Modeling the Propagation (New Equations)

Before we describe how a compound, toroidally-arranged periodic system, once accelerated, evolves in the ways described by the classical quantum mechanics, including bonding, pair photon production singularities and so on, we need to model the basic rest vector function and how it accelerates. The paradoxes and conundrums in what we classically observe are the result of a more simple geometrical system that has been obfuscated by its practical application. Like trying to get a camping tent back into it's original bag, having knowledge of what the original conditions were greatly simplifies the process. Those fundamental behaviors which form most of the standard laws of physics, including the uncertainty principle, will prove to be straightforward effects of superimposed sinusoidal functions.

At first glance we might say that total energy is about total quantity of velocity incorporated in a particle or particle structure. But velocity alone is not enough to make the universe tick. It is the gradient of velocity, (i.e. the average density of change in velocity). It is about the state of the acceleration at any given location.

Yes, the total energy of a particle's structure represents the amount of spacetime that is included in its footprint, (and "spacetime" is just velocity @c), that inclusion is specifically a transition to a different acceleration/gradient state. Total observable particle energy acts as what we call energy because of the acceleration state it represents. We know this intuitively from macro kinetic Newtonian mechanics, but we can now understand how particles "make things happen" because their simple existence represents a "potential" in the form of acceleration state structure, (an acceleration with respect to the background medium). When particles interact, they alter one-another's quantity of this acceleration structure.

From the classical viewpoint, we must use the mass measurement for the "how much" (m) and then apply the velocity of that how-much, as in ($1/2mV^2$ and mc^2). There are two problems there.

1. We must contend with the mysterious and nearly incalculable intrinsic trigonometry of how these intrinsic velocities exist on an equivalent footing with measurements of macro linear motion, (while they are moving).
2. We must transform these calculations when the kinetic velocity increases, to adjust the variable of time and space, for relativity.

When we consider both of these problems together, they hint at a shift in perspective, where the assumptions, (as variables are concerned), could be more rationally congruent.

The first issue is: From what we have empirically observed from the 19th century to now, it is natural to have developed the assumption, (from our relativistic perspective as viewers in inertial frames), that time and space change when you speed up or are otherwise in a field. With time and space being seen as existential intrinsic properties of the universe. We have even undoubtedly proven that time and distance variables change for a thing, when our measurement of the variable of linear velocity for that something changes.

The second factor is that it is also natural to assume that the rock or satellite or neutron that speeds up and then slows down, has done so with a fixed amount of mass, (it is almost absurd to think any differently). We exists as complete things, rocks are whole things and so on. Except that all the evidence points to a different reality. Classically we have assumed that, (from the standpoint of energy valuation), acceleration causes the velocity of an object to vary, but the mass remains fixed, (because that makes for a better gut instinct).

But experiment has thoroughly proven that the entire landscape of accuracy of our math must relativistically contort and transform around the gorilla in the room, which is the mysterious invariant velocity c. This velocity c is the speed that all things ultimately reduce-to intrinsically, it is the maximum speed and is the fixed point that our math must use to adjust all the time and distance variables when we measure a slower speed. When you are going to tackle a running back, and he tries to juke you, it is of paramount importance to not be deceived by the motion of his shoulders, arms, head and legs but to focus on his hips. When you navigating a house of mirrors, you must focus on the invariant frames, not the distorted images. We must focus on c.

But experiment has vigorously pointed out an elephant that is also in this room, which is the phenomenon of so-called relativistic mass. The mass that intuitively is fundamental to an object and behaves as though it increases in amount, as it approaches the speed of light. Classical rationale says that since our workaround math is successful at describing things with an invariant mass, why rock the boat? This betrayal of the classical intuition is once again, loaded onto the strained contortions of the relativistic transforms. But with both a gorilla and an elephant in the room, something is beginning to stink.

So the two vantage points in the use of variables that would seem to be changeable, in order to rectify these complications, (at the protest of classical conclusion), would be to acknowledge-completely something that we have already in fact observed empirically and have so far, informally been discussing in this paper:

1. Velocity is 1-D and is invariant in a truly absolute sense, from the standpoint of energy calculation, (i.e. c is literally the only velocity that exists and it exists at all scales in spacetime. Only direction varies.)
2. Mass is the amount of this spacetime that is conformed differentially and the amount changes as a particle is conformed to take on kinetic velocity (non-intrinsic velocity), causing an increased footprint in the spacetime. As the result of being superposed with the "footprint" of other structured particles, it makes intuitive sense that acceleration increases the amount of structured spacetime (mass) a particle incorporates.

When these two vantage points are shifted, we can eliminate the problems of unwieldy trigonometry for total energies, and eliminate mind-bending Lorentz transforms, examine dilation and a host of other properties directly and geometrically. Instead of viewing quantities of energy from the vantage point of an inertial reference frame, we must view energy from the standpoint of the invariant medium. Instead of treating macro velocity (relatively-linear/kinetic, non-intrinsic velocity), as an equivalent to intrinsic velocity, we must treat kinetic velocity as a derived, composite phenomenon, based on differential structure alone.

We must begin the written math from the fundamental basic truth of the differential relationship of the heat equation that will govern the structure of the intrinsic geometries. Macro phenomena will take place according to alterations of those geometries, via, again, only the core differential relationship.

1. c=1 so the velocity vector V=[x,y,z]=1 at any given non-relative time (t)
2. As a function of x,y,z and (t) the heat equation dictates that specific vector arrangements/periods in space will yield stable fixed-period regions where the gradient and time derivative of the velocity vector are consistently less than where the period is unstructured, (more random). Both random and non-random vector accelerations will be accounted-for.

So we will be modeling a 3d vector of velocity c, with direction that changes as a function of x,y,z,t with a set of differential equations to govern.

We will of course need a periodic element with a core period driven by (t) so we will choose cos(t) as convention. The value of the vector direction [x,y,z] at point (x,y,z) will be 3 cos functions, one for each vector component, each functions of the location x,y,z and time.

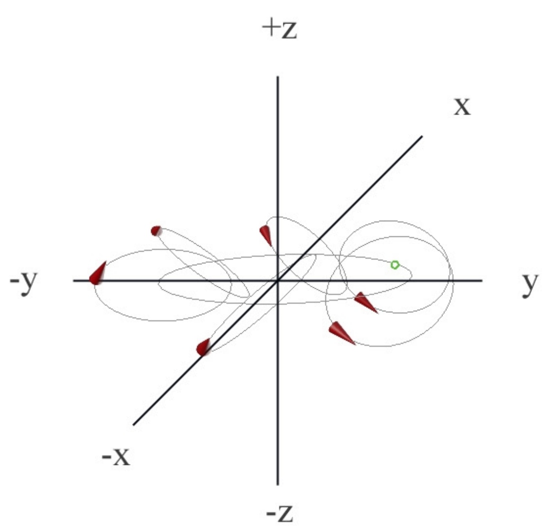
To begin sketching out the toroid time/space differential relationship we can just go ahead and note that the phase of our cos function for the component in the direction of the primary axis will change 180 degrees from one side of the primary axis to the other, so we will insert the spacial variables into the opposite and adjacent ratio "Tan-1" for this.

$$\vec{Vx} = \cos(\lambda t + 3pi/2)$$
$$\vec{Vy} = \cos(\lambda t + 0)$$
$$\vec{Vz} = \cos(\lambda t + Tan^{-1}(y/x))$$

One Tan-1 phase change consideration represents the spatial layout of the rest toroid, but as we have discussed, the presence of other toroids in proximity (F) will have their near-side states superimposed on the rest particle of reference (R). Putting on our thinking caps, we can describe what happens with this lop-sided superposition of gradient-minimizing structure.

