Weird Waves/Standing Waves

It is old news that every "particle" in our universe is also a wave, but the wave-particle duality is still an unwieldy subject to comprehend. Partly this is due to our instinct to think in terms of discrete individual objects, when the universe is delineated by an infinite series of derivatives. But in large part the conceptualization has been burdened because it is lacking the other half of the information about those quantum waves. We have been trying to "work around" the notion of a medium. If ocean water turned invisible when it were perfectly calm, we would have a better intuition about spacetime.

Before we delve into the specifics of the "how", let's look at an overview of the "what" of the unusual quantum wavefunction geometry. We are talking about waves that do not have their own momentum but are just alignments of the infinite series of changes tending-to-minimum-change that is the action of the medium. We are already very familiar with fractional versions of this mechanical situation in all classical waves. The state of surface waves on water at any given moment depend entirely on alterations of the momentums of the vibrating water molecules themselves, which bear and convey the energy that is "waving" in the form of oscillating pressure changes.

The constant active forces in 3d of the vibrating molecules, convey and provide a medium-for the periodic forces that oscillate as visible waves on the water, (with the assistance of gravity as returning force). Although the molecular vibrations of water molecules are just a higher frequency form of what could also be called "waves in water", with an additional degree of freedom, we don't call them water waves, for two reasons. 1. Their vibrations are not initiated by the same conditions as surface waves 2. When we have defined the vibration of a water molecule to be intrinsic to the nature of water itself and therefore part of the definition of the medium, how could the vibration of water molecules themselves be considered waves on the medium of water?

In the same way, we see that in the tests for a medium for light waves they were looking for a medium by testing for properties that are in fact interactions between waves, but a wave would not interact with its fundamental medium in the same way as two waves interact on that medium, just as molecular vibrations of water don't interact between each other the same way as surface waves interact with each other. When we get down to brass tacks, the change that occurs in the vibration of a water molecule, during the force caused by a surface wave, is just a modulation of the molecule's vibration, with a specific

geometric pattern, with different number of degrees of freedom than the random oscillations of the molecule the water wave is made of, but still powered, so to speak by the periodic motion of the particles of the medium. We will see that intrinsic sub-quantum dynamics is a continuation of this schema of the more-macro wave action being "powered by" a more fundamental motion dynamic that has additional degrees of freedom, (i.e. geometries).

We must ultimately determine the way in which momentum can be defined as a stand-alone property of spacetime. We must exclude the extraneous aspects of the classical definition which are simply attributable to waveform interaction. Fundamental momentum is formatted by, and thus masked by wave properties. As always, understanding the separable aspects of what is observed, on an individual basis, will lead to a better understanding of them combined.

In a water wave, gravity acts on the elevated peak causing returning pressure in a downward direction. The water spreads out horizontally when this happens, returning that energy to horizontal pressure, "bunching up" the next peak of the wave. The words to focus on here are the spreading out and bunching up. In this way, the pressure of the water molecules is influenced periodically along two dimensions, longitudinal and transverse. A quantum wave is just a mechanical wave with the returning-force being the tendency for dark energy to diffuse, i.e. expanding (from the classical perspective), or seeking the lowest energy state with respect to distance.

This would then of course be the underlying reason for all wave action subquantum or macro, as the more macro geometrical configurations are still "bunching up" and/or "spreading out", within the "forces" that are standing wave conditions of "bunching-up-ness" etc (which we will detail). This returning force of diffusion to lowest energy acts 3 dimensionally and so the geometry of oscillation will be quite different, as we will see, propagating with an extra "dimension" of wave state dynamics, unhindered by wave-interaction-based classical losses.

Much in the same way that gravity can provide the returning force for any water wavelength, but is subject to boundary definitions, the fundamental diffusion force of dark energy can support any wavelength but is subject to geometrical bounding conditions. When the classical idea of "energy loss" is removed from the landscape of wave dynamics, geometry itself provides the only facets of spacial boundary, in the form of 3d harmonics and their constructive and destructive superpositions.

This is the aspect of spacetime that has most defied any rational analysis on any more fundamental level than the quantum). Classical quantum waves are higher geometrical harmonics that consist of composites of these lower, simpler Q harmonics. But in order to exist stably and predictably, the simple Q circle of acceleration requires the more macro structure of working in groups of circles, for sustainability. An additional layer of critical obfuscation comes in the fact that a relativistic dynamic arises in the differential dynamic when these groups of Q-circles, "clump together", (further seeking lowest energy diffusion) and their subsequent clumping changes the ambient modulation conditions of the very Q circles that form their basic building blocks, (i.e. the ambient relative velocity between Q is reduced via the geometrical synchronization of dynamics). This seeming chicken-and-egg paradox is not actually paradoxical, as we will see.

