The Mass of the Proton and the Mass of the Electron

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According to the principles of Observer Physics mass is a subjectively generated phenomenon and does not exist as an objective reality. That does not mean that mass is unreal. It means you can not measure the mass of any object unless you put a resistance against it. What you end up measuring as mass is just a reflection of your own resistance to something. Thus we may say that the notion of mass is not a part of a truly "objective" science. Newton's $F = m\,a$ is an illusion, albeit an often useful one, because only variable you can observe in a detached manner is acceleration, and it may be subject to hidden influences.

Even when you get involved there can be problems. If you push against a wall, and the wall does not accelerate, and yet you push with force, does the wall have no mass? Or is there no way to determine its mass in terms of force and acceleration? If you push a car and it moves, but someone has left the emergency brake on and that adds a significant additional drag, will you calculate the correct mass? If you observe a jet of particles emitted from a star that seems to go extremely fast, is it possible that your unknown angle of observation influences the acceleration you calculate? Unless you can identify the particles in the jet, and indirectly replicate a similar acceleration of them, you can not use Newton's formula to find the force even if you can estimate the angle.

On the other hand, we observe that phenomena come in quantized packets. Therefore, we find that objects consisting of a certain number of energy quanta often behave as if they had so many quanta of mass when we apply a resistance to them. Subatomic particles such as protons and electrons come in such quantized packets, so we conventionally speak of them as having a certain quantized "mass". That means that such particles reflect resistance in consistent ways and are not purely imaginary.

The two particles that make up the stable material universe are the proton and the electron. One of the challenges of physics has been to explain how the proton and the electron happen to have the particular masses that we consistently observe them to have. Observer Physics has developed a theory of how these fundamental particles can exist as stable phenomena. The theory also explains how they happen to have the masses that we associate with them. In this article I briefly present a description of the masses of the proton and the electron. In other articles I consider in more detail their deep structures and why they are stable.

Some Preliminaries

Before presenting the masses of the proton and electron I first will discuss some preliminaries concerning the unconventional notations that I use. No physical phenomenon exists by itself. All phenomena and their properties are co-conditioned as relationships among a simple set of fundamental physical properties. In other words, our conventional definitions are always circular. We define one property in terms of a

relationship between two or more other properties. No property exists by itself. The "meanings" of these properties and phenomena derive solely from the viewpoint from which the observer observes them and chooses to define them. Different properties reflect different viewpoints. All the viewpoints involve looking at the same thing from different angles. Thus, the universe is a Unitary Reality made of conditioned components. Any holistic physical description of a cosmos properly begins with the definition of a few fundamental properties that coexist in a variety of stable relationships that hold under all conditions and locations in that given cosmos.

The Objective World and the Subjective Mind

Our reality essentially consists of the coexistence of two interconnected and conjugate realms, the Objective World and the Subjective Mind. In a sense the Objective World presents a mirror image of the Subjective Mind. Or we might say that the Subjective Mind projects the Objective World. We make sense of the Objective World as we recognize that it is not separate from who we are.

The Subjective Mind has the fundamental measureable property of space (L = length). Space is a notion we use for storing data in the Mind. The Objective World has the fundamental measureable property of time (T). Time is an extension of mind space in which we shift attention between a length interval and a standard distance interval that we call a clock (for example, the distance between two positions of a clock's second hand). These two properties interact to form a third measureable property that we call mass (M) from the perspective of space and energy (E) from the perspective of time -- although we often define energy in terms of M, L, and T, thereby making it a secondary property.

One of the fundamental principles of Observer Physics is that we can create mathematical descriptions of the physical World that have equivalent descriptions in the abstract realm of Mind. We describe the properties of both World and Mind in terms of certain constant relations among the fundamental properties that these realms assume. Properly we should define units for the measureable properties in terms of such constant relations. Thus the cosmos by definition would be quantized, inherently stable, and unified. Unfortunately our notion of measurement has evolved from very local observations and has only gradually expanded to a more general definition of units. Ideally all our units and constants are fully consistent and mutually define each other.

A constant relation is a relation among two or more properties that remains invariant under any possible transformations of the Subjective Mind or Objective World. Each physical constant has to be defined in terms of at least two of the fundamental properties (M, L, T, and E). Ultimately these definitions are circular, because we define the properties in terms of their constant relationships, and we define their constant relationships in terms of their properties. However, because the properties and constant relations refer to experiences, a person may test them to his own satisfaction and ascertain that they are mutually consistent, although perhaps ultimately meaningless. Anyone living in the universe that we jointly co-create and share as a reality will share these experiences if they are defined consistently and refer to measureable phenomena. In other universes the basic properties and their constant relationships are not necessarily the same. The ones we know may not even exist. There may also be other sets of properties and relationships in our

universe that are equally consistent or more so than the ones we choose to work with for our explorations and descriptions.

