Comments on "Dirac's Equation and the Sea of Negative Energy"
and Techniques for Verifying Projections from Hyper-Dimensional Particles
Article by Don Hotson published in issues #43-44 of **Infinite Energy**, 2002
Review and Comments by D. A. White

Don Hotson has recently written an article exploring Dirac's relativistic wave equation and theory of a sea of negative energy. In this article Hotson independently has arrived at some of the important insights into the foundation science that I call Observer Physics (OP). Dirac was a strong inspiration underlying the development of the OP theories. I recall back in the late 50's the deep impression I got from first encountering Dirac's ideas of the negative energy sea and his remarkable prediction of the positron.

I have a few helpful suggestions for Mr. Hotson's approach that I will mention below, but generally I agree with most of his main points, data, and logical arguments. I will have to make a few revisions to OP based on points he brings up, but generally we are in amazing agreement. The OP models of the electron and proton and neutron plus ways of linking the Dirac equation with recent discoveries will definitely help us bring a revived and refined vision of Diracian ideas into the lab for verification.

Hotson is right that we need to step back and look at all the theories we have concocted and evaluate them from fundamentals, testing them logically and objectively against our best data, with no fear of letting go of a paradigm when it is proven wrong. Scientists tend to be cranky, but that is no excuse for becoming afraid to do real science. Sometimes people who appear trained as scientists sell out to political and/or economic interests, but they should realize that sooner or later the facts will discredit them and that will lessen their status as scientists. The politics of fear can lead to abuse of science. On the other hand, the appearance of new data that disproves your theory is not a disaster. As Hotson points out, "With new discoveries made almost daily, no theory can be expected to be the final answer." We are all on a learning curve. As scientists we should NEVER question new data, especially if it contradicts a recognized theory. Replicate the experiment that gave the data and devise other ways of testing both the data and the theory. If the anomalous data stands up to testing, then the theory changes -- unless you want to play God and redo the universe to fit your theory. That's always a possibility, but then you will have to take responsibility for how the whole thing shakes out. If the data fails the tests, then we see if we can account for the aberration of the data. Were the instruments off? Did other factors, objective or subjective, distort measurements? And so on.

Here are some suggestions for refining Hotson's interpretation of Dirac.

Hotson manages to go through his whole discussion of a unitary Theory of Everything without bringing up the consciousness of the observer. In a personal communication to me he has indicated that he has some ideas about this, but opted to omit them from his article. Perhaps he will bring these ideas up in another venue. I look forward to what he has to say on this subject. By sticking mostly to waves he avoids getting too involved in the collapse of the wave function and the role of the observer, subjects that go

right to the heart of QM. As Wolf has already suggested (**Star Wave**, 1986) we can interpret the imaginary (i) aspects of the psi waves, or perhaps the conjugate (Starred) psi* wave as observer consciousness. OP develops these ideas much further, building on the discoveries of the ancient yogis, Maharishi, Palmer, etc. and integrating them with modern QM.

Hotson criticizes the unobservables that populate the theories of the Bangers (supporters of Big Bang theory) and SMers (supporters of the Standard Model) as a bunch of fudge factors, but then gives us an unobservable and UNDETECTABLE ether and a set of unobservable imaginary spin dimensions. These are fudge factors in the grand old tradition of the SM and BB theories. I suggest that we work on ways to detect the ether and the invisible dimensions. OP takes the viewpoint that anything we claim has existence must in principle be observable in some manner. If we can only observe indirectly, then we take the observable features as the definition of the non-observable that we have postulated. By observation we mean some mode of experience, direct or indirect.

Hotson proposes that Dirac' s sea of negative energy is the ether that scientists have debated for so many years. He goes further and describes the whole universe as a giant Bose-Einstein Condensate (BEC). According to his interpretation positive energy in the form of atoms and their interactions represents the heat exhaust from the process of cooling the cosmic BEC. This does not explain the mechanism for the cooling process. If the mechanism is the obvious standard procedure of adiabatic expansion, then he is back to a Big Bang hypothesis. Like the Bangers he then also has to explain what sets up the initial conditions of the Big Bang. According to OP the problem with the BB theorists derives from their failure to understand the nature of Time as it interacts with consciousness. Of course this is due to their systematic avoidance of any consideration of consciousness in their theories. However, they presumably consider themselves conscious when they frame their theories. And this is where the problem arises. They frame their theories from the viewpoint of a human being in a little body on a little planet living somewhere between the arbitrarily defined 20th and 21st centuries "A.D." They project time in terms of earth years. They forget that human consciousness has only been around on this planet for perhaps 3 or 4 million years, and the individual life span is usually less than 100 years. The cosmos operates on a time frame of billions of years. A day in the life of an earthling is practically nothing compared to a Day of Brahman (the life span of consciousness during an entire universe). A Day of Brahman is practically nothing compared to the total universe cycle.

OP brings up the principle of the Poincare Peak to solve the problem of where the extreme bias of the Big Bang comes from. The brilliant mathematician and theoretical physicist, Henri Poincare, pointed out that if the universe is quantum mechanical and oscillates randomly according to its Tau Clock pace through all its possible permutations, then sooner or later it will automatically configure itself into various highly biased states. Some of these will be biased enough to form black holes. Others will be biased enough to produce the concentrations necessary for Big Bangs. The usual mode of ridiculing this idea is to talk about how impossible it is for all the molecules of air in a room to

suddenly gather into one corner. Several thousand years ago the Taoist eccentric Zhuang-zu pointed out that a little sparrow hopping around in the bushes has no idea what it is like to be a giant Roc that can fly from North Pole to South Pole with a flap of its wings. This is the problem of the relativity of viewpoint in consciousness. There are two basic solutions to the molecule problem. One solution is simply to wait patiently for the Poincare Peak -- an event that will surely arrive as long as the system remains intact, undisturbed from the outside. The other solution is to intervene from outside the system. We pump the room full of coherence until it forms a Bose-Einstein Condensate. This is equivalent to saying that we chill the room until the air freezes and drops into a corner. Where does the coherence come from? It comes from the Will of the Observer. He simply decides in a coherent manner how he wants things to be. He takes a viewpoint in which there is no interference with the desired notion. The highly biased state is highly unstable and will immediately expand and explode unless he deliberately pumps the state with coherence.

This situation is exactly analogous to the function of a laser. We pump the nonlinear medium of the laser to invert the population. That means we deliberately raise its excitation level to an extremely biased high state and then let the system explode, cascading back to its equilibrium state. It takes energy to pump the laser and intervene into its natural cycle of spontaneous absorption and emission and generate stimulated absorption and emission.

Therefore the BLGs (Big Lazy Guys) simply check out of the Quantum Clock Mechanism. They hang out in a multi-dimensional realm of undefined awareness that we might call the Eternal Presence from which they can assume any viewpoint in space-time or any other dimension that they prefer. This is an altogether much more efficient and effortless procedure. A good mathematician has a feel for this, because he is very adept at this procedure in his mind. He hangs out in a mathematical manifold from which he can define and explore any mathematical system he likes. He is not necessarily quite so adept at this in the creation of his physical experience of reality. Physicists are hampered by the belief that there is a "Real World Out There" that is just a certain way and that they must describe with some equations and verify with some experiments. They like to use mathematics but are loath to adopt the true freedom of a mathematician toward their own field of exploration.