Physics is familiar with macro, 3D, "solitary waves" and other wave-esque geometries that exist. They are possible because their geometry is fed-back energy in a way that allows a solitary wave structure to be maintained, but the waves still lose energy via development of smaller-wavelength harmonics and it eventually disperses. Soliton waves in canal waters are known exist for example, but require physical boundaries of a specific geometry to be sustained, bouncing back wave energy to themselves on just the right timing.

Since the quantum wave is made of fundamental Q angular circles and so has no losses to friction, (since friction is a wave-to-wave property), or dispursion, (since the purely angular is the maximum diffused geometry), it is only subject to pure wave superpositions, which results in the continuous cycles of entropy we will examine.

The molecules that play the role of medium for the waves in water or air absorb and convey the momentum they receive from macro wave-creating sources into their internal mechanical periodic wave structures. Once the momentum begins to be translated into their internal structures, it corresponds to components of momentum in those smaller structures, and any harmonic of the macro wave in between, not just the geometry of the macro wave. This manifests in dispersion sending that energy outward in all directions and so the macro version of 3d wave structures are not stable indefinitely.

In a quantized wave system, featuring pure-angular Q, without the macro wave-formatting structures of interaction, these Q would rely on only superposition for variations of that momentum, with one Q simply summing with neighboring Q to determine its momentum state. In order for this landscape to develop solitary

wave structures, there would need to be groups of Q that would superpose momenta in a way that formed a larger group-structure that had the property of preserving the geometrical symmetry of propagated-superposition, as a virtue solely of the arrangements of Q vectors that superpose as neighbors with each other in that vicinity. It would have to be resilient enough trigonometrically in the phases of those purely-angular actions to maintain that group stability, regardless of what came along to superpose with it. Interactions between classical "particles" in this scenario, would have to be varieties of possible sustainable groups of Q that also interacted via only pure superposition of adjacent quanta state.

When we observe wavelike behavior of particles, we tend to think of things like photons that are emitted from mass as being waves that are created by the event that emitted them. But if we step back and consider that the mass a photon is emitted from, is also a wave, we are presented with a clue that points to the well known wave behavior among waves of different frequencies. Classical waves of different frequencies in the same space have peaks and valleys that add together and create other waves that travel through the system with a different group velocity, as a dispersion effect. When we apply the observation of the 2-D Q-wavelength in groups as a 3-D wavefunction we can find a geometrical relationship in the boson fermion symmetry according to a facet of group velocity.

This concept of group velocity will be of importance when we consider bonding, annihilation interactions, (i.e. photon production) and waveform collapse in greater detail later. For now it is important to have an intuition for how a field of simple Q circular wave "loops", each having its own vector of momentum, can be arranged to work in concert, forming a larger composite wave "particle", that interacts with other particles in ways that exhibit the classical laws of physics. Other than forming an intuition for the geometries we are about to explore, the most important takeaway here is that there could be no loss or gain of the momentum of a quantum wavefunction, that resulted from "interacting" with its waveform medium.

At the fundamental scale of spacetime, particle waveforms are "made of" vectors of invariant velocity @c. Since observable momentum is an aspect of structured wave interaction, particles can only increase or decrease momentum by means of those interactions, (overlaps) changing the wave's footprint in the random dark energy of spacetime, (by converting random spacetime angular motion to fixed-period spacetime).

We will begin to build a visualization of classical quantum waves in this new context, where they are secondary (quantum) waves that consist of fundamental Q waves, (simple circular 2-D waves of dark energy, with diffusion as returning force). We will start with the simplistic example of water waves, to get the general geometrical categories sorted.

When we drop a pebble in water, the pressure front that travels outward in all directions is what we call the wave. We will say our pond has no boundaries. If a pebble dropped in water never suffered from friction or dispersion of its pebble-induced energy, its center would be sustained as a coherent standing-wave structure. At its center, this solitary wave structure would need to be considered a different variety of wave than the oscillating pressure front it sends out on either side radially. We would need to start talking about things like "spin", to describe the version of symmetry we would encounter a distance away from the center, versus the symmetry found at the center.

This wave-center object would be loosely analogous to a fermion such as an electron or positron. Fermions (dual sided spin ½ symmetries) are only measurable based on their boson-based "single-side" (spin 1) interactions with other fermions, (such as those in detectors). If the only detectors available in the "pebble in the pond" thought experiment were other perpetual pebble-wave centers like this, the changing phase interactions, (on one perimeter or another), caused by the other wave centers, would be how they detected other wave centers. The detecting would be based on how the existence of the other wave-center caused changes in the wave-state of the wave center in the detector. The "boson" in this case would be the the interference pattern between the detector wave and the detected wave, (again caused by only one side of the symmetry from the other wave center, radiated and found at its perimeter edges). But this is of course a 2-D simplification, fermions and bosons have some other interesting symmetry properties due to their 3d geometry that make this water analogy incomplete. We will explore these in detail when we unbox the spinor and its inverses.

