# The Geometry

# of

# White's Dimensional-Shift Operator %

**by**

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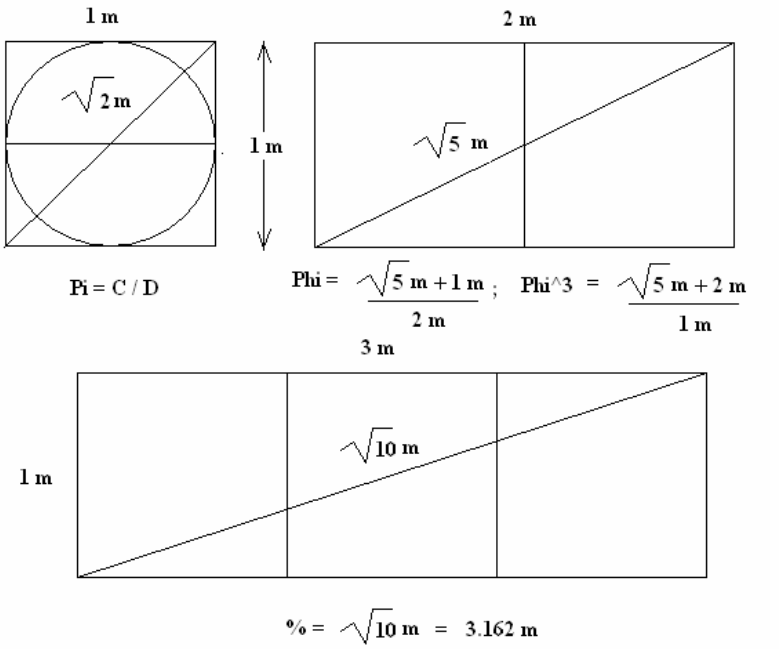



## Unit Circle and Unit Square Diagonals and Ratios

The constant ratio of the circumference of a circle to its diameter is called Pi and is a pure algebraic irrational number that approximately equals 3.14159.... If a circle's diameter is 1, the circumference is Pi. The diagonal of a unit square (each side has length = 1) is the square root of 2, another famous algebraic irrational number.

Phi is the ratio of the radius of a circle to the side of a regular decagon inscribed in it. There are many other ways to derive Phi. It is the ratio of the diagonal of a double unit square rectangle plus its height to its length. It is also the ratio obtained when a line segment is divided such that the ratio of its long part to its short part equals the ratio of the whole line to its long part. This is called the Golden Section. If (a) is the short part and (b) is the long part, b / a = (a+b) / b. This means that a^2 + ab – b^2 = 0. Also, a golden rectangle generates a fractal spiral of itself at increasing and decreasing scales. (For a diagram of this see **Observer Physics** Chapter 17, p. 25.)

The triple unit square rectangle receives much less attention, but has a similar fractal structure. It also plays a key role in both geometry and physics. Its diagonal is the square root of 10, or 3.16227766.... Let's explore it a bit. If we draw a circle with any size diameter, and erect a perpendicular from the diameter to the circle at any point and connect the junction of the perpendicular at the circle's circumference with the end points of the diameter, we get two adjacent similar right triangles that share the perpendicular. Therefore we know that wherever we erect the perpendicular (except at the diameter end points) we get such similar triangles, which means that corresponding sides of the two triangles have equal ratios. The shared perpendicular generates the condition that the ratios are always in the Einstein/de Broglie relation.

If (a) is the short portion of the diameter, and (b) is the long portion, and (c) is the perpendicular, then c / a = b / c. In other words, a*b = c^2. In the Einstein/de Broglie relation these are usually thought of as velocities, and c is the velocity of light that Einstein assumed to be constant. The other two velocities are the known as the group velocity (Vg, the short diameter portion) and the phase velocity (Vp, the long diameter portion.) The circle diagram shows that c need not be considered constant, and the dimensions of the relation may be simply thought of as distances since the time interval is identical for each component of the relation. (This same relation occurs with the geometry arranged differently when microwaves propagate through a rectangular klystron tube. See diagrams in **Observer Physics**, Chapter 6, p. 4.)