As we have said, the fundamental action of spacetime is a 1-D action that finds its minimum energy path as a 2-D perfect circle and given there is a third dimension, the lowest acceleration 3-D structure will be a distribution of 2-D planar accelerations that array themselves in a lowest energy configuration, where the 2-D planar accelerations are able to maintain lowest relative velocity vector directions with their neighbors by the phase difference around the tangent of the toroid, (minimizing pressure, so to speak, through the third dimension).

At the most basic nature of purely angular motion of a vector in 3-D space, this means the phase timing between x,y and z vector components will always have two components with the same sign (or one of them zero), and one component with the opposite sign. Although this fact seems trivial, it is that basic arithmetic of the odd-parity at the "decision making", taking place in the spacetime differential. When we observe the superposition of two structures, both wavefunctions minimizing the differential, this parity will be of key importance when analyzing how the phases between xyz, of the two structures drive the differential for the structures to rotate in a particular way.



As the Pauli matrices attest-to, what becomes of the basis vectors in the spinor rotations is considerably befuddling. So in order to constructively dissect the phase-relationships, we will adopt a convention to represent an initial coordinate basis that corresponds to an initial orientation of the toroid structure and allows for examination with some semblance of sanity. At first glance the question might arise, “how is it possible that all fermions have this same initial orientation”. They don’t of course, but what becomes of their phases follows the same mathematical relationship, but any old random initial orientations aren’t very friendly to think about.

So we have 3 functions one for each dimension, all periodic in t and with the spacial variables x and y included in the inverse tan as a phase shift for the flipping of the sign of the z component on one side of the toroid z axis or the other.

This is nowhere near complete yet but gives us foot in the door and a chance to get a first glance at how our differential circumstances might eventually work.

$$\vec{V}x = \cos(\lambda t + 3pi/2)$$

$$\vec{V}y = \cos(\lambda t + 0)$$

$$\vec{V}z = \cos(\lambda t + \mathrm{Tan}\ (y_0/x_0)) \rightarrow \frac{\partial^2}{\partial x^2}\left(\cos\left(\lambda t + \tan^{-1}\left(\frac{y}{x}\right)\right)\right) = -\frac{2\,x\,y\sin\left(\lambda t + \tan^{-1}\left(\frac{y}{x}\right)\right)}{(x^2+y^2)^2} - \frac{y^2\cos\left(\lambda t + \tan^{-1}\left(\frac{y}{x}\right)\right)}{(x^2+y^2)^2}$$

y_0 = y - (y coordinate of particle initial location)
x_0 = x - (x coordinate of particle initial location)

The final set of heat equation differentials will be $dV/dt = d^2V/dx^2$ for each spacial dimension and with the full velocity functions, but in order to ease into the derviative anatomy, we can note a few things to begin with:

1. The larger x and y get (reference point farther from the particle), the smaller the amplitude of the gradient, (less “unpinching” via organized toroid curvature)

2. The y^2 contribution from the term on the right will be more significant than the non-squared term on the left, in the total gradient, when y>1, (and less significant than the left when y<1. This will be important in the full equation, (in full context), as it will reflect a moving particle passing by the x,y,z point.
First the gradient increases, then begins to decrease as the sign of y^2 remains - and becomes dominant after reaching a point where the scalar makes it >1

The invtan element in the phase causes a larger gradient magnitude as a point x,y,z gets closer to the particle location. We also see that since the distance variables come out in the first derivative with respect to x, the second derivative in x results in a squared amplitude periodic subtracted from an unsquared amplitude periodic. When we get to the next step of building the equations, (superposition with other particles), this will become important in function evolution.

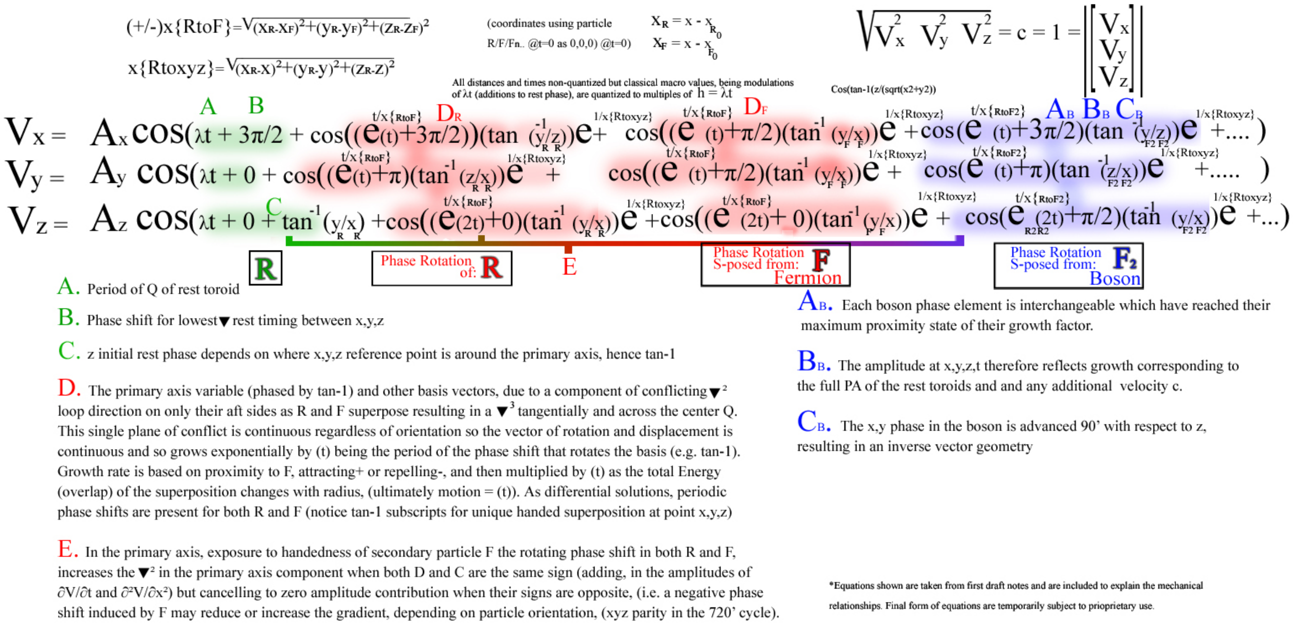
When taking partial derivatives of periodics or exponentials, the argument inside the functions pop out as magnitude for the derivative. When we then take the second partial, we must do the original partial of the periodic again but also take the derivative of that initial magnitude element that popped out. In this way, the squared term is a magnitude artifact that will include important scalar information about position that will calibrate how the system evolves.