We can describe our Objective World in terms of the following five physical constants. These are all recognized standards measured in terms of arbitrary units: M = kg (kilogram for mass), L = m (meter for spatial interval), T = s (second for temporal interval), E = J (joule for energy).

Here are the constant relationships among the four properties that we will take as fundamental.

$\hbar$ = (h-bar) = Planck's constant = 1.054×10^{-34} J·s.
$\boldsymbol{é}$ = the fundamental quantum of electric charge = 1.602×10^{-19} C (or kg/s). (See endnote.)
c = the speed of light in the vacuum state = 2.9979×10^{8} m/s.
G = the gravitational constant = 6.674×10^{-11} m^3/s^2 kg.
ε_0 = (epsilon sub zero) = the permittivity of the vacuum state = 8.854×10^{-12} kg/m^3.

The vacuum condition is generated from a single particle in its temporal (energy) state of least excitation which makes it unobservable because it is an uncharged projection of the undefined awareness of an observer. The vacuum state is not empty, but is solidly packed with aether. Aether is the superluminal vibration of the single particle in a spatial rather than a temporal manner. In its least excited state it does not move in time, but iterates itself simultaneously into a matrix of identical densely packed spheres that are copies of itself and visible to our senses only as the space between what we call ordinary matter. Local areas of disturbance in the matrix may appear to move about in and interact with the background matrix of vacuum space. The matrix is subtle enough that it generally passes through any disturbances (or allows them to pass through it), depending on the temporal energy density of the disturbances. If the notion of matrix particles passing easily through the earth is hard to visualize, please note that in standard theory electron neutrinos pass through the earth in untold numbers every second with only extremely rare interactions. Neutrinos are much denser than matrix particles. On the other hand, there is a small displacement of matrix particles that depends on the density of matter that resides in it and this engenders our sense of gravity. All matter is formed by networks of atoms arranged in various ways. Most of the matter is empty space, and what we experience as the solidity of matter is the result of electrostatic repulsion between atoms. That is why you do not sink into the ground as you walk on it.

We can derive all other physical constants from the five primary ones. Four of the five are combinations of two properties, although J can be further analyzed as consisting of the units kg m^2 / s^2. Intervals of space imply the presence of mass (localized "rest" energy). Intervals of time imply kinetic energy (mass in motion). The reciprocal interaction of space and time (L / T) manifests as an observable that we call motion or change of state and affects masses under the influence of kinetic energy.

We can describe the subjective Mind space in terms of geometry. The key element of geometry (and hence the Mind) is space. All the seven basic constants of geometry are expressed in terms of various spatial intervals or ratios of intervals. Intervals of space also play an important role in the physical constants. For example, the velocity of light is a

ratio of space to time. So the physical World is actually an extension of the Mind into an additional dimension of time. Geometry (Mind) exists in a timeless world of pure space. Such an empty space in its simplest form is Euclidean. A vacuum follows the laws of Euclidean geometry. All other types of geometry are variations of Euclidean geometry. Geometry is the spatial way of doing mathematics, the precise language (thinking) of the Mind.

Geometry fundamentally consists of points, lines, circles, and spheres viewed from different perspectives. Points, lines, circles, and spheres are all the same thing viewed from different mental or physical perspectives. However, in Observer Physics we initially focus on certain universal constants in geometry. Since these constants are not all established conventionally, I will comment on each. Here is the list. Notice that all the constants of geometry except for the dimensionless spatial ratio *pi* (π) are expressed in terms of spatial intervals, where L = m. Our standard unit of length will be the meter (m). Having a standard length allows our constants of geometry to function in the physical world as well as the mental world. We will give the abstract meter a physical interpretation.

π = (*pi*) = 3.14159... (a pure number ratio, circumference to diameter, that holds at any scale)
Ru = 1 m. (the standard radial unit of length with a quantum correlate in the physical world)
% = 3.16227766... m. (the scaling constant that links scalars to space)
Oo = 6.28318... m = 2 π Ru. (circumference of a unit radius circle)
Ao = 3.14159 m^2 = π Ru^2. (area of a unit radius circle)
As = 12.56636... m^2 = 4 π Ru^2. (area of a unit radius sphere)
Ss = 4.1887867 m^3 = 1.333... π Ru^3. (volume of a unit radius sphere)

I call Ru the Radial Unit. Theoretically this Unit can have any size, but when geometry (Mind) interacts with physics (World), there is a specific constant length in space that is fundamental to the connection between Mind and World. This happens to be almost exactly 1 meter. Oddly enough the meter also happens to be the scale at which we live. Two people interacting face to face on average will be about one meter apart. So this spatial interval seems also to be a biological constant. We will see how the Radial Unit turns out to be a quantized spatial unit connected to the proton.

