Compound Loop

The model at this scale seems to be holding reasonably with the data and matching some of the unexplained quantum scale behavior, so it is worth continuing to see if further insights or flaws can be found. At this point we will look at the spinor geometry, built on the premises so far. Staying true to the parameter of seeking a 3d geometric explanation, the first step should be to list the abnormal qualities of the spin ½ particle and then analyze the different known natural occurrences of solitary waves and standing waves and apply the structure of the idealized dark energy medium, to try to deduce the possible options for the correct vector geometry.

By defining the physical requirements for a solitary wave geometry and contrasting with standard model particle behaviors and traits, we can see what options potentially correlate. As has been part of the process so far, our list of general unexplained phenomenon in physics will be a resource as will keeping track of where the description strays from the classical view and reassessing. So what are the properties of the spinor that stand out as unique?

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Observable objects exhibit a classically undefinable property that we call potential and it does so according to a probability. This potential is associated with the wavefunction that describes it and that defines its probability of being observable, (i.e. measured). Since waves in general, (and these wavefunctions for observable particles) oscillate periodically, we know that "potential" exists with a kind of polarity. This polarity-like system of opposite-ness, (or at least contrast) of potential appears in various forms in the properties of particles, from charge, to spin to color charge and to participate in helicity and chirality.

As we have established, this exploration of a potential theorem will assume a motion-configuration as the underlying basis for the nature of potential and this this "polarity" of potential will be a a function of direction. Of course, since the motion configuration is specific within otherwise random motion of a medium, the "direction" associated with polarity is not absolute but directions of oscillation relative to other particles, according to their geometries, (e.g. left hand right hand).

The spinor is a classical quagmire because of the way it seems to defy the assumptions of the last paragraph, and other attempts to decode its behavior, by violating spacial logic. It's structure of potential has properties which change with a period of 360 degrees and other properties which change over 720 degrees, taking two complete cycles of the other property to return to its start. It's action of polarity, (i.e. direction of travel), seems to have one foot in some extra dimensional space. Its geometry seems to spin "within itself" to complete a full circuit of polarity-structure. So since we are playing dumb, that is exactly what we will assume it is doing, without the smoke and mirrors. We will assume it has a compound structure.

Like the tea-cup ride at a theme park, the spinor would have a primary and secondary rotation taking place at the same time, resulting in a complete symmetry. The energy of the electron or positron must therefore change its measurable motion-direction with a primary facet and two or more distinctly oscillating secondary facets within the primary. This would account for the spacial effect that gives it its Klein-bottle-esque inverting within itself phenominon. The differential-medium premise we have been exploring, which will treat potential in spacetime as a differential system that behaves with a kind of fluid dynamics, makes this kind of compound dynamic much more conceivable, since, like many other forms of fluid dynamics, "swirls" of a fluid can take place within a larger swirl of fluid. As we will see this is not only "like fluid dynamics" but is the underlying dynamic that gives rise to fluid dynamics.

So the two states of the changing of the spinor potential seem to have a way of swapping the rotation direction of the secondary rotation in the middle of the primary rotation, while undergoing that strange trait that seems to see the structure turn inside out. If we note that "rotation direction" is a 2 dimensional phenomenon and remember that our diffusion-maximizing pure-angular action on 2-D plane would satisfy the differential optimally, we can surmise that not only would there be a primary and secondary axis of rotation, but they can be on multiple planes of rotation as well.

So where do we begin to sketch what this would need to look like? Only pure angular looping motion as we have been describing returns wave energy back to make repeating wavelengths. So we are looking for a shape that arranges 2d circles and lets it take volume as a 3d shape without loosing the synchronized rotation-direction of the pure circular 2d loops. The overall 3d structure should itself, in some way, also be able to complete a circular loop. We can use this geometric criteria along with some of the poignant and restrictive demands of what we know about spinors and compare the refined criteria to the list of naturally occurring solitary wave objects and see if some semblance of hodge-podge will get us close to what we need.