Another problem with Hotson's interpretation of Dirac's program and also with all of modern physics is what to do with the funny photons. Hotson calls photons ephos. Modern physics has photons travelling magically across empty, etherless space. In Hotson's interpretation photons are quantum waves that propagate across the BEC ether. This is an interesting idea, but there are still questions about how Hotson's photons can transmit across the BEC ether. If we pack the ether with negative energy electrons, then photons would seem to propagate instantaneously. Line up some marbles in a gully. Push a marble at one end, and the marble at the other end appears to move simultaneously. Actually it does not do so. The interaction is just too fast for you to measure. The impulse of your push must travel as a wave through the marble medium. The efficiency of the interaction between the atoms determines the speed of the wave.

However one might wonder why such waves would move at c for all observers.

The OP solution to this question is simply that photons do not propagate. It is all an optical illusion in the observer' s mind created by his resistance to certain experiences. Once we realize that photons do not propagate, we eliminate the problem of the undetectable ether AND the problem of how photons can propagate across an apparently empty medium. (Even Hotson admits that we can not detect the ether by any physical means.) We also resolve the paradox of how photons seem to propagate at the same speed for all observers. If they are not propagating, then by definition they all propagate at the same speed. The only problem that remains is why they appear to propagate at the particular constant speed c. The answer to this question is that all observers observe by means of attention in the same medium of awareness. Photons are the reflections of attention particles. The mechanism and medium are the same no matter who observes or when or where they observe. In other words, the speed of photons is something that gets defined as one of the basic constants of the universe.

The basic physical constants are very few: h, c, G, e, and eo establish all the physical relationships between mass, energy, space, and time. Planck' s constant sets the inverse ratio of energy to time (or momentum to space). Light speed sets the ratio of space to time. The Gravity Constant sets the ratio of potential energy through a distance to two interacting neutral masses. The charge constant sets the ratio of mass to time, and the permittivity constant sets the ratio of mass to space.

It is not clear how motion can occur in the Dirac field equations. They would seem to just sit there. Somebody has to give them a push to get things started. This is a problem with all field theories. I am glad to see mass coming out of Hotson' s interpretation of Dirac' s equation. OP has a definite theory of how to get things moving. All appearances of motion derive from the observer creating and shifting viewpoints. The observer can create the appearance of automaton systems by designing belief programs that contain attention feedback loops. He then partitions his awareness and delegates part of his attention to operate these loops. He persistently runs them as subroutines in background awareness. Habits are what we call background awareness. He can always bring a background subroutine back into the foreground of deliberate primary attention and then turn it off or modify it. This is exactly what you do on your computer when you open up the control panel and change your default settings. Usually at that time you have to temporarily shut down other programs. Depending on the domain of influence of the reset parameters, you may have to reboot the system in order for the system to function under the new default settings. Thus the observer is responsible for all appearances of motion. The physical constants described above are the core settings for the current conventional universe that we are playing in.

In his article Hotson shows how we can obtain the proton-to-electron mass ratio from theoretical considerations. OP derives quite accurately not only this ratio, but also the specific masses of the proton and the electron. Of course we can only measure these masses in terms of the universal constants that define our cosmos.

Hotson brings up a lot of the problems with the theory of cosmic redshift, but that does not mean that optical Doppler is a myth. Astronomers detect blue shifts from objects that are approaching us, such as some aberrant galaxies and, of course, the side of a galactic disk that turns toward us, not to speak of radiation from highly accelerated particles in the labs. I am quite glad to reconsider the universal Doppler idea and pursue further research to test the idea, but see a necessary physics for local Doppler. Special relativity does seem to hold with regard to particles and EM phenomena.

I like Hotson' s approach to the problems of galaxy formation and galactic rotation. I suspect that his interpretation boils down to the way I treat galactic rotation curves, and adds another logical reason why the formula I use is correct and all the unobservable Dark Matter speculation is fantasy. See my paper on MOND and Dark Matter and rotation curves for the details of how to calculate galactic rotation curves.

If the universe really is a steady state system and has existed for an indefinite length of time ticking away at its universal absolute quantum time tau rate, there should be evidence of that in the form of some really OLD stuff out there. Let' s find some. The BEC substrate (cosmic consciousness) must be immortal or nearly so. The essential medium of this substrate -- what I call Undefined Awareness -- exists beyond time and space, although it willingly accepts such attributes. Some of the really OLD ONES should include forms of consciousness that go right off the scale of evolution -- perhaps characters that make GOD look like a kid in a playpen. We may think of ourselves as the pinnacle of evolution on local earth, but we may be hardly even up to microbe level in comparison to the OLD ONES. Let' s figure out how to get in touch. Having been around so long -- maybe forever -- the OLD ONES and TIMELESS ONES must be pretty good at attaining and enjoying a high quality of life. They may have some helpful suggestions to bring us out of our self-inflicted messes (SM). They certainly would be harmonious and friendly, since the destruction of others usually ends up leading to one' s own destruction -- a pretty crude approach to survival and evolution. Scientists note that most species on this planet are extinct.

Hotson mentions the idea of three dimensional steps by which our visible world emerges (Pt. 2, p. 23. I outline a similar unfolding. For a brief summary, see the summary in my review of McCutcheon' s Final Theory, available at www.dpedtech.com. The articles in the OP volume explore this theory in more detail. Hotson describes the steps a little differently than I do since he interprets gravity as an EM phenomenon, which is OK from his particular unitary viewpoint. 1D --> EM field, 2D --> angular momentum epos at speed c, 3D --> nucleons and atomic matter.

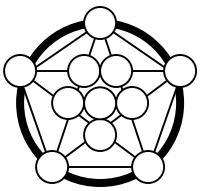
I suggest that we take a good hard look at Dirac' s complete equation in the light of the current theory of 4-wave mixing phase conjugation, a paradigm that I consider one of the foundations of OP. Like Dirac' s wave equation, phase conjugation also is a completely general theory of waves, a true Theory of Everything. Many people seem to think of phase conjugation as a specialized aspect of optics -- lasers, holography, and that sort of thing. I point out in OP that de Broglie' s demonstration of the wave aspect of matter means that we can talk of 4-particle mixing. This is a key part of my approach to

modeling gravity. The wave equations for phase conjugation theory may turn out to be basically the same as Dirac' s relativistic wave equation. They certainly do a lot of the same things. Optical phase conjugation is a well-respected field with lots of real-world observable applications. AND it is only the tip of the iceberg. The basic wave equation for phase conjugation forms a totally general mathematical model of reality. We merely need to identify what kind of data we want to put into the equation.

Hotson' s theory of inertia is quite good. In his view it seems inertia is indirect evidence of invisible dimensions. There would be ways to test this. First we have to establish evidence of the so-called invisible dimensions. A dimension is anything that we can measure against a standard. We can treat these mathematically using n-ion algebra and matrices. But there is no reason why the dimension should be invisible. We can not see heat, but we can measure it with a thermometer and represent it numerically against a standard as a temperature. If a neutron is a 10-dimensional hyperspace energy bubble, then eleven points will define it.

Geometry teaches us that two points determine a line, and two intersecting lines (3 corners of a triangle) determine a plane. Four non-coplanar points determine a 3D space (tetrahedron), and so on. If this is the case, and if the neutron is built from 10 dimensions, we would expect to find that it contains 11 component particles. This would be experimentally verifiable evidence for its 10 dimensional geometry. When we project such a hyper-dimensional figure into a 2D plane, we see a center point within an inverted pentagon within an upright pentagon -- the magician' s pentagram and the suit of pentacles in the Tarot deck.