The % (O-per) symbol in my notation stands for a constant that I call the Dimensional Shift Operator. If Ru is 1 meter, then %^{2} = 10 Ru^2. You see how this number shifts up exactly a dimension and an order of magnitude from Ru when we square it. It seems arbitrary that we are using meters and a base ten number system. It is. Yet oddly the proton contains a constant 1 meter unit, and the relationship between Planck's constant and the velocity of light interact commonly in physics equations to give exactly a power of the Dimensional Scale Shift Operator. Our SI system shows this most clearly.

* ($\hbar$ c) = (3.162×10^{-26} kg m^3 / s^2) = (%)(10^{-26} J)
* 1 J = ($\hbar$ c %$^{-1}$) (π %)^{52} (Ao)$^{-52}$

In other words, the relationship ($\hbar$ c) that permeates quantum mechanics stands for % times ten to the minus twenty-sixth joules. Energy (here written in the unit of joules) is a way of expressing dynamic time, and % is purely a spatial interval. The factors (π %)^{52} (Ao)$^{-52}$ simply shift the scale from the quantum level up to our scale which is where we

define our joule unit. Thus we can define the joule entirely in terms of physical and mental (geometrical) constants. This love triangle embracing *ħ*, *c*, and % (unified by *Ru* = 1m) marks a very deep connection between space and time in the physical World and resides at the foundation of quantum mechanics. The other symbols of geometry listed above represent the Circumference of a radial unit circle (*Oo*), the Area of a radial unit circle (*Ao*), the Area of a radial unit sphere (*As*), and the volume of a radial unit sphere (*Ss*). In each case we use the *Ru* = 1m to define our unit radius. This connects our abstract geometry of the Mind to our physical World. The following Newton-Force Unit (*Fn*) shows another interesting role that (%) plays in physics. Notice how the structure of the formula reminds one of Einstein's mass-energy relation.

* $Fn = (4\,\pi\,\varepsilon_0)\,(\%\,c)^2 = (\%\,c)^2 / k = 10^8$ Newtons, where $k = 4\,\pi\,\varepsilon_0$.

Notice also the similarity of this formula to Coulomb's equation: $Fe = k\,Qq / r^2$. If we set $r = \%$ and let $Qq = \dot{e}^2$, the product $Fe\,Fn = (\dot{e}\,c)^2$, which suggests that there is a natural force that equals ($\dot{e}\,c$), the interaction of lightspeed and the space-time warp caused by charge. We will return to this idea later.

The Mass of the Proton

Now we are ready to look at the mass of the proton. The proton (and its alternate form, the neutron) is the fundamental building block of the universe. The neutron is an excited form of proton and is thus unstable when outside of a nucleus. The proton is stable, but contains a number of components. The electron is actually just one of the components of the proton. Sometimes the electron seems to run around independently, but it is never really separated from a proton partner except by relative distances in space and time. These temporal and spatial separations determine the phenomena that we experience as the material universe.

The proton/neutron rest mass is an expression of the relation between electric charge, the speed of light, the ratio *pi*, and the Radial Unit. The formula is as follows:

$Mp = (\pi\,\dot{e}\,b/c) = 1.67897\times10^{-27}$ kg.
(Measured mass of neutron: 1.674955×10^{-27} kg)
(Measured mass of proton = 1.672621×10^{-27} kg)

This simple formula is so close to the measured values for the proton and neutron that it would be strange if the relation were irrelevant. I suspect that the radial unit *Ru* in this formula stands for a quantized spatial displacement of the magnetic flux from the core of the nucleon, and therefore I represent it with the symbol $b \approx 1$m. The unit *b* (we'll call it a subweber) is a constant average distance between each nucleon (proton or neutron) and its orbital electron that has the approximate value of the square root of one weber (Wb), the SI unit of magnetic flux that is measured in meters squared. The subweber *b* describes the nucleon's half of a charge relation with an electron in an orbital that is either internal (neutron) or external (proton).

The original definition of the weber unit derives from the primary definition of an ampere (A) as the current in two very thin parallel wires that are 1 m apart in a vacuum and gives rise to a magnetic force of 2×10^{-7} N/m on each wire. In other words we define current

indirectly by the magnetic flux it induces and that we can measure as a force exerted on an observable object. The weber describes the magnetic flux through the square meter plane defined between the wires that manifests as the force on each wire. The direction of current determines the direction of magnetic flux. Depending on the relative directions of the current in the wires, the force will be attractive or repulsive between the wires. My hypothesis is that the subweber b accounts for the spatial component of the flux for one of the charged particles in the current. The value $b = Ru = 1$ meter and my derivation of the subweber unit b come up in the definition of the ampere (A), the unit of electric current, as follows.