There is not a very long list of solitary waves and even fewer three dimensional ones that don't require stationary secondary objects to reflect their wave energy off-of to self-reinforce. Soliton waves in canal waters are known exist, but require physical boundaries of a specific geometry to be sustained, bouncing back wave energy to themselves on just the right timing. Vortex ring wave-like phenomena are also well known and can be seen in half form as a binary vortex when , for instance a paddle wheel motion creates them on a water surface. They also form in complete 360 in smoke rings and other similar fluid phenomena.

This geometrical phenomenon isn't strictly speaking a wave but is nonetheless is a good clue for a 3-D shape. Spinning a circle path through 3d space, in a circle results in a torus. There are a number of instances of the torus shape giving indications of self-reinforcement of kinetic energy. Smoke rings and so-called Falaco solitons in fluids are two examples but with different circumstances involved. The simplicity of the 3d geometry as it regards return of a looping 2-D path back to its origin while sweeping that 2-D path around a primary axis makes it a good place to start.

The axial symmetry of the torus-shape includes a mirrored structure of rotation between the two sides of the minor axis, (considering a single rotation direction of the secondary axis). To form, a ring of smoke or other fluid must have the rotation in the secondary axis of the tor-oid dynamic established. If we add a rotation symmetry in the primary axis, the spinor symmetry emerges, (given our premise of the spacetime differential that drives it).

In terms of the tangential direction of potential created by the loop structures, this configuration would have a unique compound handedness to the direction of its accelerations of Q as measured from the outside. The dynamic would be a path of diffusion like a compound helix wrapped around the primary axis. Since the rotation about the major and minor axis could turn in either a clockwise or counter clockwise direction, there would be a right handed “helix-donut” and a left handed one.

Durable loop

Again, the structure of the spinor would consist of the periodic accelerations of the Q that are then themselves part of the group spinor structure, and as we will see superposition with other handed-structures makes the whole group itself periodic in spacetime. The Q wavelength, arranged in the phase-synchronized rest structure being the “intrinsic motion” of a particle and the periodic motion of the group as a whole, (i.e. induced to rotate by phase shift) being the classical quantum wavefunction, (as described by the Schrodinger/Dirac descriptions).

A single Q could not maintain its loop in isolation. Given that mass is three dimensional, and a single Q is not self-sustaining, (or more specifically its period is not discernible from random), the spinor geometry must be at work where the two dimensional circles of optimal diffusion, form a 3d volume that makes the 2-D Q predictable and discernible to a fixed coordinate system. We need to determine how a group of Planck units could interact in concert to translate an acceleration back to a starting point over s60 and 720, with a group superposition-redundancy in order to be impervious to destructive interference.

The path of travel of the acceleration that would form the group “circuit of acceleration” must take into consideration that each participating Q bears any change in velocity vector about its own axis and must be in complimentary phase with the full group of Q. The innermost geometry must also be in phase with the Q radially. Any small deflection from the angle of equilibrium in Qa is propagated to the surrounding neighbors Q1, Q2, Q3 and so on tangentially.. The synchronization would also need to take place radially Qa, Qb, Qc and so on.

As an analogy we will use the 2-D example of a large group of adjacent compass needles on a flat surface. The tip of the needles are magnetic south (-) and they want to point away from the tip of the needle of their neighbors, (diffusing maximally). When one needle moves, the neighbors change with it. If we were to manually move one of the needles located at the center of the group, it will also produce a rotating affect in the surrounding needles. But with the needles oriented randomly, there is a problem.

https://subspaceinstitute.com/images/0/10851851/COMPASSES.mp4

If we move that center needle in a full 360 degrees, the surrounding needles cannot complete a 360 while still maintaining the lowest energy vector direction, (least head-on collisions with other needles).

To complete a full 2D 360' of acceleration in 3-D without "pinching" adjacent Q reminiscent of gimbal-lock, into head-on trajectories, (decreased diffusion, increased acceleration i.e. relative force). There needs to be another degree of freedom to accomplish the complete circuit. Like the threads of a screw, the folds of an accordion or like a car driving the wrong way down a highway, the route of the 2D path has to be able to dodge (swerving left and right) through that extra degree of freedom, in order to complete its circuit on that plane without gradient-collision with the adjacent Q.