This Einstein/de Broglie relation has the same general structure as the Phi Golden Section except that the Phi section divides the diameter of the circle at a specific location that generates the Phi Ratio.

For example, if the perpendicular is 1, the long diameter segment is 1.618, and the short diameter segment is 0.618, then the large chord is 1.902, and the small chord is 1.17555. The two chords form another Phi Ratio. The ratio 2.618 / 1.618 is the ratio of the sums of the two legs of each triangle, which is also Phi. Thus,

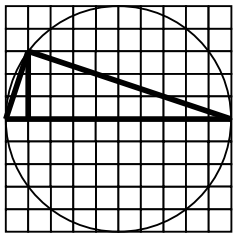
- 1.618 / 1 = 1 / 0.618 = 1.902 / 1.17555 = 2.618 / 1.618 and so on. Or,
- 1.618 / 0.618 = 0.618 / 0.236 = 1.732 / 0.6615, and so on.

The second example sets up a ratio of 2.618 / 1, or Phi squared. Note that 1.732 is the square root of 3.

If we set the diameter of our circle at 10/3, the long diameter segment at 9/3 (i.e.3), and the short one at 1/3 (or .3333), then the long chord to the perpendicular is 3.162, and the short chord to the perpendicular is 1.054. The perpendicular itself represents

1 unit. We get, then, the following ratios:

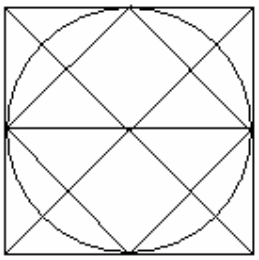
- 3/1 = 1/.3333 = 3.162 / 1.054.



(Each square on the grid = 1/3.)

These numbers are very interesting because they show up in the speed of light (3x10^8 m/s), Planck's constant (1.054x10^-34 J-s), the quantum magnetic flux of a single proton (1 m), and the product of Planck's constant and light speed (3.162x10^-26 J-m). Squaring 3.162 gives 10, so even powers of it give powers of 10, and odd powers of it give 3.162 times a power of 10. The ability of this number to shift scale without shifting ratio leads me to call it the Dimensional Shift Operator. It is a very powerful number that is embedded in the universal physical constants. Because it represents a distance, when we take it to various powers, we actually shift dimensions in both the physical space of the world and the abstract mathematical space of geometry.

**Unit Square**



**Diameter = 1**
**Circumference = 3.1416 = Pi**
**Side of Small Square = .7071 = $\sqrt{.5}$**
$(\sqrt{.5})\ (\sqrt{10}) = \sqrt{5}$

Here is a circle with unit diameter (D = 1) inscribed within a unit square. The unit square's diagonal is the square root of 2. The circle's circumference is (pi D) = 3.1416. If we inscribe a square inside the circle, it has a side with the value .7071, which is the square root of one half (.5). This is also one half the diagonal of the unit square. If we multiply the side of the square times % / Ru (the ratio of the diagonal of the triple unit-square rectangle to its height, which is 3.1622, the square

root of 10), we get the diagonal of the double unit-square rectangle, the square root of 5, the key to Phi. So these constants are all intimately connected to each other.

## The Rydberg Formula that Links % with Phi

Here is a mathematical relationship that links the Rydberg constant to the D-Shift Operator and to Phi as well as the properties of the electron. The Rydberg number describes aspects of the behavior of electrons in atomic orbits. In the late 19th century J.R. Rydberg described the various series of spectral lines for hydrogen with a single equation:

- 1/L = R((1/n1^2) – (1/n2^2)).

Here L is the wavelength, R is the Rydberg constant, and n2 > n1, both being positive integers. The formula can be written in constants and reminds us of Coulomb's Law and the fine structure constant (a), which is not surprising, given that these all have to do with the behavior of electron charges.