* $1\ A = 2\times10^{-7}\ N / 1\ m.$
* $1\ b = 2\times10^{-7}\ N / 1\ A.$

Protons tend to cluster into pairs and form hydrogen so that their orbital electrons form balanced Cooper pairs with relatively opposite spins. This then forms the factor $(2\ \pi\ b)$, which is simply (Oo), the fundamental mutual quantum orbit formed by two hydrogen atoms conjoined into a hydrogen molecule. The expression $(\dot{e} / c)$ is the ratio of the electric charge quantum to the velocity of light and indicates the space-time curvature caused by a density of light sufficient to generate mass. The formula suggests that the proton tends to form a diatomic gas as the least excited state of hydrogen. It also tells us that the proton is made of photons and that a photon of light in a mode called "charge" experiences a force (Fp) because it is moving in an accelerating path that looks like a vortex.

The photon moves at the velocity of light. But the charge represents a warping of the photon path in space/time by a force that is electro-gravitational.

* $Fp = (\dot{e}\ c) = 4.806\times10^{-11}\ N.$
* $Fp\ (Oo) = 2\ Mp\ c^2.$

The proton force times the Unit Circumference (Oo) gives us the rest energy of a pair of protons (a hydrogen molecule) or the energy of pair production for a proton-antiproton pair. So we simply rearrange the formula to get the rest mass of hydrogen gas.

* $2\ Mp = Fp\ (Oo)\ /\ c^2 = (2\ \pi\ b)\ (\dot{e}\ /\ c).$

We cancel out the 2 on each side to get the rest mass of a single proton (neutron). We should note here that taking Ru as 1 meter is an approximation. The actual average value of Ru is very slightly less (about 2.4 mm) than 1 meter. However, it is so close that I think we should consider using Ru as our meter stick, since it is the constant for our material universe that connects our Mind to our stable physical World of experience.

Notice that we can rearrange our formula so that one side of the equation consists of physical constants and the other side of the equation consists of geometry constants from the world of mind.

* $Mp\ c\ /\ \dot{e} = \pi\ Ru.$

Velocity is an observable. Charge is also observable, but seems more mysterious. Millikan measured individual charges in his oil-drop experiment and found them to be quantized at a constant value of $\dot{e} = 1.602 \times 10^{-19}$ kg/s. I use the mechanical expression for the coulomb charge unit because Millikan matched repulsion of the static charge on the drops to their gravitational acceleration. What most people do not realize is that Millikan demonstrated with his experiment the equivalence of gravity and electrostatic charge and also identified their crossover point. The charge turns out to be an apparent mass generated per second quantized in multiples of e as photons move in vortex paths due to local density modulation of space time in the subphotonic aether matrix.

The Aether

The aether has the following structure first expressed mathematically by Maxwell:

* $\varepsilon_0 \mu_0 c^2 = 1$, where $\mu_0 = 4 \pi \times 10^{-1}$ N / A^2

Note how this formula resembles the Einstein relation. Epsilon sub-zero (ε_0) is the density of the aether expressed in kilograms per cubic meter (kg / m^3) when it is displaced by matter. It is a stationary property and relates to the electrostatic component of aetheric mass. Mass to a certain extent displaces matrix particles in a vacuum like a boat displaces water in a pond. Since ε_0 has the value of 8.854×10^{-12} kg / m^3, 1 cubic meter of vacuum space has a mass of 8.854×10^{-12} kg. That tells us space is far from empty. The density referred to here is with respect to the passage of electric flux. Various materials have higher densities with respect to electric flux, and thus they transmit electric flux slower. Interestingly, certain materials can be polarized such that they have a higher ratio of electric flux to charge than "empty" space (Wikipedia, "Permittivity").

The component $\mu_0 c^2$ represents reciprocal density, which forms an antidensity (m^3 / kg), somewhat like a negative hole in the vacuum state. The combination $\mu_0 c^2$ is the extremely dynamic component of aetheric mass and functions as antimatter to maintain the unitary balance of the vacuum state of the universe. Mu sub-zero (μ_0) is the magnetic component of the aetheric medium and is usually called the vacuum permeability or magnetic constant. "In electromagnetism, **permeability** is the measure of the ability of a material to support the formation of a magnetic field within itself. In other words, it is the degree of magnetization that a material obtains in response to an applied magnetic field . . . the more conductive a material is to a magnetic field, the higher its permeability . . . . The permeability of free space is a measure of the amount of resistance encountered when forming a magnetic field in a classical vacuum." (Wikipedia, "Permeability")

The mass of the magnetic constant is reciprocal to electrostatic aetheric mass and therefore has the property of antimatter (m s^2 / kg). We can also think of it as the reciprocal of a current in amps per meter (A / m). It is dynamic and represents an acceleration of aetheric mass in a specific direction. If we rewrite the equation as $\varepsilon_0 = \mu_0^{-1} c^{-2}$, we see that the density of electric flux equals the density of the dynamic magnetic "antimass" flux.