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With a particular phase arrangement of the paths of the Q loops around the torus secondary axis, the third dimension can be used to allow complete 360 degree circuits in the xy plane components, while a staggered phase, arranged in a "folding " geometry allows the z component to be used to maintain minimum gradient, spiraling the path around the secondary axis. This will result in the individual Q loop symmetries and an additional loop symmetry of the sweep of the phase-shifts of the Q, around the primary axis. The result is a primary axis of diffusion loop and a secondary axis of diffusion loop, with the secondary having a phase-shift of 60 degrees in the z component, per Q going around the primary axis.

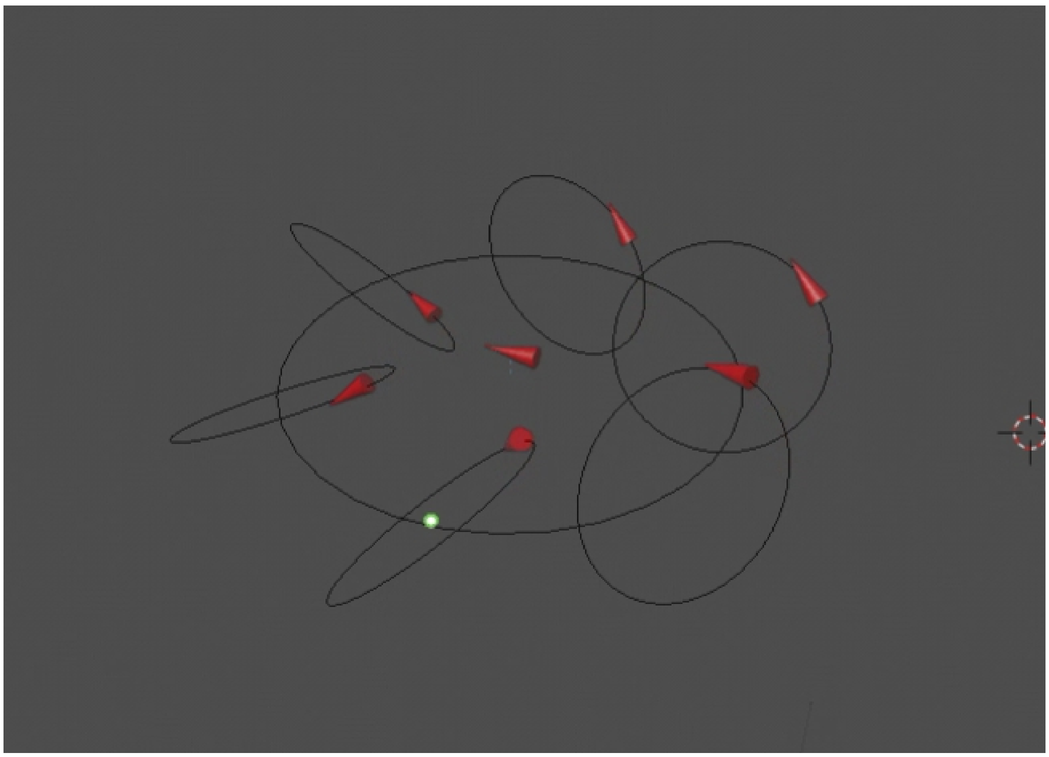
A 3d "toroid" arrangement of paths like this also meets the second criteria of having enough "redundant proximity" of the array of 2-D Q to insure against the random accelerations of spacetime external, superposing and pushing any of the Q off of their synchronization to angle that is beyond sustainability. The 3D group geometry not only allows maximum stable diffusion circuits, but the constructive-phase propagation from one Q to another insulates the superposition states they are exposed to from the outside. Like huddling together to conserve heat, they conserve their phase-states via proximity, to maintain states that do not fall beyond 180 degrees and destroy the circuit of diffusion.