- Rinf = (e^2 / 4 P eo)^2 (2 P^2 m / h^3 c).

Here P is pi, and eo is the electric permittivity of space, e is the quantum electric charge, m is the mass of the electron, h is Planck's constant, and c is light speed.. This Rinf assumes that the nucleus is infinitely more massive than the electron. Though technically incorrect, this is within 1% of the experimental value for hydrogen.

- Rydberg experimental values:
  - 0.10973731x10^8 m^-1, for infinite mass.
  - 0.10967757x10^8 m^-1 for hydrogen.

Below is a general formula that produces a good approximation of the Rydberg number. In the formula (x) is any number, (m) is a positive integer, and (n) is the decimal that corresponds to the given value of (m).

- x^0 = x^(mn + n^2) = (x^mn)(x^n^2).
- (m + n)(n) = 1.
- 1 = (9.1097722)(0.1097722).

For some curious reason the value of (m + n) when (m) = 9 not only gives a pretty good approximation of the Rydberg digit sequence as its decimal, but also looks a lot like the ratio for the mass of the electron, the behavior of which the Rydberg number elucidates.

Some other (m + n) values in the formula's set include:

- 1.618034 (PHI)
- 2.41421 [m + n = (square root of 2) + 1], [n = (square root of 2) – 1]
- 3.30377
- 4.236 (Square root of Phi / n = Phi + 1 = Phi squared)
- 5.19258
- 6.1622776 [3.1622 + 3 = (% / Ru) + 3]
- 7.14
- 8.1231
- 9.1097722 (n closely matches digits of Rydberg constant)
- 10.099
- And so on, with the n-decimals dropping off in value as the integers grow.

The value m = 6 gives us the value [(% + 3) / Ru], the ratio of the two long sides of the triple square's right triangle with the diagonal as hypotenuse to the rectangle's unit height. Compare this to the double rectangle's phi ratio and the formula given in the diagram for phi cubed.

The D-Shift interval divided by the unit Ru = 1 meter gives the pure number, square root of 10. Taken to even powers this ratio gives any power of 10 we desire. The inverse tenth power of this ratio (Ru / %)^10 times (m + n) when m = 9, times the mass of the proton (Mp = 1.67x10^-27 kg) times the ratio of the area of a unit sphere (As) times its circumference (Oo) to pi (P) times its volume (Ss) gives us a very close approximation to the mass of the electron (Me), or 1 / 1836 th that of the proton.

- Me = (m + n)(Mp)( As Oo / P Ss)(Ru/%)^10. (Where m = 9.)

**Neutrino "Mass" Estimate and the D-Shift Operator**

I first derived my predicted mass for the electron neutrino (Mne) based on a theoretical calculation of the Compton Effect with a de Broglie "radius" of (%). I initially wrote it down as follows based on a pure estimate that the neutrino had to have such a small mass that it was really not much more than a zippy photon with a bunch of generally autistic linear momentum. Electrons like to interact, but neutrinos are neutral and generally just pass by silently.

- Ldb = h / Mne c.
- Rdb = H / Mne c. (where H = h-bar)
- Mne = H / Rdb c.
- Rdb = %.
- Mne = H / % c = 1.111x10^-43 kg.

The problem with this formula was that I could not justify my use of (%) other than that it felt right and gave the fractal numbers: (3.162 and 1.1111, or 10/9, which is the square of 1.054 the ratio value of Planck's constant.). The mass was small enough that Mne would seem to be a particle without any rest mass in the conventional sense. I envisioned the hypothetical mass as right at the crossover between linear momentum and rest mass. This estimate also represents a threshold in the collapse of undefined energy into a defined particle.