But upon inspection, although these three functions sketch a basic toroid frame, they do not model how such a toroid would exhibit the properties of observables in spacetime. For instance, this theoretical absolute-rest toroid, although useful in understanding the structure of the particle's differential, does not actually exist in nature. The sheer nature of dark energy diffusing in neutral Euclidean space necessitates that any particle will have an antiparticle with which it has an acceleration relationship. These particle antiparticle pairs will form at evenly distributed angles with respect to one another, and so spacetime will be random and particles will be accelerated. We must account for that.

Also with, the initial equations we have so far, the gradient increases with proximity to the particle, this is no good and is even a bit confusing. As we have explored at length, observable particles should represent a distinctively lower acceleration on average, when compared to the vacuum, (a greater sustained diffusion). For this to be justified, we must put our periodic functions in the dark-energy context. We must include the non-observable aspects of the function. Only in comparison to the dark-energy-induced ambient gradient behavior, will the observable structures make sense in the differential.

This context will happen via phase shifts to the core time-dependent period, (i.e. the pure-angular element). We have already alluded to this by the presence of the invtan element, where its phase shift fills a kind of trajectory-shaping duty for the periodics. But in order for a shaping-action to make something observable, a structure must make the shapes IN something, (some kind of medium).

We have discussed at length that the entire nature of spacetime and the ability for observable things to arise from it is the direction vectors arrange themselves in order to be at lowest energy (lowest relative velocity), and observables being sustained patterns of lowered-energy configuration, (sustained lower relative velocity). This vector pattern shaping must take place by way of foreground-background relationship made of synchronized periodic phase shifts from fermions contrasted with unsychronized phase shifts from countless boson structures, all playing out on the canvas of the derivative magnitudes.



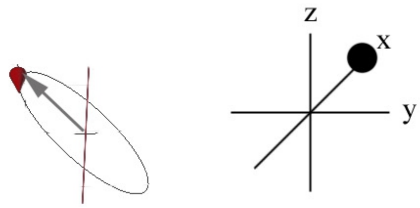
Within our original 3 periodic functions we have added phase-shift elements that represent the superpositions with other toroids. For reasons we have discussed, these overlaps result in the rotation of the planes of pure angular motion in a toroid we are modeling the math for. These rotations, as mentioned are themselves periodic, since the other toroid in the interaction is also rotated. It follows that the Boson phase-shift elements (depicted in blue). Although the complete equation would include an infinite number of bosons, a reasonable number approximating randomality will suffice, (shorthand methods exist as well to simply represent a random phase shift element).

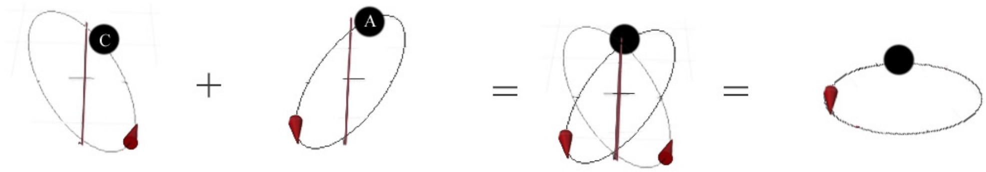
Before we delve into how these phase shifts work, it is worth remembering the significance of Euler's growth featured in this context. As we have discussed, the texture of spacetime is a texture of accelerations represented at any point by a chain of derivatives, (one point accelerating the next vie heat equation and so on), and so an infinite series of accelerations at any given point x,y,z,t reflects the state at that point. The interactions of acceleration structures take place via superposition of phases, with magnitudes defined by the infinite series, (with their proximities as the argument).

The lop-sided (spinor-handed) differential superposition that another fermion or boson will present to the particle we are modeling, will result in a rotation of the structure. This will cause a superposition and interaction of their two acceleration states, each represented by an exponential. The phase shift that is caused will be one that gets larger and larger as particles propagate together (as they present each other a greater overlap), or diminish as they repel. So fermion-fermion superposition necessarily means exponential growth, at a rate based on initial radius between the particles and a simple time evolution. But lets look at each element of the functions individually.

In the diagram, A and B (in green) are the core pure-angular rest mass elements, where based on the static phase shifts, a 2-D planar acceleration is taking place at any given time. The base intrinsic wavelength λ being the Planck constant or simply the observation of a pure angular circle in spacetime, (with no further intrinsic motion).These static rest phase shifts govern what plane this circular path will assume at any given time. The total toroid structure, again, is arranged so that Q regions of this core wavelength can be arranged in space in such a way as to minimize the relative velocity between the planes, around the z axis.

The periodic phase shift in red DR and DF represent the differential increments imposed on the phase. For a particle R influenced by a field from particle F, the state of spacetime at x,y,z,t will involve a periodic phase shift element that results in both particles R and F. This might seem counter-intuitive but we must remember that both acceleration states are superposed. The derivatives of the equation show a net rotation that translates to the periodic phase shift DR. But we must consider that the same thing is happening at some distance in F, and so DF is also a periodic phase shift element. As the solution to a set of differential equations, we see the “cause” and “effect” taking place in the same phase shift elements here.





Denotes background (in perspective)

To be specific, we can choose a snap-shot point in the phase, between opposite charges R and F, located at the Q on the “aft” side of R, and note that two planes of acceleration are constructive to the diffusion paths of both R and F and one plane is destructive. This happens because two vector paths, both with odd-parity vector directions at any given time (-x,-y,z or x,-y,-z etc), combine their accelerations which are dictated by the differential, such that at any given time, one spacial direction will violate the need for the odd parity. The spacial dimension that is either positive in both superposed particles (R and F), or negative in both R and F, will be the dimension both particles will have vectors of acceleration -away from-, (i.e. there will be components of increased gradient (conflicting components of velocity) in that dimension, causing a rotation.

This means, (according to the heat equation equality), a corresponding component of acceleration dt perpendicular to the rest acceleration is present, causing a rotation toward a new lowest-energy path, (the path that they both constructively had in common). So in the diagram, both paths of acceleration (based on the phases of R and F at x,y,z) would get their z components “pinched”, resulting in a increased gradient, but this supposed path doesn’t get the chance to cause an overall increased total gradient, because any small total gradient increase causes the rotation that propagates through the entire toroid, to the new lowest E path, hence the rotation and so we can know the direction.

There are two uses of the exponential as quantities that grow. Both of them represent the pure-angular arc length increase of time, translated to the angular arc length it will produce at some distance away, via the infinite series. As we have covered, the acceleration of a vector at point 1 is translated through whatever number of Q states to point 2, represented by the magnitude of the nth derivative of the function at point 1, (and so the need for the factorial in the series).

An increment of arc length (t) in particle F translated this way via infinite series and reaching particle R, whereby the resulting arc incremented length physically functions as the incremented gradient in R, (because of the geometry) with a component in the direction of F and an angular component (perpendicular to the rest acceleration on the aft side), due to the lop-sided spinor superposition. In this way, time directly translates to linear and angular displacement, via the exponential function used as the period. So in this way we get the classical observation that E=hbar(f) and the acceleration by another particle causes the increase in frequency of the phase-shift, (and the frequency of the particle as whole).