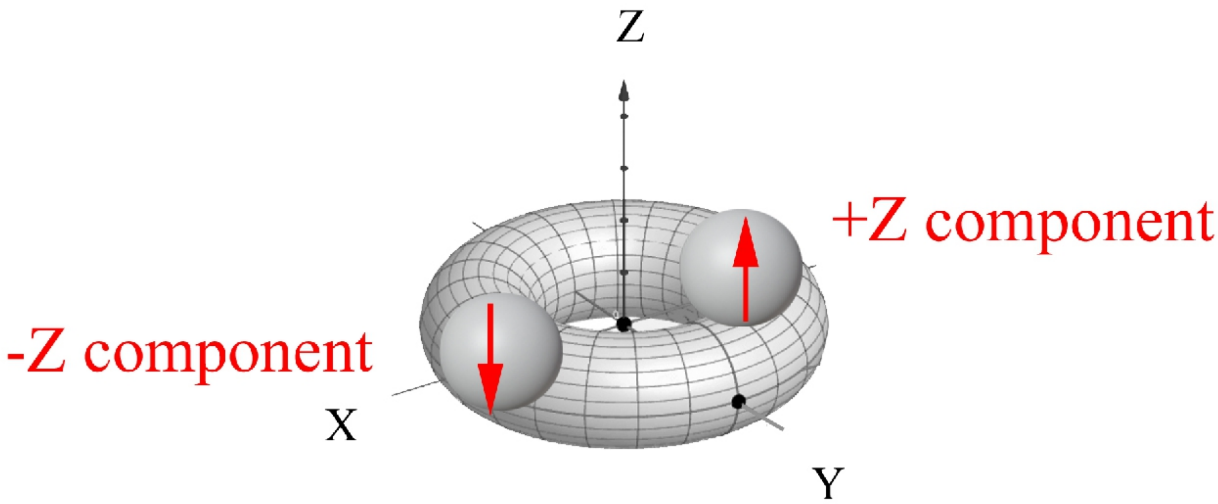
It should be noted that the phase orientations of a stable geometry of acceleration should not be confused with the fact that there will always be an inherent phase delay between any Q by nature of simple propagation, (regardless of acceleration state). The principal action of spacetime is to change angular orientation toward minimum energy (t), so the ratio of circumference to radius determines c, (regardless of ambient dilation). So since the "angular action" is connected across space via the differential relationship, the "linear action" is just an observation of this ratio from circle geometry. Because of this there will always be a phase difference of pi. The communication Q to Q has a built-in inherent phase delay of (pi), given that (pi) times (Qdiameter) = (Qcircumference) where (Qcircumference) = (t) the phase delay Q to Q would be (Qdiameter) = (Qcircumference)/(pi) = (t)/(pi).

This phase difference would be completely transparent to all acceleration interactions that would ever take place since changes to relative velocity, (any communication Q to Q) is strictly based on angular changes. Like a system of equal diameter gears, the "phase" of the gears does not matter. Phase matters greatly of course when we are talking about the particle structures the Q make, where the phase timings dictate the plane of angular rotation, in the synchronized structure, (where one plane of rotation would have a constructive or destructive component, compared to another plane, where adjacent particles are concerned).

To put this dynamic in the broader context and to begin to address the way this geometry extends infinitely, (radially) and how the overlap of its periphery affects other structures of this type, we will consider two further aspects of this group dynamic. First, the periodic acceleration of the Q in the center, and also the net-periodic acceleration of the group geometry as a whole (i.e. curvature/gradient), from the perspective of the surrounding spacetime.

We might already note that other nearby particles of this type will "see" the adjacent particle's symmetry based on the state that superposes with it, but the symmetry it sees must necessarily be a partial symmetry (i.e. periferal in the fact that the primary axis state conveys, but only the phase arrangement from the near-side of the secondary axis). Like a merry-go round, everyone can see the castle in the center, from all sides, but the figures around the perimeter can only be seen from one side at a time. This is because the spinor symmetry cancels the velocity component that is parallel to the primary axis, across the center.