The epsilon mass and the mu antimass cancel each other in the vacuum state and are therefore virtual in undisturbed space, but the effective resultant of their aetheric interaction is the propagation of a "restless" massless photon and a "restless" massless antiphoton at the

directional velocity *c* as a phase conjugated pair between two terminals with electric charge. The photon moves forward in time, and the antiphoton moves backward in time. We can only detect a photon by absorbing it directly, and this is how we determine its directional vector and thus its emission source. To detect a photon we must emit an antiphoton "attention particle" that matches the photon "light particle" as its phase conjugate pair. All photons appear to be going at velocity *c* when detected, regardless of other factors because the observer (or his detection device) is always at rest with respect to the aether, and photons always propagate at c with respect to the aether and with respect to all observers. All other motions are relative to phenomena generated by interactions of individual photons and configurations of photons. When other relative motion is present, the frequency of exchanged photons appears to shift analogous to the Doppler effect that occurs with sound. When observer and observed approach, the frequency increases. When observer and observed move apart, the frequency decreases.

The aether consists of a single particle of undefined size and properties. Imagined objectively we might call it a photon and give it the property of light and other electromagnetic radiation. Imagined subjectively we might call it awareness. When an observer defines the particle as something other than awareness (not I), then a virtual conjugate pair is created. If the observer imagines himself as a viewpoint inside the light particle, then an interval is created such as exists between a central point and a sphere. This arbitrary interval is then immediately filled with any number of identical photon particles that are superluminal spatial iterations of the original particle all coexisting as closely packed spheres. An observer can assert pressure on this matrix gas by emitting attention particles (antiphotons). The pressure causes a reaction in the matrix that transmits through the photon gas as a wave of excitation at velocity *c*. However, in order for perception to result, the observer must first create a pair of identical but reciprocal particles (what we call electron and positron) that will act as terminals for the transmission of photons through the gas.

Particle pairs can be produced by random fluctuations of the aetheric photons or by an observer as a player from outside the system deliberately placing pressure on them the way a potter presses on clay to mold it into a shape. When the pressure between a conjugate pair of particles is released, they relax back into the photon gas and release a wave of excited photon vibration through the photon gas. Random fluctuations result simply in what appears to be a random sparkling of the photon gas. However, if the observer surrounds an antiparticle (positron) with enough additional density pressure (about 1822-1836 times as much), the electron partner will not be able to relax back into the positron. A steady flow of excited photon energy will flow from the electron to the positron, but it will not be able to merge with the positron spatially. The average spatial distance between the electron and positron will be 1 meter.

Charge

The property of charge is simply the tendency of a conjugate pair to relax back into the aether photon gas and release the excitation pressure that holds them in particle mode. Each particle of the pair has a density gradient that increases sharply in the vicinity of the particle core. The pressure is constantly released in electrons by outwardly spiralling photon excitation that (relative to a hypothetical outside observer) appears to accelerate as it spirals outward. When it reaches a certain radius ($\lambda = \hbar/Mec$), the velocity becomes *c* relative to the

vacuum aether density, and the photon excitation usually propagates across the aether to a positron where it can spiral inward decelerating to the antimatter core where the pair creation occurred. Then it crosses over the particle interaction zone and spirals back out from the electron. This circuit usually continues until perchance the electron can merge with a positron and relax back into the aetheric gas. An occasional alternate possibility is that the photon excitation encounters another electron instead of a positron and transfers its excitation to the electron. If the electron is in a fixed pattern of motion (such as an atomic orbital), this disturbs the electron's motion and excites it. When it is no longer stimulated, it will relax and emit the extra excitation energy as a photon that propagates through the aether. Then the electron returns to its customary orbital vibration or other pattern of motion.

The local excited density increase in the aether perturbs it and pushes some of the aether out of the dense core of the excited photon pocket. The passive aetheric photon gas then exerts a counter pressure to restore its own smooth equilibrium. The pressure of the aether on a particle creates the illusion of gravity, a tendency for the aether gas to push all particle disturbances back toward their centers of initial excitation so as to resume its unitary equilibrium.

