Beauty are seen as the second generation of quarks. Top t would be paired with an even larger o (Over the Top). Why quark pair or triplet combinations would prefer to balance to be neutral or match the "elementary charge" is not clear.

The new *mnp* Loop Model allows particle interaction to be discussed through tabulation of "charge material" and tracing loops through the interaction, and sees "virtual photons" as (real, physical) evenly balanced numbers of loops of charge material. The Model accepts that 6 n loops and 6 p loops traveling could reform to be an electron and a positron, but also accepts that energy or light could rarely recruit n loops and p loops for form electrons and positrons in areas with existing fields but no recent particle interactions. (not fully developed)

Neutrino basic structure is more complicated and is not ready for prime time. Neutrinos could "grow" over time with accumulation proportional to their mass, which leads to "mass squared" effects. The muon neutrino as two loops of opposite charge material is easy to picture, but the electron neutrino and the "extra" from neutron to proton decay is harder to picture. (not fully developed)

Basic Georgi and Glashow SU(5) theory of Grand Unification might still be viable if it has omitted only the effect of surrounding electrons and protons on a proton. This would reduce the decay probability of a proton, which does have the effect of removing a much sought proof, but leaves the theory viable. SU(5) theory may not be terribly compatible with the *mnp* Model, though the charge material conservation of the *mnp* Model would allow proton decay to e^+ and $pion^0$. The challenge for the *mnp* Model is to understand why that decay does NOT occur! All theories and models attempting unification need to pick their battles and not try to map the unnecessary. In this regard, all unifying theories are kin and can benefit from the identification of superfluous complications. Added to the end of "unsolved problems".

Cooper Pairs aka Dirac Binding moved to Appendix B. Notes on the fine-structure constant in abeyance pending determination of the size of a free electron, whenever that occurs.

Much superseded material moved to the "Journal of Negative Results" page 247. The blogs appendix has been split into two: recent (page 93) and older material (page 221). The recent blogs may be of higher quality than this draft.

Nomenclature Notes

In general, the author prefers to avoid terms already used in physics for new concepts. This will minimize confusion, explanation, and the need for readers to unlearn or overlay existing concepts. The author does feel that "structure" is best used for the *mnp* Model view of matter and fields. Those unwilling to overlay the present meaning with the meanings in quantum theories can prefix "sub" whenever this document uses the word "structure."

The author is still considering whether to retain Axis (aka Torque neè Spin) or just to go to Axis for the basic attribute of figments that leads to electro-magnetic effects. Admitting that early documents used Spin and that the author still thinks of spin may ease the transition to Axis.

Draft 18: 2012-10-18

New image of matter with charge structure as a flat coiled filament rather than adjacent rings. Filament takes a larger role in the description of *mnp*.

Terms Axis, Axis Alignment, Travel, and Travel Alignment used for the tendencies of figments to align by axis (charge) and travel direction (gravity)

Some editing of sections, very old material removed, untestable stories removed.

Draft 17: 2012-08-22 not released

Document source converted to latex using kile. Unfortunately, a change in format does not improve content.

Introduction, outlining the development and documentation of a model, added. The remainder of the document is not yet divided accordingly.

Experimenting with replacing Spin with Torque or Axis. Axis (aka Torque neè Spin) is the general concept that figments have an attribute that influences and is influenced by that attribute in other figments. The author still likes the concept of

"spin" that interacts with other figments depending on how close the figments are, though the mathematics of interactions may eventually lead to the conclusion that figments behave more, for example, like disks.

Axis is a vector relative to the figment location that has, for the author, the same useful connotations as spin, but has the naming virtue of not conflicting with Quantum Mechanics ideas of spin. Nor of orbiting electrons.

Filaments introduced as a possible intermediate to rings that form for electrons and other planar and bulbular structures. The possibility of forming bulbs of filaments curved much as rings have been but without the clear boundaries when expanded as electron shells and quarks added. Speculation about sideways movement by the front part of photons and by filaments added.

Blog and Forum entries updated (through May). Gravitational field comments most updated there. Gravity is very unfinished business, but may be the first to yield to calculation.

Notes on the Unsolved Problems in Physics revised very slightly, in need of much more review.