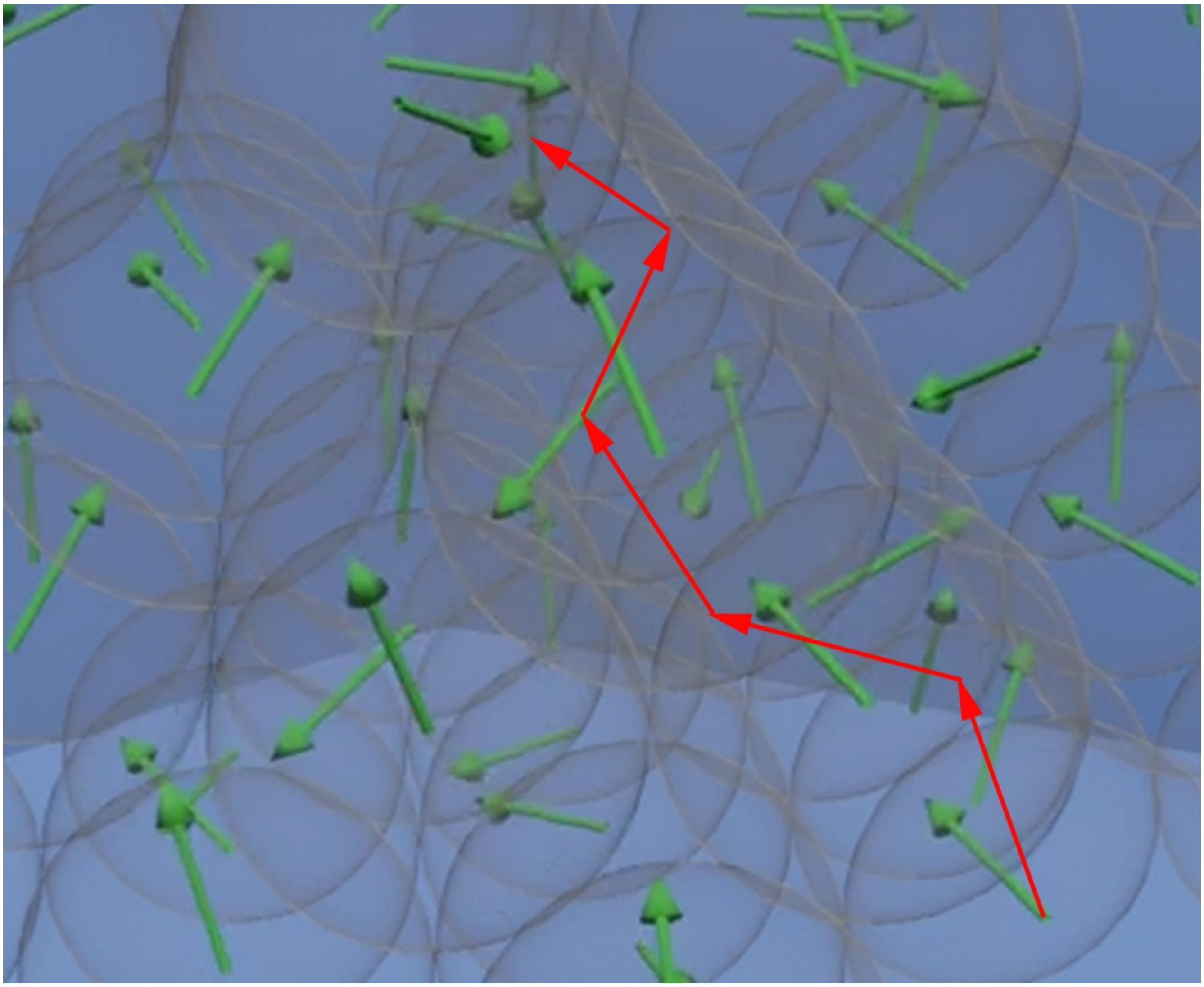


As we will see this symmetrical cancellation is one of the core features of the spinor geometry (making it spin ½). This configuration only exposes the Z component direction corresponding to the side you view it from, hence the state that the viewer "sees" from any one side is a spin 1 state that propagates radially from the spinor. We will discuss how this fact, plus the mutual interaction between particles results in what we call a boson.