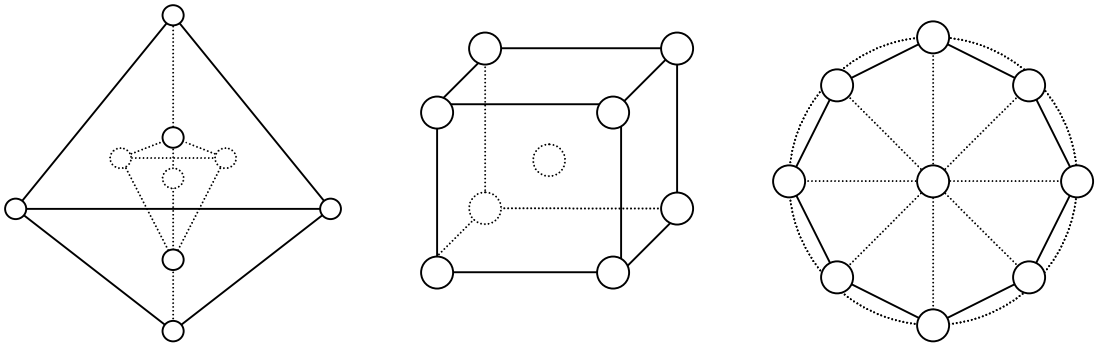
2-D Projection of a 10-Dimensional Neutron



Hotson also correctly predicts that both the neutron and proton contain positrons. In **OP** I make the same prediction. According to my calculations the neutron consists of exactly 11 subatomic components: 2 quarks, 1 antiquark, 2 positrons, 2 electrons, 2 neutrinos and 2 antineutrinos. Since these 11 components are all in intimate interaction and function as a single particle, we must represent them mathematically as a product of the 11 factors that represent those components. Almost all of the mass is concentrated in the quarks. The charge is in the electron/positron vortexes. The neutrinos just add spin momentum. Therefore, when we multiply the factors together, the product of the three quarks gives us a value very close to the rest mass of the neutron. Two quarks have positive energy, and one quark has negative energy -- i.e. is an anti-quark. The product of the masses of the electron/positron factors comes to unity. The pair of electrons have positive energy and opposite spins forming a Cooper pair. The pair of positrons have negative energy and opposite spins, forming a Cooper anti-pair. The charges (spins) all balance out, as do the neutrino and anti-neutrino spin momenta.

A proton is a neutron in which one electron and one antineutrino have shifted out to larger orbits in order to satisfy the Heisenberg requirements for a single stable nucleon. It thus has 9 central components plus two peripheral components. The loose antineutrino wave packet spreads out far to allow the remaining components to keep their compact standing wave bubble stable. Projected into three dimensions this particle with 9 components looks like a center point inside an inverted tetrahedron inside an upright tetrahedron or a center point inside a cube. If we squash this 3-D projection further down into two dimensions, it looks schematically like an octahedron with a center point.

3-D and 2-D Projections of a Hyper-Dimensional Proton



We have to remember that the proton projection has an electron and an antineutrino forming outer energy shells. I did not draw them in the above sketches.

* Bu^2 = H c a / G. (H = h-bar; a = fine structure constant = 1/137.)
* Bu^2 = e^2 Ao / As P eo G.

Ao = area of circle with radius Ru = 1 m.; As = area of sphere with radius = 1 m.: eo = permittivity constant. Here we simply substitute Bohr' s derivation of the fine structure constant: (a) = e^2 / 4 P eo H c. However we can derive each result separately from different lines of reasoning. The first case argues from exploring the theoretical microscopic limit to the physics of black holes, and the second derivation argues from the ratio of the electric force (Coulomb' s Law) to the gravitational force (Newton' s Law). The experimental verification of the mass in the latter case was actually discovered long ago by Robert Millikan in his famous oil-drop experiment when he found out that charge occurs in discrete quanta. The inertial mass of an oil drop with a single electron charge on it that will exactly levitate in his magnetic field indirectly gives us the mass of the hidden Higgs particle. Millikan realized the significance of the charge quantum but missed the importance of the mass of the oil drop that carried that charge. That mass marks the cross-over point between the electric and gravitational forces. (See **OP**, ch. 9-10.)

* Bu = (4 P eo) (Ss) (As / Ao) = 1.86x10^-9 kg.

Here Ss = the volume of a sphere of radius 1 m., and P is pi. The expression (4 P eo) is of course the constant that shows up in Coulomb' s Law. Ss, As, andAo are all

fundamental constants of the geometry of circles and spheres. The ratio As/Ao is independent of radius, but Ss takes the magic radius Ru = 1 m. that we find in the formula for the proton. The expression P Ru = 2 P (.5 Ru), the wavelength of a specific photon helix, one circular loop around if it stays in place.

* Mp = (e/c)(P Ru) = Bu^2 Bd. (Mp is the rest mass of the proton.)
* Bu = 1.86x10^-9 kg. (This is an up quark.)
* Bd = 2.07x10^-9 kg^-1. (Approximation. This is an anti-down quark.)

The Bu and Bd quarks are bosons. The Bd has negative energy. All the components are nodes in the hyper-dimensional nucleon. Shortly we will give a more refined estimate of the negative energy of the anti-down quark.

The characteristic period (Te) for the electron is:

* Te = Me / e = 5.686x10^-12 s.
* Fu = c / P Ru = 9.55x10^7 s^-1.
* Tu = P Ru / c = 1.0472x10x^-8 s.

Fu is the characteristic quantum spin frequency of the electron neutrino with a radius of half a meter, or half a wavelength.

My independent derivation of the mass of the electron neutrino (Mne) is as follows:

* Mne = H / c %. (% = 3.16227766 m. = [10 m^2]^.5.)

The value % is a universal constant of distance that relates to the physical constants h-bar and c and stabilizes the fractal generation of space/time geometry. We get the characteristic period for this theoretical particle as follows:

* Mne c^2 / H = c / % = 1.054x10^-8 s.

As you can see this period differs from the inter-nucleonic neutrino period that we just derived in a totally different way by only a very small margin.

* % / P Ru = 1.006585.

This ratio apparently plays an important role in physics that needs to be explored experimentally. If we take the measured rest mass of the neutron as our standard, we have:

* Mn = 1.674954x10^-27 kg.
* (P Ru) (e / c) = 1.6789687x10^-27 kg.

The discrepancy from our theoretically predicted mass is a ratio of about 1/1.0023969. If we divide 1 m. by this number we get .9976 m. If we substitute this refined value for

Ru into our ratio, we get:

* % / P Ru = 1.0090067.

The fourth root of this refined ratio comes to 1.002244, extremely close to giving us the missing discrepancy. This suggests there is a fractal relationship here involving powers of the (%/P Ru) ratio. The separately derived theoretical period of the neutrino: Tne = 1.054x10^-8 s already suggests a fractal relationship, since h-bar (H) = 1.054x10^-34 kg m^2 / s. The constants H, c, and % form a trinity that echoes throughout creation in many scales and dimensions.

* (Tne) (H) = 1.11x10^-42 kg m^2.
* Mne = H / c % = (H Tne) / %^2.

So here are our complete formulas for the proton and the neutron.

* Mp = (e e^-1 e^-1)(Fu Fu Fu^-1)(Bu Bu Bd) (e) (Fu^-1).
* Mp = [(e <u>e e</u>)(Fu Fu <u>Fu</u>)(Bu Bu <u>Bd</u>)] (e) (<u>Fu</u>).

In the second expression we simplify the notation by underscoring the antiparticles. Mathematically we show the interaction of positive energy particles by multiplication and negative energy particles by division. Thus a particle/antiparticle pair reduces to a factor of unity and has no effect on the mass-energy of an interaction. The above formula gives us 9 components: 1 electron, 2 positrons, two neutrinos, an antineutrino, two up quarks, and an anti-down quark. We represent the electron/positrons as charges and the neutrinos as photon vibration frequencies.