Thus according to Observer Physics the phenomena of gravity and charge both derive from a viewpoint shift by the observer that puts pressure on the equilbium of the spatially vibrating aetheric gas (subjectively known as awareness). Gravity is the reaction of the aether to the initial push by an observer to manifest something more than unity. It is a resistance rather than an attraction. The observer then rapidly twists his viewpoint to avoid the fruitless reaction to the initial push, and this creates the illusion that a photon is spinning around in a circle rather than going straight ahead through space. Space is a purely mental phenomenon. The observer by definition identifies with a viewpoint and transcends whatever he observes. His initial viewpoint is beyond all phenomena. Theoretically it takes only a tiny effort to do such a twist in the mind. But it does take an interval of time and some energy for an observer who has jumped in and identified with a viewpoint in the aether to shift a viewpoint, and it generates the sensation of a physical force. Not wanting to take responsibility for the twisted viewpoint, we say that the photon is whirling in a vortex.

Since our physics has not yet advanced to the point of even recognizing the vortex motion of photons inside electrons and protons, we simply say that we have a stable subatomic particle with a charge called a proton with a much smaller "oppositely" charged particle as its satellite. As a rough approximation that is fine, but it does not explain what gravity and charge are and where they come from. Both gravitation and electromagnetic phenomena are reactions to deliberate or habitual resistance placed on the vacuum by the observer and are the reactions by the aether as it returns to equilibrium. The aether is objectified awareness. The unobservable portion is subconscious. The observable portion becomes various states of conscious awareness.

The Mass of the Electron

To complete our picture of the fundamental stable particles that make up our material world we must consider the mass of the electron. This is a bit more complex. It seems odd that the electron is a component of the proton and yet its mass has a more complex mathematical structure than the proton. This has to do with its mode of interaction. All

interactions that we call perception occur via the emission and absorption of photons from electrons. If you look deeply into the core of the positron at the core of a proton, you find the viewpoint of self that has identified with and peers out at the world via antiphoton attention particles through a hole in a core of a material form (a positron inside a proton), but that actually resides outside the aether matrix and the material phenomena that it supports.

The electron has the same quantum charge as the proton, but a much smaller mass. The charge seems to be opposite, but that is due to the antimatter core of the proton that spirals photon excitation flow inwards and backwards in time. The electron mass is about 1836 times smaller than the that of the proton. We would expect the electron and the proton to have the same basic vortex structure, and indeed they do, except for the extra energy buffer in the proton that protects the positron core.

For starters we observe the following relation, where we let $Me\ c^2$ stand for the electron rest mass energy (Ee):

* $Ee = Me\ c^2 = (\dot{e}\ c)\ (\lambda)$.

Here (λ) represents some unknown radial distance. Actually it is not unknown. We know it has to be about 1836 times shorter than ($\pi\ b$) since the proton-to-electron mass ratio is around 1836 while $\dot{e}$ and c are constant. So we know right off the bat that (approximately):

* $Me = (\dot{e}\ /c)\ (\lambda) = (\dot{e}\ /c)\ (\pi\ b\ /\ 1836)$.
* $(\lambda) = (\pi\ b)\ /\ 1836 = .0017111$ m. (approx. val.)

The electron always interacts with photons via the fine structure coupling constant alpha (α). Niels Bohr derived this pure number constant from a fundamental set of physical constants. We mentioned the combinations ($k = 4\ \pi\ \varepsilon_0$) and ($\hbar\ c$) earlier in this article.

* $(\alpha)^{-1} = 4\ \pi\ \varepsilon_0\ \hbar\ c\ /\ \dot{e}^2 = \hbar\ c\ /\ k\ \dot{e}^2 = 137.035999679$
* $\alpha = k\ \dot{e}^2\ /\ \hbar\ c = (\dot{e}\ /c)\ (k\ \dot{e}\ /\ \hbar)$

The factor (α) contains the factor ($\dot{e}\ /c$) that defines a core particle with charge like the proton. The factor ($k\ \dot{e}\ /\ \hbar$) has the dimensions of length over mass that corresponds to the b component but then cancels the mass of the ($\dot{e}\ /c$) factor to leave a dimensionless scalar. Inserting the alpha factor gets us pretty close to our ratio and it logically makes sense that we will have (α) appear for each component of an electron interaction. Hence we will have $(\alpha)^2$ show up when two electrons interact electromagnetically. Now we have:

* $(\lambda) = \pi\ b\ \alpha\ /\ 13.4$.

We are very close, and we notice that 13.4 is ten times the ratio 4/3 = 1.333.... Of course, that reminds us of the volume of our Unit Sphere: 1.333... $\pi\ R_U^3$. This makes sense since the electron behaves like an energy cloud that fills the spherical space around a proton. The size of the cloud depends on the "rest" energy of the electron (its ground state) plus any additional energy it may have that will expand the sphere. The cloud's shape gets distorted in many atoms due to complex interactions among the various charges. A single

proton is the simplest possible state. Let's put in our Unit Volume Ss and then balance the units.