Although we can say the exponential function serves as the period for the phase shift, it must be pointed out that, combined with the inverse-distance growth rate, the exponential serves to steadily increase the differential increment of time itself. As we have discussed in concept, the observable particles convert, (re-structure) the random acceleration directions of dark energy, so in this way the differential increment of time that is increasing the vector of rotation in R is indirectly being "pulling" that time from the arc-length of time that would otherwise be devoted to some random dark path. We see vividly how the pure-angular path of energy to satisfy the minimum energy path is non-relative time itself, being exchanged from its dark format to accelerate a particle etc.

This will be explicit when we discuss the other (random) phase-shift elements present alongside this R and F rotation relationship. We will be able to directly see how the growth of the differential progress of time in the phase shift elements labeled DR and DF in the diagram, "steal" magnitude away from the gradient that would otherwise be the result of the random-period boson phase shift elements. When the fermion phase shift element increases its footprint, the ambient boson phase shift decreases its footprint, (in the derivative magnitudes), as the pure-angular action becomes more synchronized spatially, (i.e. less gradient).

Now, because time continues to increment, the periodic phase shift grows in frequency exponentially, but this exponential is then also multiplied times time (t) again, since the periodic phase shift is itself a function of t. This makes intuitive sense because the arc length of time from F, produces an increment of gradient in R displacing the symmetry-center of R physically closer toward F and that increment itself then grows because a closer particle means a greater magnitude of gradient imposed in that footprint. But as the particles get closer, since they are mutually superposing on one another, they both increase their capacity to produce the accelerations that translate across distance through the exponential.

So, the increment of formatted time that F "pushes" into the gradient of R, pushes R and F closer together, reducing the distance between them (and so F's intensity is "more pure" in the infinite series when it reaches R, i.e. has a larger PA). In other words particle-particle acceleration causes the probability amplitude imbalance across their centers to "grow" the amplitudes specially as time passes, in the direction of motion and then since the grow closer together the rate of growth also grows with time.

So simultaneously the extra overlap increases both F and R's effective mass, (and so increasing the structures that are the acceleration state to begin with). As we will see, the "relativistic" mass can be determined directly by the magnitudes of these phase-shift elements, which get larger as they attract and increase frequency and momentum. In effect, time (t) has a less-diluted overlap when they are closer and this has the double effect of making for larger structures that overlap, (i.e. mass). Hence time is present in the argument of the exponential and then also multiplied by the exponential to make up the periodic phase shift element.

$$\frac{\partial Vz}{\partial t} = \frac{\partial^2 Vz}{\partial x^2}$$

$$\boxed{\frac{\partial Vz}{\partial t}\Big(\cos\Big(t+0+\tan^{-1}\Big(\frac{y_R}{x}\Big)+\cos\Big(\Big(\exp\Big(\frac{t}{x}\Big)\,t+\frac{\pi}{2}\Big)\tan^{-1}\Big(\frac{y_F}{z_F}\Big)\Big)\Big)\Big) = \frac{\partial^2 Vz}{\partial x^2}\Big(\cos\Big(t+0+\tan^{-1}\Big(\frac{y_R}{x}\Big)+\cos\Big(\Big(\exp\Big(\frac{t}{x}\Big)\,t+\frac{\pi}{2}\Big)\tan^{-1}\Big(\frac{y_F}{x_F}\Big)\Big)\Big)\Big)}$$

$$\frac{1}{x}\Big(e^{t/x}(t+x)\tan^{-1}\Big(\frac{y_F}{z_F}\Big)\sin\Big(\Big(t\,e^{t/x}+\frac{\pi}{2}\Big)\tan^{-1}\Big(\frac{y_F}{z_F}\Big)\Big)-x\Big)\sin\Big(\cos\Big(\Big(t\,e^{t/x}+\frac{\pi}{2}\Big)\tan^{-1}\Big(\frac{y_F}{z_F}\Big)\Big)+\tan^{-1}\Big(\frac{y_R}{x}\Big)+t+0\Big) = \Big(-\Big(-\frac{y_F\big(t\,e^{t/x}+\frac{\pi}{2}\big)}{x_F^2\big(\frac{y_F^2}{x_F^2}+1\big)}-\frac{t^2 e^{t/x}\tan^{-1}\big(\frac{y_F}{x_F}\big)}{x^2}\Big)\sin\Big(\Big(t\,e^{t/x}+\frac{\pi}{2}\Big)\tan^{-1}\Big(\frac{y_F}{x_F}\Big)\Big)-\frac{y_R}{x_F^2\big(\frac{y_R^2}{x_F^2}+1\big)}\Big)^2$$

$$\Big(-\cos\Big(\cos\Big(\Big(t\,e^{t/x}+\frac{\pi}{2}\Big)\tan^{-1}\Big(\frac{y_F}{x_F}\Big)\Big)+\tan^{-1}\Big(\frac{y_R}{x_F}\Big)+t+0\Big)\Big)-$$

$$\Big(-\Big(-\frac{y_F\big(t\,e^{t/x}+\frac{\pi}{2}\big)}{x_F^2\big(\frac{y_F^2}{x_F^2}+1\big)}-\frac{t^2 e^{t/x}\tan^{-1}\big(\frac{y_F}{x_F}\big)}{x^2}\Big)^2\cos\Big(\Big(t\,e^{t/x}+\frac{\pi}{2}\Big)\tan^{-1}\Big(\frac{y_F}{x_F}\Big)\Big)-$$

$$\Big(\frac{2y_F t^2 e^{t/x}}{x_F^4\big(\frac{y_F^2}{x_F^2}+1\big)}+\frac{2y_F\big(t\,e^{t/x}+\frac{\pi}{2}\big)}{x_F^3\big(\frac{y_F^2}{x_F^2}+1\big)}-\frac{2y_F^3\big(t\,e^{t/x}+\frac{\pi}{2}\big)}{x_F^5\big(\frac{y_F^2}{x_F^2}+1\big)^2}+\frac{t^3 e^{t/x}\tan^{-1}\big(\frac{y_F}{x_F}\big)}{x^4}+$$

$$\frac{2t^2 e^{t/x}\tan^{-1}\big(\frac{y_F}{x_F}\big)}{x^3}\Big)\sin\Big(\Big(t\,e^{t/x}+\frac{\pi}{2}\Big)\tan^{-1}\Big(\frac{y_F}{x_F}\Big)\Big)+\frac{2y_R}{x^3\big(\frac{y_R^2}{x_F^2}+1\big)}-$$

$$\frac{2y_R^3}{x_F^5\big(\frac{y_R^2}{x_F^2}+1\big)^2}\Big)\sin\Big(\cos\Big(\Big(t\,e^{t/x}+\frac{\pi}{2}\Big)\tan^{-1}\Big(\frac{y_F}{x_F}\Big)\Big)+\tan^{-1}\Big(\frac{y_R}{x_F}\Big)+t+0\Big)$$