Theoretically there could be any number of virtual electron/positron pairs in a proton. Why do we end up with 9 components? The quark bubble determines this. It starts as an overlapping pair of mini black holes that stabilize into a dynamic feedback loop. The overlap between the two quarks forms an anti-quark negative energy region. This gives us three quarks. The vortexes through which the energy flows form electrons and positrons. We must have one for each quark. But the vortexes must also loop around, so they must form pairs. This requires an extra electron to hang around somewhere. Each quark will have an antielectron, and each antiquark will have an electron. Each electron will have an antineutrino, and each antielectron will have a neutrino. It perfectly weaves together a balance between quarks, electrons, and neutrinos.

The proton and the neutron are the same particle seen from different perspectives. We simply rearrange the factors to show this. The small increase in the neutron' s mass over that of the proton comes when we include the extra electron mass and the helicity of the antineutrino into our laboratory calculations. The calculation of the proton rest mass ignores these. The tiny discrepancy between our predictions and the measured values can be easily handled in an adjustment of the anti-down quark' s mass, which we have no way to directly measure. We therefore work backwards from the measured neutron mass through the measured Millikan mass (the cross-over oil drop mass) to find the <u>Bd</u>

mass. We will use the following constant values:

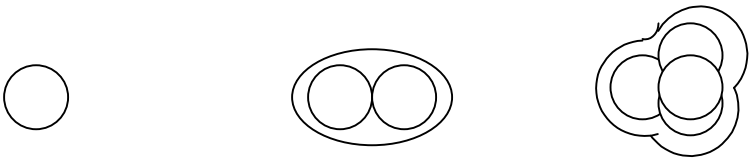
* H = 1.0545887x10^-34 kg m^2/s.
* c = 2.99792458x10^8 m/s.
* G = 6.672x10^-11 m^3/s^2 kg.
* a = e^2 / 4 P eo H c = .0072973564 = 1/137.035927
* Bu^2 = 3.4579x10^-18 kg^2.
* Bu = 1.859543x10^-9 kg.
* Mn = 1.674954x10^-27 kg.
  Bd = Mn / Bu^2 = 4.84385x10^-9 kg^-1.
* Mn = [(e e e e)(Fu Fu Fu Fu)(Bu Bu Bd)].
* Mp = [(e e e)(Fu Fu Fu)(Bu Bu Bd)] (e) (Fu).
* Mn --> Mp + e + Mne.

We find that the anti-down quark has a negative mass about 2.6 times heavier than the up quark. The exact value depends on our calculations of the other values since we can not extract this virtual bubble from the nucleon. However researchers have detected it as a bump vibrating around inside the nucleon. The leptons are too small in comparison to the quarks for our apparatus to detect them inside the nucleon. We can only detect them when they move outside the average nucleonic radius. The final expression shown above is the usual formula showing the equivalence of the proton and the neutron. The arrow shows that the reaction tends to move in the direction of beta decay -- i.e., the neutron emits an electron and an antineutrino and decays into a proton.

One thing that does not seem predicted by this formula is the left-handed helicity of the neutrino. Actually, what the formula shows is that the neutrino is not really a particle, just a particular photon resonance. The photon is its own anti-particle. The Fu and Fu will have opposite helicities. It just so happens that Fu has the left-handed orientation, so Fu has the right-handed orientation. As I discuss elsewhere in my analysis of the neutrino, this is an arbitrary result of spontaneous symmetry breaking that occurs when the primordial observer created primordial consciousness at the founding of this universe. It is a telltale trace of that cosmic event.

In OP I use Dirac' s energy sea and several other concepts and calculations to show how the neutron-proton bubble can maintain a dynamic equilibrium indefinitely. This equilibrium is inherently structured in the constant ratios under which our current universe functions (h-bar, c, G, e, eo) and the inherent structure of Euclidean geometry (pi and some other spatial relations.) The structure of these ratios is quasifractal and sets up a feedback loop that shields the positrons from the electrons by bulking them up to proton size. The stable positron bubble is armored with quarks. The up quarks are really a pair of heavy Higgsish background shadow particles that can be verified both theoretically and experimentally in a number of ways, the simplest being the Millikan oil-drop experiment. In the tradition of Dirac my equations also require negative energy to keep the system stable. Hawking' s formula for black hole radiation is an important key for understanding the internal thermodynamics of the proton system. I discuss this elsewhere in the OP articles.

The proton and the electron and the neutrinos are the only stable particles. All other particles decay. Anything other than a neutron decays extremely fast. That is because such so-called particles are really dissonant states of the nucleon quantum bubble. Any extra energy gets thrown off as radiation or leptons. The only way to build stable structures is in the same way that electron orbits build. They must be integral quanta of the original bubble. In other words, they must be integral multiples of the fundamental nucleon.

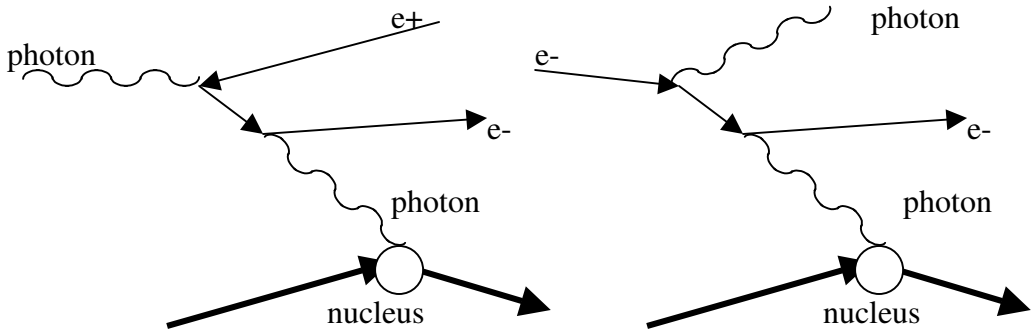


Single Nucleon Hydrogen Molecule Helium

The Helium atom forms a stable tetrahedron bubble with the two protons and two neutrons rapidly changing positions. They are really just rapid vibrations of the original nucleon bubble. The quantum harmonic resonance states only allow integral nucleon numbers, but the density adjusts the number of protons versus neutrons. The electron shells recapitulate the configuration of protons in the nucleus. Once we fully understand this structure, we will be able to transmute elements at will simply by adjusting the harmonic resonance states. The emerging field of controlled low temperature transmutation suggests that physicists are discovering this principle. Indications are that this will lead to unprecedented progress in the development of advanced materials and new energy resources. Many of these processes will result in the sloughing off of excess energy as the resonance states shift. This occurs because various resonant states become slightly off from integral values at different nuclear densities. There is a nonlinear fractal aspect that comes into play.