* $\pi\ Ss\ \%^2 / Ao^2 = 13.333...$m.
* $(\lambda) = (\pi\ b\ \alpha)\ (Ao^2 / \pi\ Ss\ \%^2) = .001711292.$

We are now very close to the desired proton/electron "mass" ratio.

* $\pi\ Ss\ \%^2 / \alpha\ Ao^2 = 1826.666...$ m.

Inserting another $(\% / Ao) = 1.006585\ m^{-1}$ cancels the extra spatial unit and brings the ratio closer with a tiny overshoot: $(\pi\ Ss / \alpha)\ (\% / Ao)^3 = 1839.1786$

We invert this factor to divide by the mass ratio, and our formula for the electron becomes an elegant object of contemplation next to the formula for the proton.

* $Me = (\dot{e} / c)\ (b\ \alpha / Ss)\ (Ao / \%)^3 = 9.12\times10^{-31}$ kg.
* $Mp = (\dot{e} / c)\ (\pi\ b) = 1.67\times10^{-27}$ kg.

With our logical argument we have gotten so close to the measured mass of the electron that this formula is not likely to be chance. We simply inserted two factors: the fine structure constant that is the constant companion of the electron and a spatial adjustment for the smaller size of the electron. Since $Fp = (e\ c)$, we also get the following rest energies for the electron and proton/neutron.

* $Me\ c^2 = (Fp)\ (b\ \alpha / Ss)\ (Ao / \%)^3.$
* $Mp\ c^2 = (Fp)\ (\pi\ b).$

We can combine our proton formula with Maxwell's electromagnetic aether formula.

* $Mp\ c^3 = \pi\ \dot{e}\ b / \varepsilon_o \mu_o.$
* $(Mp\ c^2) = (\pi / c)\ (\dot{e} / \varepsilon_o)\ (b / \mu_o).$

This elegantly shows the "rest energy" of a proton in terms of light moving in a vortex to generate electric and magnetic components relative to the respective permittivity and permeability of the aether in its vacuum state.

If we have a single free proton moving somewhere within a plane and subject to a magnetic field perpendicular to the plane of its motion, the proton assumes a circular motion in the plane called cyclotron motion. As long as the magnetic field B is constant and homogeneous, the motion will continue in a circle with a constant radius. The cyclotron formula for this radius R is:

* $R = Mp\ v / q\ B.$

If we set $v = c$ and $R = Ru = b$, (and of course $q = e$) then we get the following interesting relation.

* $R_u = M_p\, c\, /\, \dot{\boldsymbol{e}}\, B$
* $M_p = (B\, R_u)\, (\dot{\boldsymbol{e}}\, /\, c)$
* $M_p = (B\, b)\, (\dot{\boldsymbol{e}}\, /\, c)$

The value of B, the strength of the magnetic field, then turns out to be π in teslas. The value of R_u is the constant radius value that appears when a proton is moving at light speed and the magnetic field is π in teslas. The radius of 1 meter is the magnetic constant (b) for the proton. Or we can say that in this situation ($B\, b = \pi$ Wb/m).

Suggested Reading

Murakami, Aaron. **The Quantum Key**. For an overview and chapter summaries: http://www.whitedragonpress.com/go.php?offer=drdaw38&pid=1&tid=drdaw38

Endnote on the Mechanical Value of Charge

The electromagnetic units are very opaque. Because electrostatic charge dissipates (a hint that perhaps it is not so "static" after all) and is thus hard to measure accurately, scientists decided to define the coulomb unit of charge based on the ampere unit of current. However, they could not even measure current directly in a mechanical manner. Fortunately an electric current induces a magnetic field that is perpendicular to the direction of current flow. When current flows along a straight wire, a magnetic flux flows around the wire. The relative direction of the magnetic flux follows the "right-hand rule" that if you point the extended thumb of your right hand along the direction of electric current flow and curl your fingers toward your palm, the fingers indicate the direction of magnetic flow relative to the current flow in the wire.

If a second wire runs parallel to the first wire and has the same current running along it, then the electric current generates a magnetic force per unit length on each wire. If the two currents run in the same direction, the forces push the wires toward each other. If the currents run in opposite directions, the forces push the wires apart from each other. Scientists decided to define the unit of current as a magnetic force of 2×10^{-7} N/m (newtons per meter) when the parallel wires have negligible cross section and are in a vacuum. Thus scientists defined the ampere unit of electric current (A) in terms of a force per unit length exerted magnetically in a direction orthogonal to the direction of current flow. Finally they defined the coulomb unit of charge (C) in terms of the ampere with the relation 1 C = 1 A·s. Notice that the magnetic force is also orthogonal to the direction of magnetic flux. So we have to twist our mind through two levels of indirection and three directional dimensions in order to define the charge unit (the direction of electric current flow along the wire, the direction of magnetic flow around the wire, and the direction of the force away from or towards the wire). Furthermore, aside from arbitrarily assigning a unit to charge, the establishment that maintains the standard paradigm has yet to provide an explanation of what charge is in spite of it being a fundamental property of physical systems.