Here is another derivation of this same predicted "mass". It is not really a rest mass because the mass-energy is always extremely dynamic. (H c) is a factor that shows up very often in quantum physics. (For example, see the Rydberg formula just noted above). The (H c) is also often written very obscurely and obtusely in so-called "natural units" as 1 GeV^-1 = .197 fm. This conceals the presence of the D-Shift Operator. Here "fm" means femto-meters. The conversion is that 1 eV is 1.602x10^-19 J. The product of this "distance" GeV^-1 times 1 eV is 3.162x10^-26 J-m, which is the true value of (H c). Physicists often deliberately delete the (H c) factor in the name of "simplification" of their equations, but this just hides what is going on. Only when you fully understand the fractal structure of mass-energy can you shift to a unitary viewpoint to work your transformations. Planck's constant defines the smallest scale, and light speed defines the largest scale (upper speed limit for matter) in the physical world. These two constants appear to set the boundary conditions within which the universe's physical laws function.

- (H c) = 3.162x10^-26 J-m = (%)(10^-26 J).
- 10^-26 J = (1.111x10^-43 kg)(c^2).
- (H c) = (%)(Mne)(c^2).
- H = (%)(Mne c)
- Mne = H / % c = 1.111x10^-43 kg = (10/9)(10^-43 kg).

In other words the magic quantum constant factor (H c) can be interpreted as White's Dimensional Operator times the total conversion of an electron neutrino into energy. We surmise this by setting (H c) to be equal to some mass times a distance times c^2. This gives us a clue to the basic energy quantum of our universe, the value 3.5136x10^-43 kg-m. Theoretically the mass and distance could have any value as in the usual Heisenberg relation, but we know the neutrino mass is much smaller than that of an electron. The Compton radius for an electron is in the range of 10^-13 m, and the Compton radius for a proton is 1836 times smaller, in the range of 10^-16 m.

So we know that the radius increases rapidly as the mass decreases. At some point we reach the crossover between a particle and a wave. Given the neutrino's tiny mass, we can estimate the crossover at somewhere near our scale, when we start to describe things as waves, such as average surf on a beach, rather than particles. We would hardly call beach surf a particle if it has the mass of a neutrino.

The number 10 happens to be (% / b)^2, where (b) is the quantum magnetic flux of the neutron/proton (b = Ru = 1 meter) and b^2 is 1 weber. The neutron rest mass (Mn) is as follows:

- Mn = P e b / c.

Here P is pi, e is a quantum of electric charge, b is a quantum of magnetic flux, and c is light speed. We could also think of (P b) as describing a circle with diameter b and circumference of pi meters. The ratio of this pi cycle with the speed of light gives us a standard clock by which a quantum of electric charge oscillates to generate the illusion of a proton mass.

The number 9 is the ratio for (c^2). The number 1.1111 is 1.054 squared. The range of 1 meter to 3.162 meters seems about right for the neutrino. Also, this way the ratios weave an elegant fractal relationship. We have a rest mass for the proton (Mp) and have an experimental Compton value for the wavelength radius by scattering photons near protons. The problem is that we still don't have a tested numerical value for either mass or length for the neutrino, although there recently is evidence supporting the notion of some tiny mass. The neutrino has no charge so it has no Compton wavelength in the normal sense, but the equivalent is probably what is called neutrino oscillation. A neutrino is an energetic photon that self-interacts as it moves along and also interacts with other neutrinos that happen to travel with it.

Let's go back to the fine structure constant (fsc) or (a) that I mentioned earlier and plug in our hypothetical neutrino mass and its corresponding Compton radius of %. (We could substitute known electron or proton values just as well.)

- a = (1 / 4 P eo) (e^2 / Hc) (Here we use H to represent Planck's h-bar.)
- a = (1 / 4 P eo) (e^2 / (%)(Mne)(c^2)).
- Mne = e^2 / (4 P eo) (a)(%)(c^2).
- Mne c^2 = e^2 / 4 P eo a %.