$$\frac{\partial Vx}{\partial t} = \frac{\partial^2 Vx}{\partial x^2}$$

$$\boxed{\frac{\partial Vx}{\partial t}\Big(\cos\Big(t+\frac{3\pi}{2}+\cos\Big(\Big(\exp\Big(\frac{t}{x}\Big)(2t)+\pi\Big)\tan^{-1}\Big(\frac{y_F}{z_F}\Big)\Big)\Big)\Big) = \frac{\partial^2 Vx}{\partial x^2}\Big(\cos\Big(t+\frac{3\pi}{2}+\cos\Big(\Big(\exp\Big(\frac{t}{x}\Big)(2t)+\pi\Big)\tan^{-1}\Big(\frac{y_F}{z_F}\Big)\Big)\Big)\Big)}$$

$$\frac{1}{x}\Big(2e^{t/x}(t+x)\tan^{-1}\Big(\frac{y_F}{z_F}\Big)\sin\Big(\big(2t\,e^{t/x}+\pi\big)\tan^{-1}\Big(\frac{y_F}{z_F}\Big)\Big)-x\Big)\sin\Big(\cos\Big(\big(2t\,e^{t/x}+\pi\big)\tan^{-1}\Big(\frac{y_F}{z_F}\Big)\Big)+t+\frac{3\pi}{2}\Big) = \Big(-\frac{y_F\big(2t\,e^{t/x}+\pi\big)}{z_F^2\big(\frac{y_F^2}{z_F^2}+1\big)}-\frac{2t^2 e^{t/x}\tan^{-1}\big(\frac{y_F}{z_F}\big)}{z^2}\Big)^2\sin^2\Big(\big(2t\,e^{t/x}+\pi\big)\tan^{-1}\Big(\frac{y_F}{z_F}\Big)\Big)$$

$$\frac{\partial Vy}{\partial t} = \frac{\partial^2 Vy}{\partial x^2}$$

$$\boxed{\frac{\partial Vy}{\partial t}\Big(\cos\Big(t+\pi+\cos\Big(\Big(\exp\Big(\frac{t}{x}\Big)(2t)+\frac{\pi}{2}\Big)\tan^{-1}\Big(\frac{z_F}{x_F}\Big)\Big)\Big)\Big) = \frac{\partial^2 Vy}{\partial x^2}\Big(\cos\Big(t+\pi+\cos\Big(\Big(\exp\Big(\frac{t}{x}\Big)(2t)+\frac{\pi}{2}\Big)\tan^{-1}\Big(\frac{y_F}{x_F}\Big)\Big)\Big)\Big)}$$

$$\frac{1}{x}\Big(2e^{t/x}(t+x)\tan^{-1}\Big(\frac{z_F}{x_F}\Big)\sin\Big(\Big(2t\,e^{t/x}+\frac{\pi}{2}\Big)\tan^{-1}\Big(\frac{z_F}{x_F}\Big)\Big)-x\Big)\sin\Big(\cos\Big(\Big(2t\,e^{t/x}+\frac{\pi}{2}\Big)\tan^{-1}\Big(\frac{z_F}{x_F}\Big)\Big)+t+\pi\Big) = \Big(-\frac{y_F\big(2t\,e^{t/x}+\frac{\pi}{2}\big)}{x_F^2\big(\frac{y_F^2}{x_F^2}+1\big)}-\frac{2t^2 e^{t/x}\tan^{-1}\big(\frac{y_F}{x_F}\big)}{x^2}\Big)^2\sin^2\Big(\Big(2t\,e^{t/x}+\frac{\pi}{2}\Big)\tan^{-1}\Big(\frac{y_F}{x_F}\Big)\Big)$$

$$\Big(-\cos\Big(\cos\Big(\Big(2t\,e^{t/x}+\frac{\pi}{2}\Big)\tan^{-1}\Big(\frac{y_F}{x_F}\Big)\Big)+t+\pi\Big)\Big)+$$

$$\Big(-\frac{y_F\big(2t\,e^{t/x}+\frac{\pi}{2}\big)}{x_F^2\big(\frac{y_F^2}{x_F^2}+1\big)}-\frac{2t^2 e^{t/x}\tan^{-1}\big(\frac{y_F}{x_F}\big)}{x^2}\Big)^2\cos\Big(\Big(2t\,e^{t/x}+\frac{\pi}{2}\Big)\tan^{-1}\Big(\frac{y_F}{x_F}\Big)\Big)$$

$$\sin\Big(\cos\Big(\Big(2t\,e^{t/x}+\frac{\pi}{2}\Big)\tan^{-1}\Big(\frac{y_F}{x_F}\Big)\Big)+t+\pi\Big)+\Big(\frac{4y_F t^2 e^{t/x}}{x_F^4\big(\frac{y_F^2}{x_F^2}+1\big)}+\frac{2y_F\big(2t\,e^{t/x}+\frac{\pi}{2}\big)}{x_F^3\big(\frac{y_F^2}{x_F^2}+1\big)}$$

$$\frac{2y_F^3\big(2t\,e^{t/x}+\frac{\pi}{2}\big)}{x_F^5\big(\frac{y_F^2}{x_F^2}+1\big)^2}+\frac{2t^3 e^{t/x}\tan^{-1}\big(\frac{y_F}{x_F}\big)}{x^4}+\frac{4t^2 e^{t/x}\tan^{-1}\big(\frac{y_F}{x_F}\big)}{x^3}\Big)$$

$$\sin\Big(\Big(2t\,e^{t/x}+\frac{\pi}{2}\Big)\tan^{-1}\Big(\frac{y_F}{x_F}\Big)\Big)\sin\Big(\cos\Big(\Big(2t\,e^{t/x}+\frac{\pi}{2}\Big)\tan^{-1}\Big(\frac{y_F}{x_F}\Big)\Big)+t+\pi\Big)$$

Above are examples of a next step in refining the general set of differential equations. We can note that when we take this general format and include additional phase-shift elements, (to include boson influence) a distinction arises between the group of phase shift elements "A" "B" "DR" and "DF" and the group "AB" "BB" and "CB". The first group represents fermion-fermion interactions, which result in the non-annihilative interactions we have been discussing, (which are found at points in the space x,y,z between fermions), but the second group represents the phase shift format, (and rotation format) of the fermion interaction once the point of reference x,y,z is outside a fermion-fermion interaction, (once within the "already annihilated" zone, whether completely annihilated or partially, as with bonding) i.e. the fermion interaction becomes "a photon", with this phase-shift.

We will discuss this fermion-photon phase difference in specific later, but for now it is important to see the comparison between what the first category of phase shift does to the magnitude of the gradient, and what the second category does, (fermion vs boson). Stated simply, the boson-state phase arrangement is the residue, (one component) of the selective cancellation of gradient that fermions cause one another. Although not destructive per se, in their interaction, (e.g. they accelerate one another), from the outside, the state data that results is only the symmetry of cancellation, (not bearing the full spinor symmetry).

Since the boson-state phase arrangement is the result of a cancellation, (rotation) of one component of a toroid second gradient structure, (as we have been discussing), that state (viewed from the outside) is only the vector constantly perpendicular to the planes of gradient reduction loops of the fermion, (i.e. propagation of the loss of the second gradient). Not in so many words, this is destructive to a fermion-fermion symmetry of interaction, (without any corresponding linear acceleration (linear momentum) like we would see in the fermion-fermion superposition of states).