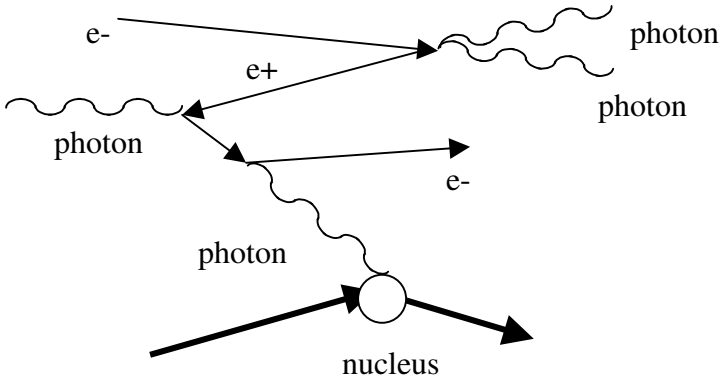
In my paper on Dirac-current positron generation I describe a theory of stimulated positron emission. Mastery of this procedure may lead to controlled proton decay, although probably it will temporarily transmute virtual positrons into real ones much as we do currently with the common procedure of pair production. The model I describe is analogous to Einstein' s (1916) wild but elegant and simple theory of stimulated photon emission, an idea that eventually led to the discovery of lasers and optical phase conjugation -- technologies that are now transforming our daily lives. Einstein' s notion was that materials pumped by EM radiation form a dynamic equilibrium that generates a coherent quantum field. Whereas excited electrons tend to spontaneously decay back to their least excited orbits, protons do not spontaneously decay. However neutrons do. So although stimulated positron emission from protons may be a bit tricky, we definitely can (and commonly do) get positrons from the vacuum, and it should be quite easy to get all kinds of transmutation effects by stimulated neutron decay (stimulated beta decay.) The currently proliferating research on low temperature controlled transmutation (aka "cold fusion") is a good example of this approach. Certain electrolytic solutions pumped with an electric current may stimulate all sorts of interesting atomic transmutations via the simple process of neutron beta decay and subsequent rearrangement of nucleons. Electron-positron pair production is basically a kind of

reverse bremsstrahlung. Both processes utilize the interaction of EM radiation with nucleons.



Pair Production Bremsstrahlung

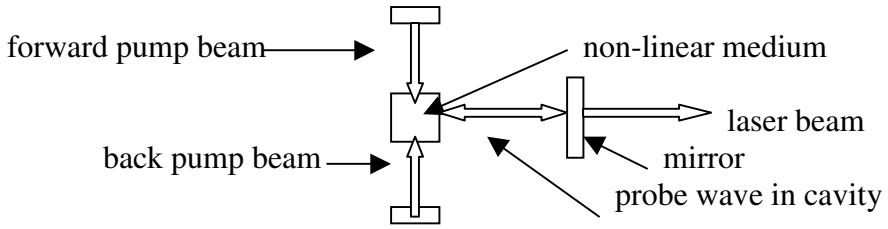
The above Pair Production Feynman diagram is not complete. We need to show what happens to the positron. The highest probability is that it will soon encounter an electron. This will lead to pair annihilation. Therefore the overall picture is that an electron has zigzagged sharply in space/time, reversing briefly to travel backward relative to our sense of time.



We can view this process as an electron so excited that it is in a "free" orbit relative to the nucleus it interacts with. During the interaction it cascades down to "free" orbits with lower and lower momenta relative to the nucleus. In both pair production and bremsstrahlung the electron also exchanges a photon with the nucleus. This is proof that bremsstrahlung must occur in the lower electron orbits. We can not see the photons that exchange with the nucleons in all three cases (pair production, bremsstrahlung, and stable electron orbits.) We can only detect as indirect evidence a slight disturbance of the nucleus and the electron the photon energy (linear momentum) exchanges between them. This phenomenon generates the quantum vibratory pattern of the electron shells and a portion of the nuclear vibration, both of which we can observe indirectly through various detection processes.

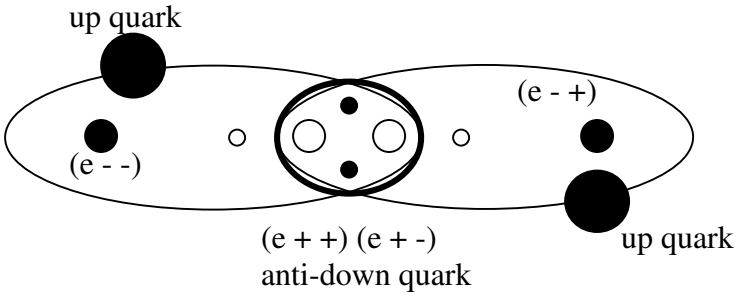
Dirac' s equation in its complete form predicts four kinds of electron. We have a positive energy electron with negative charge and spin up or spin down. We also have a negative energy electron (positron) with positive charge and spin up or spin down. The

up and down spins like to form Cooper pairs. The model I have arrived at fits this very nicely. I use what I call 4-particle fermion mixing. This is based on 4-wave boson mixing, but looks a little different because of the different properties of bosons and fermions. A simple example of 4-wave mixing is a laser. Here is a general schematic.



The key point to notice here is that both the pump and probe beams are bi-directional. They consist of phase conjugate waves that are coherent -- that is, strongly quasi-monochromatic. The beams consist of photon-antiphoton pairs that all match up and form standing wave patterns. The result is a time independent quantum bubble that transcends "ordinary" incoherent space/time. Photons are bosons, so the beams ride right on top of each other with no problem at all. They like that.

Now let us look at 4-particle mixing with electrons. The electrons are "point" particles. They represent vortex centers, the foci of an energy system that forms a dynamic equilibrium. We can think of our model as a tiny binary star system. The stars that you see pulsating and shining as they orbit each other are not the actual core of the system. The inner working of a binary star system consists of four invisible dynamos. Here is a very schematic drawing of such a system with our electron vortexes drawn in. This is a neutron. We label the electron with spin up (e - +), and the one with spin down (e - -). The positrons work the same way.



The whole diagram resembles a fractal tai-ji diagram. In this diagram you see the four electron types forming the foci for the orbits of a pair of up quarks. The figures are not at all to scale, and I have greatly exaggerated the elliptical shapes so you can see the relative component positions. The whole thing is much more compact and spherical. The tiny circles are neutrinos, the dark ones being positive energy whorls and the light ones being negative energy whorls. The positions of the up quarks actually are not so well defined. They smear around in the orbits forming a standing wave. Imagine the Tai-ji diagram.

The whole system is a resonant standing wave of electro-gravity. The two quark orbits overlap to form a positive charge anti-down quark. An anti-down quark is the same as an anti-up quark plus two positrons (one spin up and one spin down) and a negative energy electron that orbits outside the down quark nucleon nucleus and neutralizes one of the positive charges. A second electron neutralizes the second positive charge. In a neutron the second electron stays at or near its proper focus. In a proton the Heisenberg relation pushes the second electron out of the nuclear radius. The proton by itself lacks enough density to hold the electron in place.

The down quark is made almost entirely from negative energy except for the two poles of positive energy formed by the neutrinos. Its center of mass is right in the middle between the two positrons, but I have drawn it spread out to include the whole lenticular overlap region. The positive energy up quarks each have a negatively charged electron as a focus. The negative energy anti-neutrinos represent the helical whorls as the nuclear bremsstrahlung whorls in a helical path into a positron vortex.

The positive and negative energies are balanced. When the neutron beta decays, one electron moves out of the nuclear radius. It can be either one, and the electrons actually swap. The shapes of the p-orbitals show that the orbiting electrons routinely cycle in and out of the nucleus and undoubtedly alternate with the inter-nuclear electrons. The Heisenberg effect explains the difference between the up quark with an electron focus in place and the up quark whose electron has a distended focus. The only differences among all these particles is the relative positions they hold in the dynamic photon energy loop that forms the illusion of matter. How we classify them as up or down quarks is quite arbitrary as long as we see the eleven points of space/time energy that cooperate to form a 10-dimensional neucleon.

Each electron type has a neutrino sidekick of the opposite energy type. The up quarks are like giant neutrinos. They have no charge and are just loose whorls of energy like the electron neutrinos. Negative energy neutrinos are anti-neutrinos. Here is one way of grouping the components that gives us the quarks for a neutron.

* u
* d- = u, e - +, ue_.
* d+ = u_, e + -, e + +, e - -, ue, ue, ue_

.