Appendix six and seven removed.

Draft 16: 2012-03-30

Gravitation will require more thought in the *mnp* Model. General Relativity's suggestion that clocks stop completely for matter entering, even by free fall, into a black hole, poses extreme difficulties. Wags might suggest this issue is a show stopper. The resolution seems to be that gravitational potential causes sideways movement by the figments without affecting the spin axis with the net speed remaining c. The axis of spin is no longer parallel or perpendicular to the line of travel. As with movement, this leads to time dilation and length compression. Mechanisms for potential as different from acceleration are not fully developed.

Of course, time stopping completely and distance compressing to 0 pose challenges to other views of black holes as well, including the hope that "information" is conserved. The considerations of gravity is not complete, and the blithe tone of some musings still in this document may be currently out of place. The author's experience with the tests of Special Relativity offer glimmers of hope.

Some drawings have been redone with a vector graphics editor, are more scalable, and may be slightly easier to understand.

Chosen blog articles are included as Appendix Three.

Two stories of the start of the universe are included as Appendix Six and Seven, both based on the *mnp* Model and both using the same "new physics" but taking orthogonally different perspectives.

Draft 15: 2012-02-06

Additional criteria for a "Theory of Everything" known here as "The Big Five" included.

Further sketches of how electro-magnetism works, how the second half of a photon with opposite polarity follows the first, and how interference and diffraction work.

The MOND (Modified Newtonian Dynamics) data on rotation rates in spiral galaxies and a0 are seen as supporting the quantization of gravitons.

Gravitational potential is seen as a redirection of figments in rotating rings, analogous to movement but with Traction pulling the figments back into plane. Time dilation is an inherent part of that redirection, with length contraction probably also involved though not yet experimentally confirmed for any theory.

Investigated some "one-way" tests of the speed of light. Length contraction is very difficult to find at earth or solar system based scales, given that time dilation occurs. So *mnp* is still "Possible but not proven"

Simultaneity and Emergence discussed. Simultaneity may be purely classical in the *mnp* Model with every location and every entity having a history even when that history is unknown.

Next steps - simulate light and electro-magnetism, better drawings. Now that parallel charges attracting and the coherence of photons is covered, attention from physicists can be solicited.

Draft 14: 2012-01-24

Non-relativistic explanation for Michelson-Morley experiments and the many precise successors. Movement relative to the Cosmic Background Radiation may be absolute. Author admits the *mnp* Model depends on space with no structure (or space uniformly expanding or contracting). Increasingly red shifted light from the early universe may have a different explanation in the Model. Author admits the *mnp* Model may not quite match modern descriptions of rest mass and mass at velocity. The *mnp* Model sees "resting" mass of neutrinos and perhaps free electrons going down as the kinetic energy goes up. The biggest gap in the *mnp* Model at this time is a clear explanation of the effect that causes photons to stay together (the second half to actually follow the first - why it has spin direction opposite the first is clear), why diffraction (which bends light much more than gravity) and why parallel moving charges attract. When those are explained, the Model will be worth some attention. The mechanism for gravity's effect on figment rings must match gravitational time dilation. That correspondence should help provide a basis for that modeling.

Draft 13: 2011-12-12

Fine-structure constant (actually the square root) investigated and posited to result from the faceted ring structure of the electron. Started with 137 being somewhat less than 4 pi squared. Clarification of "resting mass," which goes down as a particle's velocity increases.

Draft 12: 2011-12-09

Nomenclature is clarified: "forces" applies to traditional physics, "effects" applies at the figment/entity level described by the *mnp* Model. Still looking for good words for figments and effects. Try to clarify and expand relativistic movement, momentum, mass. Release notes added.

Draft 11: 2011-12-02

Abstract on relativistic travel, time dilation and length contraction. Minimum wavelength for light due to m-figment radius of Spin effect. Discussion of the Standard Model and the *mnp* Model. Quark thoughts moved to Appendix 2. Old thoughts about relativity moved to Appendix 2.

Draft 10: 2011-12-01

Editing. Time dilation and length contraction computations. Discussion of movement, momentum, rest mass.

List of Figures