Again, we will look into the specifics of this later but this distinctiveness of the boson-specific phase element, within the total state equation, is itself what gives the presence of a fermion structure, (fermion phase elements) its gradient-reduction properties. In a fully descriptive model of spacetime, there would be an infinite number of boson phase elements, resulting in a randomizing destructive-to-fermion-symmetry ambient environment, wherein the fermion phase-shift elements then present themselves as being gradient-reducers.

We should take a moment and look at the broader context. Classical quantum physics successfully describes the second gradient and time derivative of the potential "Psi" as equaling energy and the first gradient equaling momentum. Up until this point in the paper, we have been exploring what Psi itself is as a system of dark energy that results in potential. We have been working to define the differential fabric of spacetime and examine how the velocity vector direction varies over space and therefore has gradients. We have seen how a group of synced-neighboring-Q in a region results in the velocity function having a non-zero, (non-canceling) second gradient on average over time, (observable curvatures). We are now at the place where that description can be meet the classical quantum description.

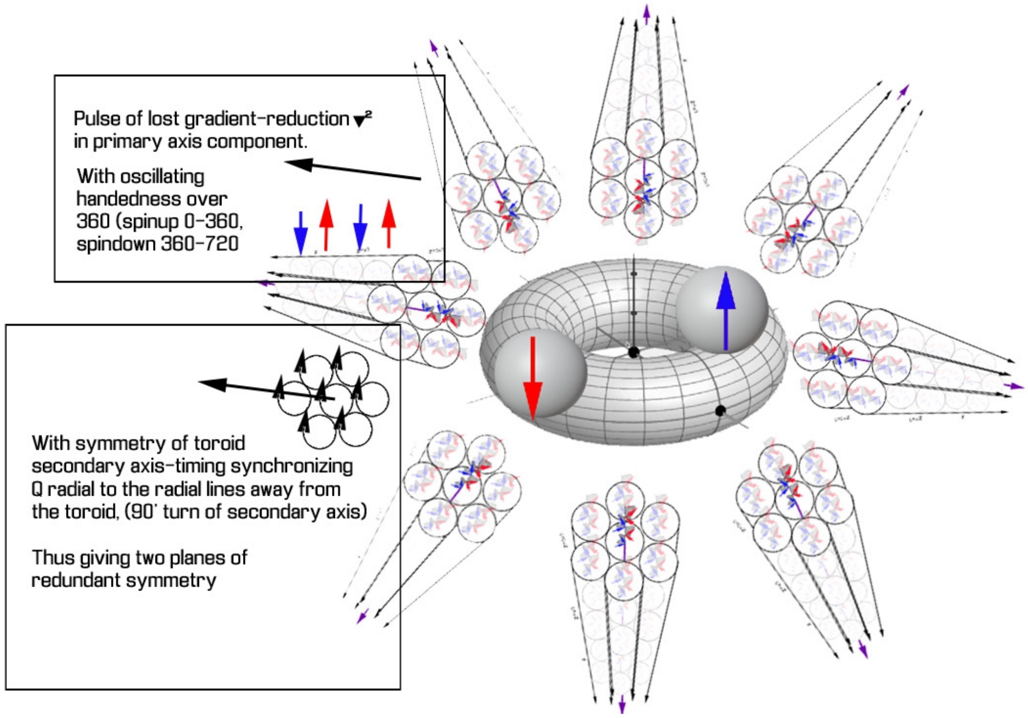
The observable geometries, recognizable by their second gradients constitute the Psi variable, (observable potential being the sustained gradient of velocity in spacetime). When the toroid geometries, (with their second gradients) that we have described, are accelerated, (overlapped with other curvatures), they then develop non-zero THIRD gradients, (i.e. first gradients of classical Psi). They develop non-zero linear momenta. The total energy of their state of acceleration (total overlap) can be found with the FOURTH gradient of velocity, (i.e. the effect of two overlapping second gradients), corresponding to the classical second gradient of Psi.

As we have seen in the diagrams, the superposition of F onto R results in an increased second gradient for the component in R parallel to the primary axis, but only on the aft side of the particle. This creates a change in the second gradient with respect to space across the center Q, (or more specifically tangent to the center Q, greater on one side of the center Q than the other). The "pinch" acceleration of the primary axis component sends that non-zero third gradient diffusing around the toroid primary axis. Again, since this third gradient (first gradient of psi i.e. momentum P) is tangential and on only one side of the toroid, we get linear propagation and rotation in that constant seeking of equilibrium.

The distance our reference point xyz is from R, the distance of F from R and the polarity of the inverse of that distance, (as found in the growth rate of the period), are all critical factors in the behavior of the magnitude of the various orders of gradient and time derivatives. These values being associated with additions and subtractions of elements of the gradient magnitude that have exponential growth rates as scalars means that the spacial variables at t=0 in the evolution of the system calibrate when particles will pass the reference point or continue to propagate away from the reference point, when particles will annihilate and the rate of the change to the particle's second gradient that is found at the reference point at any given time.

As a brief pause for more reminder of context, the changes to state found in these equations, with respect to (t), are again, taking place at the speed of light c. When we observe the progress of an increasing growth rate associated with a particle acceleration, the value for that exponential growth at time (t) is the value of the magnitude of the third gradient across the center at that time (t). That differential quantity represents the percentage off-balance the particle is across its center and therefore the percentage of the total particle symmetry(i.e rest energy) that is propagated per time (t). So the third gradient equates to a momentum P. Spacetime is always propagating at c, what exact component of that propagation is formatted to the pattern associated with the particle is a matter of the wave superposition (interactions). Lets dig a little deeper.

In the boson elements of the phase shifts, at some reference point xyzt we naturally see the same contribution to acceleration state as that found on the periphery of a pair of fermions. The dynamic of the superposition of a pair, with its asymmetrical 3rd gradient is a dynamic that takes place only across the center of the toroid symmetry. However, the vector represented by that 3rd gradient, (the vector of changed trajectory of the second gradient) is a new 2-D loop symmetry, (the inverse of the spinor secondary axis symmetry). This spinor secondary axis symmetry, turned 90 degrees from the original forms a new 3-D particle symmetry when combined with the radial component of 3rd gradient, (cancellation of gradient reduction that we call the photon (at whatever intensity we find it).



In the same way the secondary toroid axis (i.e. tan-1(y/x) element provided the distribution of phase angles necessary to create a sustainable array of 2-D loops diffusing maximally, distributed around the primary toroid axis, the change in the second gradient of the particle due to fermion-fermion cancellation. Plus the resulting 90'-turned secondary (in the zy plane for example), steadily distributing the radial x component through the rotating phases of x,y, (creating a helix radial to the primary axis, where the toroid helix was wrapped around the primary axis). The propagation of fermion-cancellation radially is the new "secondary axis symmetry", having its angles of acceleration spaced 60 degrees per Q, (again, in order to maintain minimum acceleration Q-to-Q sustainably). When a photon is produced, half of the spin1/2 symmetry is inverted to become a spin 1 symmetry.