Since the action of pursuing equilibrium between Q ultimately is definable by rotations on the angular 2D Q-planes, deflections always have a force effect in both radial and tangential components of that acceleration. To be more exact, there is a differential change in both radial and tangential directions, exactly what that relationship is, will be investigated in much greater detail later.

In other words as a vector turns, there is a force in the direction it is turning, along with a reaction perpendicular to that direction, (acting inward to "fill the space that was left behind"), since diffusion acts in 3D by all surrounding Q. In the cyclical structure of observable mass or energy, this means a dual action of its footprint in spacetime, both radial to, (inward) and tangential to (around) the periodic loop structure, wherever it is found, in particles and the fields of forces they represent.

Due to this 1D diffusion force being satisfied in 2D loops, that form stable 3d particle geometries, the path of propagation of forces will always ultimately be based on these angular structures and so the ever-present complimentary perpendicular components in a randomized medium results in a path of force or propagation always being a zigzag on the quantum scales, only averaging to smooth linear motions on more macro scales.



In a 3d system, even the randomized patterns of the medium would exhibit perpendicular complimentary force arrangements constantly. This angular vs. radial complimentary vector arrangement, (or time derivative of velocity vs. second gradient of velocity) is the most stripped down core of the differential relationship, (we will be studying at length). Namely the relationship between an acceleration with respect to time (in a circle) and the disproportionate reduction in acceleration-conflict with respect to distance that it causes to a neighboring region of dark energy.

The seeking of lowest energy configurations is governed by this equilibrium. There will always be some component of acceleration with respect to distance because in 3-D, no perfect sync of angular motion can come to equilibrium in 3 spacial dimensions, (circles are 2-D arrangements of the 1-D diffusion force).

But the sustained second-gradient represents an observable event.

In the empty vacuum of space, the pervasive effect of this angular/linear equilibrium-action causes the swirling propagation patterns of various diameters that can be seen on various scales, canceling each other out on average, forming turbulence patterns, like smoke in still air.

Video credit: 3blue1brown youtube

https://subspaceinstitute.com/images/0/10852298/turbulence.mp4

Again, any imbalance in the diffusion of spacetime vectors of velocity c result in a counter-action to balance, which ultimately circles back, whether within a sustainable structural geometry or just randomly. The linear-propagation-via-angular is the true nature of motion in spacetime, starting with the Q of subspace and observable as a dynamic in the quantum, atomic and up to the microscopic scale of Brownian motion and macro in turbulence and force paths. Straight-line motion is a manifestation of this angular equilibrium action being applied to the sustained circular geometries of diffusion in particles. This right angle arrangement has an impact on all manifestations of force, including the right angle relationship between the electrical and magnetic force and many others.

Since the net energy-path associated with a structured non-random particle ultimately returns the acceleration in a complete loop, the net-action of the complimentary right angle deflections propagated along the circular path, do something that is also non-random. Since the structured non-random accelerations complete a loop and cause pronounced energy that stands out from the random background, an area of apparent greater diffusion, (lower “pressure”) is maintained not only tangentially in the loop structure but radially, toward the center of the loop, in the form of a second gradient of the velocity.

The phase spacing and synchronization in a particle, compliment and reinforce the structure of their Q neighbors, which is a structure that allows for retention of any periodic dynamic superposed on the structure, including applied outside accelerations, no matter how it warps or elongates the periodic structure. Fixed-period “wobbles” from other particles are preserved within the group as periodic alterations to the phases that constitute the symmetry of the Q, acting to “store” what we know as momentum.