As we try to track down what goes on in the ampere, things get even murkier. To find the current we have to look at a pair of forces that interact. To make a measurement, the scientist assumes the viewpoint of one of the wires and the interaction between the two wires becomes as if a single force. For wire 2, we have $F_{21} = I_2\, l_2\, (\mu_o\, I_1\, /\, 2\, \pi\, d)$, where I_2 is the current in wire 2, l_2 is the unit length of wire 2 (1 meter), d is the distance between the wires (1 meter), and μ_o is the magnetic permeability of a vacuum ($4\, \pi \times 10^{-7}$ N/A^2). For

wire 1 we simply switch the subscripts for the wires. Since l is the same for both wires and the net force is the same when viewed from either wire, we can drop the subscripts for l and reorganize as follows: $F / l = (\mu_o I_1 I_2 / 2 \pi d)$. Since, for the definition of the ampere, we choose $l = d$, we can also cancel the spatial intervals from the equation: $F = \mu_o I_1 I_2 / 2 \pi$. Since μ_o has the units (m s² / kg) based on the relation $\varepsilon_o \mu_o c^2 = 1$, we know that the ampere must have the mechanical units (kg / s²). Therefore, the coulomb has the mechanical units (kg /s) and this tells us that a proton or an electron radiates a certain amount of mass every second.

The mechanical revelation is one of the reasons the electromagnet units are defined completely separate from the mechanical units and in such a convoluted and opaque manner in our modern day and age. How can a charged particle like a proton or an electron radiate mass-energy constantly and not rapidly fade away and disappear? Common sense dictates that these particles are not static. They are dynamic systems like tornadoes. In order for them to remain stable, there must be an inflow of energy that matches the outflow of energy that we call charge.

When we insert the value of the magnetic permeability into the force that defines the current, we find the following: 2×10^{-7} N = $(4 \pi \times 10^{-7}$ N/A²) (A² / 2 π). Thus we discover that the factor 2×10^{-7} was deliberately inserted into the definition in order to balance the same factor in the magnetic permeability. We could just as easily prepare the ampere definition setup, drop all the numbers, and say that the magnetic force between the wires divided by the current squared equals the magnetic permeability.

So the question arises, what is the mechanical value of a quantum charge (the charge on a single proton or a single electron)? By comparing the electrostatic balance of charged oil droplets against the force of gravity, scientists found the smallest quantum of charge to be

* $q_e = 1.602\times10^{-19}$ C.
* 1 C = 1 A·s.
* 1 A = 2×10^{-7} N / m = 2×10^{-7} kg / s².
* 1 C = 2×10^{-7} kg / s.
* $q_e = 3.204\times10^{-26}$ kg / s.

That means an electron radiates over 35,000 times its mass every second and a proton radiates over 19 times its mass every second. Those are numbers that physicists do not want students to contemplate when they are not ready to provide them with an explanation for the source of that mass-energy.

Because the factor (2×10^{-7}) is inserted into the definition of the ampere in order to balance the unavoidable interference of the magnetic permeability with the measurement and is not really a part of the current itself, I choose to carry it over as a hidden constant scale adjustment in the electric charge quantum. I write e in boldface italics with a dot over it $\dot{\boldsymbol{e}}$ and give it the value of $\dot{\boldsymbol{e}} = 1.602\times10^{-19}$ kg/s. The notation reminds us that we can treat e as $\dot{\boldsymbol{e}}$ times a factor (2×10^{-7}), which we can represent in purely spatial terms as follows:

* $(2\times10^{-7}) = (O_o / \pi b)(\text{Ao} / \pi \%_o^2)^7$.

If we leave out the hidden magnetic factor, we have the electron radiating over 35,000,000,000 (35 billion) times its mass every second, on top of which the electron is considered to be a point particle (with mass no less!) in the standard paradigm. If that were really the case, physicists would fold their tents and go home.

Another way to look at it is to imagine that the universe winks out of existence every 35 billionth of a second and then magically comes back to life. The existence of an unrecognized energy circuit nicely resolves the problem by conveniently turning the universe back on again after every wink.

See **The Incorporation of Light** by Miles Mathis, Chapters 6 and 7. ("An Analysis of Dark Matter", "The Galactic Rotation Problem (MOND)", and http://www.milesmathis.com.