The oscillation of polarity of the photon is the oscillation between the handedness of one charged particle and the other as their attraction paths result in them orbiting to annihilation. Its polarization is based on the orientation of the line of attraction the pair have between them, as they alternately "expose" the positive then negative particle in the pair to the vantage point of the photon's destination at a given place in spacetime.

This radial path geometry, combined with the synced phase relationship tangential to the annihilating pair, allows maximum-diffusion sustainability of the trajectory of the Q. This gives the structure of a photon the geometric redundancy against random ambient accelerations (making it impervious to destructive modulations from the random vacuum over time), in the same way the primary and secondary toroid axes do, but the photon is inverted and in truth, as strange as it is to say, occupies the propagation of the entire universe as a boundaries of its geometry, (continually expanding while that radial helical symmetry continues, also always keeping the symmetry around the point of original annihilation). In this way photons have durable symmetry over effectively infinite time, being altered only by red-shifting, as universe-wide dilation as a product of entropy's evolution.

The constant growth rate of the differential step found in the periodic phase shift elements is caused by the displacement resulting from the differential step itself, (being asymmetrical) that rotates both R and F. This growth magnitude at the point of photon production, (whether from total annihilation or partial via bonding) also doubles as the corresponding gradient magnitude, that is the magnitude of the momentum that the overlap creates.

A boson phase shift element is therefore the phase shift element of a fermion pair that has achieved a maximum growth rate, (a fixed final-proximity to it's charge opposite) and is therefore fixed in its momentum, whether this is the result of total annihilation or a quark-geometry (symmetrical multi-particle proximity configuration), a quark-quark nucleon proximity relationship or the other myriad bonding geometries and their corresponding proximities.

In other words, whatever complete final momentum was caused by the opposite charges accelerating together is the "amount of structure" that propagates at the speed of light c. The infinitesimal low-PA outskirts of the photon propagate at c, (as a small component of observable, together with the random, that together propagate at c as the acceleration state).

A fully annihilated pair, for instance, will have grown in the magnitude of 3^{rd} gradient until both particles "have the same location" and the growth rate comes to maximum, as the argument of the exponential, (the inverse of radius between them), approached zero. It thereafter maintains a fixed growth rate element (representing the angular momentum of the photon), them having completely overlapped, lost the asymmetry and annihilated the duality.

The function then only increases or decreases in PA from the standpoint of a stationary reference x,y,z at some distance from the pair location based on the xyz position exponential (on the right side, multiplied by each of the periodic phase shifts), as it travels at c with that fixed momentum, (i.e. wave structure), increasing in PA at that point until overtaking a point, then decreasing in PA, (structured-ness).

Again, the vector equations model the gradient, (or time derivative) at a specific x,y,z reference point in space. The gradient integrated over time or the time derivative integrated over space will approach zero in the vacuum but be non-zero near a particle, representing an increased PA of interacting with the particle. Although nonetheless integrating to zero the gradient in the total equation will be of a greater instantaneous value in the vacuum than in the gradient-reducting vicinity of an observable.

So at a fixed reference point in space the growth factors associated with the fermion phase elements will result in the gradient' progressively reducing as an accelerated particle approaches, then increasing again as it passes. In other words the PA increases then decreases as the particle passes. If the reference point is nearby an annihilation, the PA will increase until at some time (t) the growth factor will result in a phase shift of the symmetry and a "photon" PA will be what then increases and passes.

Quarks formed and quark-quark interactions have interesting periodic growth-magnitudes, as they take part in color charge geometries and move in the quantum orbital values, experiencing the accelerations of positive charges modulated with accelerations of negative charges as the compound structures rotate, not unlike multi-body astronomical dynamics, but with linear progressions of the arguments of these exponentials. We will study the geometries involved there but not delve into the differential equations of those relationships in this paper but it should be known that they are all relatively simple extrapolations of growth-calibrators played by the spatial variables the phase shift elements, and therefore the timing of increases and decreases in PA at any point x,y,z,t, as a result of particle interactions.

From the standpoint of representing already-created photons in the vector equations, with their corresponding affect on acceleration, the phase shift element must reflect the half-inverted symmetry. Namely, the phase shift element for a photon will always have phase reflecting a 90 degree turn in the secondary axis symmetry. And again, the radial component in the symmetry of a photon is the conversion of a component of observable curvature to dark curvature which results this 90 degree turn.

So the component of photon symmetry radial to a system we would be modeling in our vector equations "lives" in the changes to the differential equation that the observable parts cause, (the phase shifts in the other axes), among the other phase shifts. To look at this relationship in more detail we will examine the significance of parity between the 3 spacial coordinates, where it concerns sustained reductions in second gradient vs ambient.

We have touched on the subject, but looking more closely at path parity in 3-D space. That is to say looking at the relationships between the vector coordinates of each part of a superposition. A circular path represented by a periodic function in each coordinate direction will have two coordinates that are the same polarity, (up to one of the two being zero) and one 90 degrees rotated, at any given time. If one of the two that are the same polarity are rotated 180' the rotation direction of the loop switches.

When we superpose two loops, we must observe a similar parity math in order to determine if a component-plane of the two loops is in "pinched" opposition, between the two, in terms of the differential equation, (to see if there will be a dV/dt rotation due to a gradient increase when they are added), and on which component. Partial opposition will render two planes, one destructive and the other constructive, (in the diffusion force taking place, i.e. lowest E path).

We must find the plane that is destructive if it exists and use this information to determine the new vector of acceleration it causes, according to the differential pressure, to find the path of least acceleration and find the rotation direction or new symmetry of the particle. When we compare the elements of superimposed phase-shift from two particles, the destructive plane will be the plane that has the odd parity. If in the two particles we find that there are two coordinates, (say their x and y coordinates), have opposite polarity, (i.e. 90+ obtuse angle) and one, (the z coordinates) have the same polarity between them, the coordinate with the same polarity is destructive (we'll remember this as the first component). Then we look at which of the other two coordinates forms a 90 between them and remember this as the second component. The "first component" and "second component" form the plane that is destructive to the gradient-reduction of the fermion system.

We can add up an unlimited number of phase-shift elements from particles that contribute to a vector state equation and use this parity rule of thumb to know where our vector of rotation to R will be, in the final state. There will be a resultant vector of rotation on the entire structure of R. This formula applies to other fermion influence, photon influence and the chorus of distant photon influences that constitutes the ambient fabric of uncertainty.

If we break R into two components, the destructive plane and constructive, the new vector of acceleration will be in the direction that the destructive plane would rotate-to get to the new constructive plane. And as we have examined, this vector acts differently in the various Q around primary axis of the toroid, since the effective planes of rotation are distributed per tan-1 around the primary axis.

The rotations of the toroid structures that a pair induces on one another again, are described mathematically by the periodic phase shifts. It should be noted that the orientation of the euclidean/orthogonal basis vectors we choose are arbitrary but the the distribution of phases between the x,y and z variables, and therefore the timing of the oscillation of the tan-1 factor are not arbitrary.

A toroid geometry presents a mathematical relationship with respect to another toroid geometry. Regardless of initial orientation, both will assume orientations with respect to one another with only two options, spin-up or spin down. The greater the deviation from these two dynamic inter-orientations, the greater the magnitude of the vector of rotation to arrive at either spin-up or spin down. The greater the second gradient (disequilibrium), the greater the acceleration. Regardless, spin up or spin down is where the relationship will be.