A proton contains two up quarks and a d+ quark. The product of the masses of the three quarks equals the mass of the neutron. We use the product rather than the sum because quarks are bound inextricably into their interactions. If we could treat them as independent particles, then we could have instances where we sum their masses.

* H / Mn c = 2.1x10^-16 m.

This is approximately the radius of a nucleon. Since Mn is the resultant mass of the neutron, the action of its eleven components must on average occur within that radius. We can think of the neutron as a bubble of energy potential that is vibrating harmonically so that it has eleven vibration nodes.

The most important component of the nucleon is the electron quartet. So to understand the internal dynamics of the nucleon we must study the dynamics of the electron quartet. We know that the electron spins, and its spin involves a curious rotation of 720 degrees rather than what we think of as the normal 360 degrees. This rotation is a key part of electron 4-particle mixing. There are four rotations of 180 degrees each. So we can think of the electron quartet as a single electron spinning through four seasons faster than light so that it seems to our slowed-down senses to be four different particles. To get an idea of how the electron needs 720 degrees to complete one round, fill a cup with water and hold it in your right palm about a foot from your torso. Now, without spilling any water, rotate the cup 180 degrees clockwise. Your fingers now point toward your body. Now it gets a bit tricky. Rotate another 180 degrees clockwise by lifting your elbow up above your palm. Now you have completed a 360-degree clockwise turn. But your elbow started out pointing down, and is now pointing up in the air. Do another 180-degree clockwise turn, keeping your elbow up in the air. Finally make another 180-degree clockwise turn while dropping your elbow back to the downward pointing position. You can spin like an electron. The electron does the same thing. The only difference is that it flips from electron to positron during two half turns. We do the same thing by flipping our elbow from down to up position. In our analogy the finger direction represents spin orientation, and the elbow direction represents energy type (and charge type). During the rotation we can continuously turn the glass of water without spilling any water. We simply move through four separate modalities of posture instead of two. Practice this beer hall waiter routine until you have it down and you will get a feel for electron spin. It is a real physical procedure, not just a mathematical trick.

Go back and redo the exercise once more. Slow down and watch carefully what happens. When you complete the first half rotation, your fingers face inward, but the elbow is still in the down position. Then, when you rotate another 45 degrees, the elbow rotates 90 degrees. Add another 45 degrees to the palm, and the elbow shifts another 90 degrees. As the palm turns 90 degrees, the elbow rotates 180 degrees. Now continue with another 90 degrees. The fingers again face inward, but the elbow is still in up position. Add another 45 degrees to the palm, and the elbow shifts down 90 degrees. Then add another 45 degrees to the palm, and the elbow shifts back into fully down position. This is a remarkable mechanical feat.

We can further understand the electron' s internal dynamics by watching its external behavior, its body language. The electron has electric charge. If we propel an electron through a vacuum that is subject to a magnetic field, the electron will curve about in a circular trajectory normal to the magnetic field lines. This is the cyclotron ratio. Every charged particle obeys this ratio that results in a constant frequency of circulation for each charged particle of a specific mass.

* f = V / 2 P R = e **B** / 2 P Me.

Here P is pi, R is the radius of the cycle, V is the velocity, e is the electron charge quantum, **B** is the strength of the magnetic field, and Me is the rest mass of the electron. We must adjust the above version for relativistic effects if the electron moves close to the speed of light. We can do that by just sticking in the special relativity factor.

The cyclotron ratio has a certain weirdness that threatens to tell us something important about the structure of the electron (or the proton). Physicists love this ratio, because it allows them to control beams of particles in accelerators. The mass spectrometer is another useful application of the cyclotron. Any charged particle in a constant magnetic field in a vacuum will move in a flat circular orbit without any nucleus, and its frequency of cycling will be constant so long as the magnetic field is constant. Velocity is a ratio of space to time, and the cyclotron ratio is a relationship of velocity to space (or space to velocity). This means that it de-ratios the velocity ratio and separates space from time. In other words it gives us a nice quantum clock. This clock is a symptom of the internal structure of the electron. Electron spin itself is a constant -- the internal clock of the electron.

If we start with an electron nearly at rest and steadily increment the magnetic field as physicists do in a simple double-D cyclotron accelerator, the electron will move in an Archimedean spiral [R = a (A)]. R is the radius, (a) is a constant increment and (A) is the angle of rotation in radians. However, if the fast-moving electron enters a space with a constant magnetic field and filled with a gas such as water vapor in a cloud chamber, it will interact with the molecules and gradually lose its momentum. As the velocity drops, the radius also shrinks in the constant magnetic field according to the cyclotron ratio. Thus the electron takes on a corkscrew trajectory. The velocity and radius will continue to shrink until the electron regains equilibrium in a roughly circular orbit that is so small that it seems at rest amid the spaces separating the molecules. However, the molecules are moving about randomly, so they will perturb the electron and cause it to jiggle about restlessly once the corkscrew motion erases the electron' s forward momentum.

The tightness of the corkscrew depends on the strength of the magnetic field, and the density of the gas, and the strengths of the electric fields that disturb the cyclotron ratio.

This corkscrew behavior is a major clue to the internal structure of the electron. As the electron starts to spiral, the distribution of the electric field influences in the gas is statistically the same in all directions. Whichever way the electron turns it will have close encounters with electric fields generated by molecules. The electron thus finds itself in a roughly constant magnetic field and a roughly constant electric field. If we assume that an electron is made from a set of identical photons, that means that the electron' s internal environment must consist of constant electric and magnetic fields. As with the electron in the gas, the only thing that changes is the density. The cyclotron relation remains constant.

Photons translate in space/time according to the velocity equation. When they are in open space, they move at light speed (c), forming photon-antiphoton pairs. When photons move through a wave guide, the pairs split apart, and one member slows down while the other member speeds up. The product of the two members always comes to c^2. This is the real significance of Einstein's famous mass-energy conversion equation, E = M c^2 or E / M = c^2. What we call mass is really the inverse of the group velocity. What we call energy is the phase velocity. E = (M V^2) / 2. The masses cancel out. (M V^2) / 2 M = c^2. V^2 / 2 = c^2. The V^2 actually contains two different V's. One V is for the speed of the particle, Vg < c. The other V is for the speed of the particle's phase wave. Since the 2 is a constant, we can readjust the value of the phase velocity to include that constant, and just call it Vp. Since Vg is less than c, Vp must be greater than c. There are many other ways to derive this relation, but it is inherent in the principle of relativity. Here we simply show that the notion of mass is a meaningless token that physicists substitute for the observable, Vg. The phase velocity propagates along a line of sight normal to the photon velocity, because the wave front generates it, and the wave front by definition is normal to the photon trajectory.

One of the simplest ways to see this is to observe the behavior of radio waves in a rectangular klystron wave guide tube. The photons zigzag back and forth from side to side, reflecting down the tube from the source at one end. The zigzag path means that the actual forward progress of a photon down the tube is less than c. The photon's wave front sweeps along the klystron wall at the phase velocity. The geometry of this relationship ensures that the phase velocity in the wave guide always goes faster than light. At the cutoff point the photons simply bounce back and forth across the tube without moving down the tube. In that case the phase velocity runs parallel to the tube and thus becomes infinite. All the velocities involved in a wave guide are resultant interference patterns generated by scattering of photon wave bubbles throughout the tube. Hence they are all really group waves.

According to this analysis we expect the internal structure of the electron to be a disc-shaped wave guide. Recall that the cyclotron effect generates a flat circular orbit for the electron to move in. The center of this orbit is an imaginary axis that is normal to the cyclotron orbit and parallel to the magnetic field vector **B**. This tells us the fundamental structure of the electron. We do not need to build huge accelerators to see into the interiors of subatomic particles. We only need to observe closely their orderly behavior under simple, well-defined conditions.