This gives us another elegant hypothetical formula for the electron neutrino in terms of its "rest" mass or its "rest" energy. This suggests that the neutrino may have a

connection to charge and probably operates via the fsc relation just as other leptons. Since the electron, muon, and tauon all have charge, it is odd that the neutrino apparently is electrically neutral. It may be that neutrinos actually form a neutrino gas somewhat analogous to hydrogen gas. Positive and negative neutrinos may bind in pairs that cancel their incipient charges. The neutrino mass is so small that the binding energy of the incipient quantum charge overwhelms the mass, and you just do not find any charged neutrinos floating around anywhere – only neutral pairs in which the charges are exactly balanced. The neutrino pair circulates energy within itself, giving the illusion of a particle without charge. Another way of interpreting this hypothetical structure is to say that we have a highly energetic photon whose vibration appears to loop around in something like a tight figure eight. It is not tight enough to be an electron. I don't know how to test that idea since we already have a hard time even detecting neutrinos. But it may shake out of a clearer understanding of the nature of charge, which is another big question. (**Observer Physics**, Ch. 10.)

The interpretation I give for using the value % is that the electron neutrino, though very close to massless, is actually smeared out over a distance of about 3.162 meters on the average. This, of course, is what the Compton Effect means. If a photon scatters off an electron, the electron moves off at an angle and the photon also shifts by an angle. Photon energy transfers to the electron and simultaneously drops the frequency of the photon. That is the same as saying it lengthens its wavelength. This wavelength shift is given by the relation: h / Me c, where Me is the rest mass of the electron. In the case of the neutrino, the Compton Effect is a **self-interaction** due to the high frequency of the photon vibration and hence the density of the energy. We use H (i.e. h-bar) instead of h to look at it as a radius rather than a wavelength. The self-scattering photon can't quite pull itself into the form of a black hole, but it vibrates back and forth in space/time with a "radius" of about %. (This additional vibration is not the same as an ordinary photon wavelength. It is like an overtone due to energy density.) I suspect it may look like a tight lazy eight oscillating not only in space but in time as well. That cancels out the incipient charges, an opposite one on each of the two loops. When lots of neutrinos stream together, they also oscillate among their various types, especially between muon and electron neutrinos. At the electron energy threshold the lemniscate photon overtone vibration form tightens until it turns into a pair of mutually time-reversed vortexes as discussed in **Observer Physics**, Chapter 11. Those vortexes can appear to float apart, giving the impression that the electron and the positron are separate particles. But they are always bound by photon exchange and eventually annihilate entirely into photons when they come together.

The neutrino and antineutrino are the same particle distinguished only by left or right handedness. Thus, unlike photons that always go in conjugate pairs, the neutrino resembles the electron. Photons have spin 1 because they are their own antiparticles. A photon moving through space from an electron to a positron carries a space/time reversed photon that runs from the positron to the electron. To the observer the two seem to be just a single photon. But in a wave guide, the photon pairs split apart scattering at different angles and velocities forming what we call group and phase waves. The group photons go slower than c, and the phase photons go faster than c. The interaction always equals c^2. An electron is a wave guide structured like a white hole vortex. Photons emerge from the electron's center and spiral outward in a Phi spiral. The velocity is slow at the center and increases to c at the outer rim. Then the photon travels through space at c velocity to a positron (positively charged particle) and spirals inward. As it spirals inward, it slows down. When it reaches the core of the antiparticle vortex, it tunnels back in space/time as an anti-photon to the core of the electron, where it emerges in space time again as a photon. Thus the ensemble forms a double vortex loop which is really a single hour-glass shaped vortex that appears to separate into two oppositely charged vortexes. The antiphoton portion of the loop occurs in the observer's consciousness. The antiphoton is what we might call a particle of attention. The observer's attention antiphoton travels backwards in space/time to the object of attention located somewhere and somewhen in the past, and then the object sends a photon forward in space/time to the observer. Thus the electron is only half a particle, the other half being its partner antiparticle at the other end of the photon exchange. The most common such exchange occurs as bremsstrahlung radiation between orbiting electrons and their atomic nucleons. The photon exchange resembles handshake routines in computer communications, except that one side goes faster than light, so the handshake is truly a simultaneous handshake over a gap of space/time. The light that we see usually is due to orbiting electrons dropping to lower energy states. They give off excess energy in the outward direction as a sort of reaction bremsstrahlung as the electron falls inward. Orbiting electrons also absorb photons and kick out to higher orbits. This is actually a special case of the Compton Effect. The photon really wants to get to the positively charged nucleon, but hits the outer electron shell instead and disturbs it.