This is an abstract seeming concept and can’t be reiterated enough. The structure that keeps the path of the energy formatted to retain periodic particle behavior is stored in the continual symmetrical loopback of propagation of acceleration that takes place among all its individual Q, (the same propagation process that acts randomly in the vacuum, but formatted to the geometry).

Much like how a solitary or soliton wave observed in water utilizes exterior structures like the sea walls of a canal to reflect its wave-force back to itself, with a precise reinforcing timing, the energy of a quantum wave in spacetime feeds-back the circular oscillating wave propagation creating a sustained lower average gradient, compared to the restoring-force of dark energy’s pervasive random gradient. The metaphor for this gradient reduction would be the reduced collision, (or slowdown) provided by a roundabout in traffic, as opposed to the stopping and starting of a perpendicular intersection. A toroid solitary wave creates “more roundabout-ness” near its core, propagating that patterned loopback outward, but fading in intensity radially while perpetually it maintains its structure internally.

Fields in Complex Numbers

The use of the irrational number “ i ” in spacetime wavefunctions is in response to any motion @c in a line, causing a footprint that is an area c^2 in spacetime. We model the perodic changes of these acceleration footprints as sinusoidal wavefunctions and since matter wavefunctions are footprints with toroid geometries, we need to be able to represent the sin function for where the structure “is not” as well as where “it is”, while still conforming to the -1 to 0 to 1 oscillation of a sin curve.

We need to represent rotation of the circumference around the "donut hole" and also across the hole. Since the value "zero" is already used to represent vector values in the sin function, we must use "i" in a composite sum with sin and (i)sin both conveniently but not coincidentally found in Euler's exponential function. Both the real and irrational contributions to the sum are represented in the infinite series that accounts for factors of acceleration that influence the magnitude including all aspects of the geometry, to infinite resolution.

The alternating series featured in Euler's formula shows the smooth oscillation between cos(t) and (i)sin(t) where the value for position/momentum etc is a complex number. In a way, this alternating series is the sum of two infinite series, one for the imaginary values that contribute to the final position/momentum etc, (i.e. part of the moving toroid system but including a canceled-out probability amplitude of finding fixed-period vectors of acceleration "across the donut hole"), and one for the real values, which correspond to where the vectors of potential are not canceled across the toroid geometry.

We will see in the final set of vector functions that Euler's exponential exposes two crucial aspects of spacetime. The fact that any point in spacetime represents an infinite series of states of acceleration of dark energy, (with intensities based on distance from particle inducing those accelerations), and the fact that as a particle in spacetime moves closer to any point of reference x,y,z in spacetime, that point develops an increasing probability amplitude that vectors there will have fixed-period structure, (i.e. a greater component conforming to the particle structure). As we will see when we go into greater detail, this infinite series acts as scalar and growth-factor (i.e. acceleration) for states of the differential functions and is essential for determining probability amplitude where accelerations from distant systems are superposed with one another at any given location, accounted for by these states of the infinite series at that location.

The infinite derivatives of the function at any given point capture the snap-shot of changes taking place in the function that resulted from regions of space nearby or infinitely far away, and store them as the infinitesimal contributions to the value for the state of the function. In this way, the factors of increasing order (real and imaginary) in the infinite series, represent the influences from distances away in integers of Q, (i.e. the first derivative of this Q's acceleration function was due to the state of the next Q over and the second derivative was from the second Q over and so on to infinite distance.

The factors that sum to yield the total acceleration at any point necessarily include accelerations from all distances away. In a structure like a toroid that is oscillating its structure as it moves through space, that sum, described classically at any point would include irrational acceleration influences (where the toroid “wasn’t”) and also where it “was”, as it tumbled in the past, as part of the sequence of acceleration states that affected that point. The contributions to the sum would decrease in magnitude as the contributions were from further away, more prior states of spacetime.

Our goal here will be to mathematically model the intrinsic mechanics of the potential of the fermion, boson and higher orders, such that their complete wavefunctions do not need the imaginary value “i” to represent the not-there. The compound sinusoidal structures of particles will include those regions in the phase oscillation structure.

End of Section 6