So now we know that the electron has a disc shape with an imaginary axis spindle through its center that generates the appearance of its magnetic poles. The corkscrew motion of the electron in the electric field tells us about the detailed structure of the disc. Electrons emit and absorb photons, so perhaps they are built entirely from photons. Perhaps they are simply a flow of photons. From an electron's viewpoint, it emits photons and absorbs antiphotons. Antiphotons are simply photons moving backward in space/time.

The cyclotron orbit and the corkscrew path are wave guide effects. Lacking such influences a free electron in open space just keeps moving forward under its given momentum. We can imagine that the electron's cyclotron orbit is a klystron bent into a circle (actually a spiral). The cyclotron orbit is analogous to a black hole. The electron can not escape. The corkscrew path and the electron's disc then represent a klystron tube bent into a spiral shape, sucking the electron (or the photon) in toward a singularity just like a black hole. In fact the electron is a mini white hole because it habitually spits out photons. It is a time-reversed black hole.

We know that photons emitted by an electron leave the de Broglie radius and move into open space at velocity c.

* Redb = (H / Me c) = 3.86x10^-13 m.

Redb is the electron's de Broglie radius, defined as Planck's constant (h-bar) divided by the light-speed momentum of the electron. This radius is larger than a proton radius, so it must be the minimum radius for an electron. It is also then the minimum radius for the ground state electron orbit around a proton (hydrogen atom.) It turns out that other factors are involved because of the interaction of the electron with the proton, so as Bohr showed, the minimum hydrogen ground state radius is around two orders of magnitude larger.

* R1 = h^2 eo / P Me e^2 = 5.29x10^-11 m.

In order for the ground state electron of hydrogen to emit a photon in the outward direction, it must first absorb an antiphoton and move up to an excited orbit. However, the electron continuously emits photons that enter the proton as bremsstrahlung. Since the electron is not constantly absorbing antiphotons from outside its orbit, in order not to lose momentum and spiral into the proton, the electron must also continuously absorb antiphotons transmitted to it by the proton. The two flows must balance or else the electron will leave its orbit and quickly fall into the nucleus. But Heisenberg uncertainty usually will not allow this, so there must be a constant energy loop between the electron and the nucleus.

Our theory is that we have a wave guide effect that splits the photon-antiphoton pairs into separate components. The orthogonal relation between the photon trajectory and the wave front -- the electric field and the magnetic field -- controls the relation between the photon and antiphoton in the wave guide. We want to find a relationship that allows a photon to move through the spiral wave guide of the electron in such a way that the relationship of the Velocity Equation remains steady.

The simplest way to do this is by means of a phi spiral. The phi relationship allows us to keep a constant ratio as the photon spirals out of the electron vortex. We must also take into account a refraction effect as the photon moves through decreasing self-imposed densities as it progresses outward from the center of the electron.

* c = f Lo (f is photon frequency and Lo is its wavelength in open space.)
* Ve = f Le (Ve is the photon velocity inside the electron.)
(Le is the wavelength.)

Notice that the frequency remains constant as required by the cyclotron relationship.

* n = Lo / Le. (This is the ratio of the two wavelengths.)
* n (Ve) = c. (The refraction formula, n being the index of refraction.)

We can see from this that the refraction formula is the same as the cyclotron formula. In both cases the frequency remains constant while the wave length and velocity change.

* f = Ve / Le = Ve / 2 P R. (refracted photons)
* f = Ve / 2 P R. (electrons in cyclotron)

For the free electron one wavelength is one circuit in the cyclotron. So we frame our spiral in terms of phi, the Golden Ratio: a / c = c / b; ab = c^2. The Velocity Equation IS the Golden Ratio expressed in terms of velocity. Since Nature loves to build things according to this ratio (actually using the Fibonacci sequence as its "real world" quasi-fractal approximation,) we would be quite surprised if the most elementary of elementary particles were not built from pure light unfolding in the Fibonacci/phi ratio. Here is a formula for the construction of an electron.

* Rfe = phi^(A / 2 P) Rpl.

Here Rfe is the radial distance of a photon as it unwinds in the electron' s disc. Rpl is the Planck radius (approximately 10^-35 m.) Phi is the constant, 1.618.... P is pi, and A is the angle of the photon' s rotation in the disc expressed in radians. Every loop around of 2 P radians we get the following relationship between the new radius (Rn) and the radius from one loop before (Rm):

* Rn / Rm = phi^(2 P / 2 P) = 1.618...
* Rfpl = phi^(0/P) Rpl = 1 Rpl.

This is the status of the photon when it emerges from the Planck-scale core at the center of the electron' s axis. Antiphotons flow in along the axis, moving backward in time. Then they do a 90-degree turn at the center of the vortex and shift into forward time photons spiralling outward on the disc. Due to the cyclotron relation, the relative velocity of photons near the electron axis is extremely slow, around 10^-15 m / s. As the radius of the spiral grows, the photon velocity increases. By the time the photon reaches the de Broglie radius of the electron disc, the photon is moving at its open space velocity of c.

The positron is a temporal reflection of an electron. Almost all positrons sit inside nucleons. Neutrons have a balance of positive and negative charge, so they have no electrons in orbit around them. The electron in orbit around a proton is a projection

from the positron that is inside the proton. The two particles constantly exchange energy in a loop until such time as the electron can annihilate with its positron partner. Photons absorbed by a positron flow into the outer edge of the positron disc as electric energy and then spiral inward in slower and slower cycles that maintain the constant frequency as the radius decreases. When the photons reach the positron axis, they shift 90 degrees and move out the axis as antiphoton magnetic energy. The axis forms another klystron tube. As such it also marks the Zero Point axis.

Think of an electron as a lawn sprinkler. Water flows down the hose into the central axis of the sprinkler. It flows up the central axis and then shifts 90 degrees and flows into the rotating sprinkler arms. It then spirals out the arms and sprays outward in curving arcs. The linear momentum of the spray drives the circular "spin" of the sprinkler head. The hose is the time connection between the water source and the sprinkler head. The positron is a drain in a reservoir. It provides water pressure. The water on the lawn evaporates and then falls as rain into the positron reservoir. It then spirals down the drain at the center of the reservoir tank, shifting from spread out horizontally in the tank to flowing downward vertically.

The electron and positron are two strokes of a single process. Their apparent separation in space and time is an illusion generated by observer-defined viewpoint. The electron is an amazing fractal clock that tracks the evolution of the universe from its inception near the Planck scale to the present moment with particles spread out interacting in space.

There is another key issue we must deal with. If the photons move at c when they range around the de Broglie radius, then we must consider the problem of what happens when the electron as a whole moves in space. This creates a Lorentz invariance issue. It appears as if the photons could be moving faster than light.

We know that this is not the case. We must make a relativistic adjustment. The Velocity Equation tells us how to do this. Recall Einstein' s light clock. It is a nice picture of what happens in the electron, which we have just described as a light clock. Instead of reflecting back and forth between plane mirrors, the photons swirl around in a cyclotron spiral. But the result is still a light clock. When the Einstein clock moves along at a velocity $Vg < c$, we know that it is the group velocity for the system. The distance the clock moves in a unit of time is $Vg\ Dt$. The distance that the clock' s photon moves in the same time interval is $c\ Dt$. If we imagine the clock as a long rectangular tube mirror -- a light klystron, then we note that the wave front of the photon moves along the mirror at the phase velocity $Vp > c$. The ratio is the golden ratio: $Vg / c = c / Vp$. The time intervals all cancel out and are not relevant.