The electron is photon energy that reaches a threshold of energy density where it forms a white hole vortex. The positron is its black hole partner. Photons spiral in a stream out of the electron's singularity (actually a Planck-scale wormhole) giving the electron the appearance of quantum "spin". They boil out into space at speed c

(they go much slower close to the central Planck hole). Then they fall spiraling into a positron black hole and return backward through a wormhole in time to the electron-positron bifurcation point in the vacuum. Attractive charge arises as the desire of electrons to fuse with their positron partners and return to their original unity in the vacuum (this is just like gravitational attraction, but on another scale.) Like charges reflect a resistance between like particles because they are interacting white holes, each with energy spewing outward (or inward if they are black hole positrons. The electron is focused down to within a radius of around 10^-13 m. A proton is focused down to a radius around 10^-16 m. The more massive the particle, the more focused it is in a location. It also tends to move more slowly. It is denser and heavier. The electron wave packet still spreads quite rapidly as it evolves over time compared to a proton.

The neutrino is really a hybrid. It is a photon looping around in space-time. But it is also like an electron in the sense that it is only half there. The other half (the anti-photon loop) is in the mind of the observer. The loop is longitudinal, so that when it loops forward it goes faster than light, and when it loops backward, it goes slower than light. Each loop half has charge, but the charges mutually cancel. The whole loop maintains the Einstein/de Broglie relation. However, neutrinos are all left-handed loops, and all anti-neutrinos are right-handed loops. This handedness bias occurs as the first symmetry breaking after the Big Bang. All neutrinos have right-handed partners in the observer's mind. Anti-neutrinos have left-handed partners in the observer's mind. But because neutrinos have no net charge, they do not interact very much. But they do oscillate among themselves. This is caused by the interactions of their widely dispersed charges. Neutrinos do have polarity, and we can control or manipulate them through that highly diluted charge. (It is diluted because it is a quantum charge spread out over 3.1622 meters.)

If we reduce the mass of a neutrino by several orders of magnitude from my predicted value, its overtone smear goes up by just as many orders of magnitude (since H and c are constant). This quickly leaves the realm of what we could even conceive of as a "localized particle" and retains only its quantum photon nature. The photon no longer self-interacts to form a loop, but just passes between larger charged particles. Therefore the range of 1-3.162 meters marks the crossover point between waves and particles, the threshold at which we can begin to conceive of a tiny "bullet" of matter. I am not sure we can pin it down more than that in the lab, but the techies can get very clever, so I suspect we will get better and better approximations. I think it is also remarkable that the neutrino crossover seems to be right at our humanistic scale.

This suggests that as self-conscious humans we may have some very subtle interactions with neutrinos. There may be neutrino beings that are about our size. They interact only very weakly with us from our point of view and seem rather ghostlike and invisible, almost transcendental. Lacking EM charge they can pass right through walls, even fly right through the core of the earth. Lacking all but a trace of mass they can travel at or near light speed vibrating back and forth longitudinally in their direction of travel in space/time. They can consciously phase conjugate and move at superluminal speeds from one quadrant to another in the universe. They have no trouble stepping right into the core of a star, and spew out from there in huge numbers. They may actually govern the universe from a very subtle level as the most refined form of solid-body light beings possible in our physical world. They operate from a stable neutral status that is not conditioned the way ordinary light or matter particles are.

There may be a technology for transmuting between charged matter bodies and neutrino forms. The latter are physical, but essentially immortal and not subject to the forces and limitations of ordinary matter. They survive from shortly after the Big Bang until nearly the end of the Gnab Gib either as free entities or as standing waves inside protons and neutrons.