We must remember that ultimately diffusion is the action attempting to divide the angular path of linear time equally over the three linear dimensions of space, (i.e. the circle is the most consolidated lowest energy in the heat equation, but in 3-D it must share that privilege with 3 planes). When two symmetry geometries interact, they are essentially structured translations of that basic action to diffuse. Only when they assume their mutual up or down spin orientations do they achieve best dynamic equilibrium with respect to one another, within their curvature-wells with respect to the vacuum.

It is for this reason that the equations for the x,y and z components must be written as non-arbitrary. The primary axis could be pointed any direction with respect to absolute space but forms a relationship with the direction of the primary axis of other toroids in proximity. Here the z axis is chosen as a convention for the primary axis and as such is given the rest condition of its phase being subject to tan-1 and its phase-shift oscillation being half the period of the x and y axes.

We come to an interesting observation that exemplifies the necessary violation of some classical intuitions, when we recognize the full roll of dark energy as a medium, (e.g. merged classical boundaries between definitions of phenomena). As a toroid structure "leaves", traveling away from point x,y,z, in spacetime (as it is accelerated toward an opposite charged particle), the reduction in PA, (and 90 rotation of one plane, from that particle, (that is characteristic of the leaving), is the same reduction in PA that is the minuscule leading edge of the photon that may or may not eventually fully annihilate or otherwise complete a photon symmetry. If it does not complete a symmetry, it is associated with a "virtual photon". If charges complete a photon, that PA of the particle that moved away from the initial point, (that faded out when one of the pair moved away from its initial location at t=0), the PA will "keep decreasing" further at that point, becoming a photon "more" (with the lowered overall gradient-reductions it represents, to a particle, (such as a detector) there).

Again we must remember the geometry of this reduction in dark/random-gradient that makes up observable particle structures. Toroids are 180 degrees opposite-handed, (i.e. the component of periodic velocity parallel to the primary axis, (z as convention in this text), is opposite sign on opposite sides around the primary axis or "across the donut hole"). So as the toroid pair attracts and accelerates together, their oscillation and inevitable orbiting of one another will alternately present a left handed curvature, then a right handed curvature from any fixed vantage point in spacetime.

At the fixed point x,y,z that our original particle traveled away from, the fading PA from the traveling away and the rotation/cancellation from the pair attraction-interaction is one and the same as the increasing canceled-curvature, (90 degree rotated secondary symmetry), which oscillates right-hand then left-hand in the photon. As we will see in the non-complete-annihilation "bonding" dynamic, the oscillation of the photon cancellation-curvature counteracts the curvature interactions of the opposite charge attraction superposition by means of, (again) rotating the secondary axis periodic loop by 90 degrees, (i.e. "loosening" the bond).

As a crude way to conceptualize the situation, we could imagine the point where the two will eventually annihilate as radiating out the state of the two toroids, only with the secondary axis turned 90, such that it begins canceling both particles where they are, resulting in the PA where they are diminishing. The reality is one step more complex because they are both radiating the cancellation, and it also results in their rotation and gravitation to one another until full cancellation. In a sense, they only continue to exist while being accelerated, (despite the progressive cancellation), because of the reduced distance between them, (until that is zero). This highlights the way that entropy and ultimately dilation/contraction is truly at play in all motion/acceleration.

This process of cancellation and the corresponding incremental rotation of the secondary axis symmetry to radial happens only partially in charge bondings with unequal mass between + and — charge such as with nucleons and electrons. The electron is accelerated until its secondary axis is canceled in the superposition and it is bonded. When a photon comes along and presents a further 90 secondary rotation (oscillating with both right and left handed inverted versions of the toroid loop), the cancellation of the electron is counteracted, and the bond is reversed to the extent of the energy of the photon. Again, all of these accelerations are caused by the familiar lop-siding of the spinor with its 180 phase across the primary axis. The bond/no bond accelerate forward/backward etc are just arithmetic of that handed loop imbalance.

Psi is the periodic function representing the second gradient of velocity of dark energy, which becomes observable where the function has a sustained, (non random) fixed-period

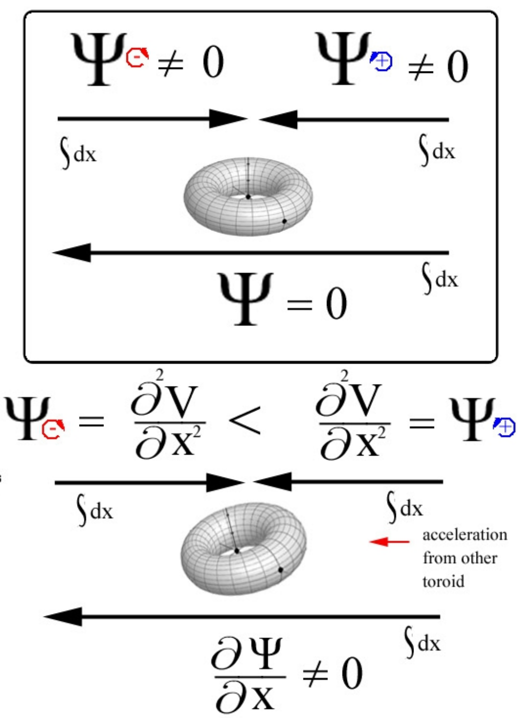
$$\Psi_{(x,y,z,t)} = \frac{\partial^2 \vec{V}_{(x,y,z,t)}}{\partial x^2}$$

The second partial in x (gradient'), that is non-zero up to the center of a particle (symmetrical gradient' of V) equates to Psi, being 180' opposite phase (handed gradient' loop direction on either side of the primary axis), is zero gradient' across its entire symmetry

$$\frac{\partial^2 \Psi}{\partial x^2} = E_{Kinetic}$$

$$\frac{\partial \Psi}{\partial x} = P_{linear}$$

At theoretical absolute rest, Psi = 0, (as integrated wr x across its symmetry). In the presence of opposite charges, (as seen in reality), Psi is accelerated and has a net non-zero first and second gradient (P and E).



We should notice again that particle velocity is not calculable per-se in the dark-energy-centric model of spacetime. The model is of vector states in spacetime and what can be determined directly is the probability amplitude that the acceleration state at a point in space will bear the pattern of the particle structure. This PA oscillates as the particle oscillates, interacting with other particles, and this oscillating PA becomes smaller at distances further from the center Q. What we can determine, (which equates to classical momentum), is the rate at which the state at a point is changing its acceleration format, (a state which is again, always propagating at c).

All changes of probability amplitude at that point assume a propagation at c but with a certain component random and certain component “particle”. As we have seen, these “components” are distinctions in the phase elements which affect the gradient and time acceleration differently. The “four vector” method, (observing these components trigonometrically) roughly accounts for the macro quantum oscillation, but the dynamic between dark and observable is ultimately a phase consideration between pure angular paths and reducing this to trig components loses an order of complexity, (hence the paradoxes the fourvector method encounters).

End of Section
9