So what happens when the electron vortex begins to move in space is that this motion becomes a group velocity. When the light clock is at rest, the group velocity is zero and the phase velocity is infinite. By the way, this tells us that nothing can be at absolute rest and remain manifest in the universe. At absolute rest we have the velocity relation between nothing and infinity, which is meaningless as an experience, although it may well be a reality from the level of undefined awareness and our light clock can function

very well in that condition. When the observer is at rest relative to the clock, he experiences the clock just as it is, with no distortions. As soon as the clock moves (or the observer moves relative to the clock), distortion begins to occur.

Relative to itself a photon never moves. Relative to any object it moves at c. However, the photon' s group and wave velocities do not do this. The group velocity moves slower than c, and the phase velocity moves faster. The "c" relative to an object in a rest frame and the "c" relative to an object in a moving frame are different. Obviously the diagonal trajectory in the light tube takes longer than the pathway that is normal to the mirror wall. We can either say that there is time dilation or that the photon slows down. Einstein liked to say that time dilates. But if we have a cyclotron, and the cyclotron starts to move relative to the observers, then that means the cyclotron frequency slows even though all else stays the same. In super high-speed accelerators this becomes an issue. Adjustments must be made for the distortions of time and mass in order to get the right momentum for the particles.

This tells us exactly what happens when an electron starts to move relative to an observer. The photon cyclotron gets distorted. The photons in the spirals appear to slow even more than usual. Or we can say that the electron' s cyclotron frequency slows down. This is like saying that the photon velocity in the vortex slows. The radius is linked to the velocity. So the electron shrinks. If we could accelerate an electron up to the speed of light, its radius would shrink to zero and the electron would identify with its central axis. It would then shift 90 degrees and move into the positron world. Change in the velocity of an electron produces the equivalent of redshift inside the electron vortex. So there is no problem with relativity. Nor do we need to invoke any hidden dimensions that we take on faith from the mathematics. Theoretically we can test this model by building a cyclotron and moving it at high speed.

The photon in the light clock at rest is like the photon in the electron spiraling about the axis. When the electron moves in a vacuum with no magnetic field, we can not see anything unless it interacts with something. If it moves under electric influence, we can detect it. At high speeds we will see what appears to be the relativistic distortion of the electron. But the actual situation is that as the group velocity approaches c from zero, the phase velocity approaches c from infinity.

At the electron' s edge you are at c, move inward and slowing until you stop at the center. Shift 90 degrees and move at infinite velocity. Gradually move out of the positron, reducing that infinite speed down to c at the edge. "Infinite speed" really just means a 90-degree shift. Recall that in the klystron tube the group velocity reaches zero when it bounces back and forth across the tube. When the group velocity goes straight down the tube, it goes at c. When the phase velocity is normal to the tube walls, it moves at c. When the phase velocity points straight down the tube it moves at infinite speed. The electron axis is oriented 90 degrees from the photon vortex orbit. When the photon jumps from positron to electron along the hyperspace Zero Point axis, it jumps instantly at infinite speed.

We do not need to build huge particle accelerators in order to probe the early universe and the structure of subatomic particles. We simply use quantum microscopy. The structure of the universe is quasi-fractal. We can trace backwards from careful observation of the macroscopic behavior of particles to discover their internal structures and origins.

The electron is a space/time klystron tube that transports photons from the Big Flash to our present moment. The proton' s positron core takes them back to the Flash. The cyclotron provides a macroscopic model of the relation between the electric and the magnetic components of radiation. The electron moves in a circle. This is electric current, the essential electric field. The magnet provides the axis of rotation. So electrons in the cyclotron will line up their axes with the magnetic field and roll around the orbit at a constant "spin" defined by the ratio of the particle' s mass to its charge.

* e **B** = 2 P Me f.

This is the relation of the electric charge quantum to a magnetic field. The Bohr magneton is m = (e H / 2 Me) = 9.27x10^-24 A m^2. (A is for amps. We can also think of A m^2 as Joules.) If we combine these two equations, we discover that Planck' s constant can be seen macroscopically as the ratio of the Bohr magneton (m) times a particular magnetic field to pi times the cyclotron frequency (fc) for an electron in that particular field.

* H = m **B** / P fc.

A frequency is nothing more than a number of periods a system cycles through per second. At the center axis the photons theoretically achieve zero radius and zero velocity. Time stops at this point like it does at the high swing of a pendulum. But then it reverses direction. The sweep of the clock pendulum runs at a constant tick.

* tau = (2 e^2) / (4 P eo) (3 Me c^3) = 6.26x10^-24 s.

This is the time gap between each photon pulse. It also generates the apparent spin of the electron. Since the whole system is a photon circuit, we detect four phases. The electronic unwinding phase, the spatial electric photon transmission phase, the antiphoton magnetic windup phase, and the magnetic temporal transmission phase. The spatial transmission is the emission of photons by an electron from its disc edge. The temporal transmission phase is the injection of photons from positron to electron via the magnetic axis.

The electric field represents the spatial transmission of photons. The magnetic field represents the temporal transmission of antiphotons.

Physicists spend much time modeling the world to our peculiar observer viewpoint that is based on stereoscopic vision. This is fine for the applied aspects of physics that we must interface with our perceptions of the world. But when we realize that such a

viewpoint is totally arbitrary and simply designed for the convenience of our particular habitual mode of operation as organisms, we can release ourselves from that cross-eyed viewpoint and look for one more suitable for Mr. Ockham' s wonderful Razor Principle. If we start with a single unitary particle, it is logically clear that we will need some sort of Big Bang plus superluminal inflation (to get the illusion of multiple particles) and a few other clever twists to get to the world as we see it. There may not be any real conflict between the steady state theory and the BB theory -- just viewpoint differences. (See my article on McCutcheon' s expansion theory for more details.)

In OP the EM fields become virtual standing wave photon bubbles. These bubbles are projections into subjective space/time generated by the observer' s particular chosen viewpoint. There is no vacuum of space (or ether). The emitting electron and the absorbing electron are the same particle. The observer projects the emitting electron as Not-Me, and then creates the myth of photons translating across an abyss of space and time. We use frequencies, wavelengths, size-scale, distortions, and all kinds of fun-house mirror effects as ways of calculating how much we resist accepting the reality of who we are. A lot of it is done faster than light, which I guess is why Einstein specifically told us not to think about faster-than-light phenomena even though his own equations tell us that the FTL world is just a mirror reflection of our apparent slow world. I agree with Mr. Hotson that the history of physics over the past 100 years is indeed bizarre and definitely took a few unwarranted turns, perhaps with certain parties deliberately obfuscating or suppressing information. But many great discoveries also have occurred, and we continue to make progress even though our SM paradigm is a bit skewed lately. Enough people are working on it now that I think we' ll have a much clearer picture in the next ten years or so. The free flow of information on the Internet is quite helpful in this regard. Let us hope that our friends who believe in "protecting" us from the "bad" guys and the hackers who like to show off by throwing monkey wrenches into the works do not choke off this remarkable resource.

Douglass A. White
www.dpedtech.com
dpedtech@dpedtech.com
deltapt@ms19.hinet.net

If we go back to our Planck formula, and apply it to the electron, we get H / Me c = 3.857x10^-13 m. This is a larger minimum radius than the proton. So it must be something like the radius of the minimum ground state orbit of hydrogen, since the electron functions as a satellite orbiting the proton nucleus. The proton' s EM field is constant, so we know that the electron, undisturbed from the outside, will maintain a standing wave orbit around the proton.