In order to persist with the 2-D analogy, we must add a detail about our pebble-wave that brings it closer to the 3-D quantum version. Instead of a simple pebble wave, the wave center has a rotation direction, such as waves traveling outward from a vortex, caused by a pebble that is spinning when it is dropped. In this way we can visualize the extra degree of freedom found when pure-agnular 2-D Q form 3-D arrangements of the tendency to minimum acceleration. To use the spinning pebble to introduce the idea, there are couple layers of geometric nuance that would need to be added before we got to the true intrinsic quantum

structure but we don't want to strain the analogy too much. We only want an intuition before we describe the vector system literally.

So a matter particle formed in the medium of dark energy is somewhat like that vortex-ed standing-pebble-wave formed in otherwise still water. When two vortexes interact, they influence each other, since their "object-ness" and their "interaction-ness" are made of the same wave system. When their rotations have opposite handed-ness (pebble rotation direction) they attract, when they are the same they repel.

They do this by affecting each others' wave-centers differently on their near-sides (between them), than on the far sides (outsides). Like pebble rotation direction cause propagation-superposition we know as repulsion, opposite rotation direction, ("charge") causes attraction propagation. We will see that the symetrical distribution of the wave about the wave-center is "tipped" in one direction or the other, in terms of the second gradient the wave center itself causes in the spacetime differential, (again, as energy forms particles as it points to the minimum acceleration paths $dV/dt=d^2V/dx^2$).

If these two sustained pebble-drop standing-waves with opposing rotation-directions interacted in a destructive way, they would each then send out a pattern based on the cancellation of their original rest-patterns that would also look like a sustained wavefront-symmetry traveling radially outward from the pair. This new partially-inverse wavefront would effect the symmetry of any other third wavecenter that was nearby, subjecting it to a disturbance of its Q loop direction and it would do so at whatever frequency of oscillation the original pebble waves had in their interaction. That superposition that would be sent out, would be analogous to a photon emitted after an electron encounters and orbits a positron or the multiple-fermion positive charge that is a proton.

In the case of wavefunctions in spacetime, the vortex-like pebble waves, as fermions, represent more efficient configurations of velocity vectors, (reduced second gradient) than the random configuration of the dark energy in the vacuum, (lower overall acceleration in the fixed-period format than the random). So as these opposite-handed configurations radiate outward, and their perimeters meet and interact, their patterns mutually cancel and the interference pattern propagates radially away from the meeting place as a loss of that "lower acceleration" d^2V/dx^2 they both had, which we consider curvature of spacetime.

To add one last caveat, before we put the overextended water analogy to rest, if

instead of flat calm, the ambient medium, (the pond) were very randomly turbulent, the conditions required to register a detection or non-detection would be blurred, with all particles being subject to the random ambient cross-talk from all other particles in spacetime, with only the proximity to the particle deciding the probability of its amplitude registering as a detection.

If will be useful to remember this pond, when we discuss literal 3d solitary wave geometries. The quantum properties such as handedness, spinor symmetry, the inverse nature of bosons and a host of other things should be more easy to conceptualize.

Motion Not Motion

By far, the biggest existential paradigm shift in conceptualization needed for coming to terms with a subspace model of the universe is the concept of a physical object "moving". The concept of motion has a deep rooted, tangible and personal meaning, tied tightly to the concept of existence, object-ness and therefore particle-ness. Isolated objects move with respect to other isolated objects, and when they get close and interact, they are caused to do so with a totally different kind of invisible stuff called force. When motion (i.e. change) is the ever-present phenomenon and objects are just patterned alterations of that constant motion, we don't have the luxury of treating momentum as an isolated purely-observable quantity and we don't have the luxury of discrete boundaries for the existences (or locations) of things.

We have classically come to terms with things that can exist but are invisible but we are sure that a single thing cannot have both visible parts and invisible parts, where the invisible part is common to all objects , (so to speak). Even though all masses and forces in the universe are ultimately reducible to energy, we believe force and mass are irretrievably different existential things and claiming otherwise would be immensely counter-intuitive. But this, unfortunately is exactly what we must do, if we are to proceed to where our future is taking us.

Similar to the way water molecules do not go traveling along with an ocean wave but simply move up and down, acting as agents that convey the pattern of energy along, the energy that any particle is made of does not travel with the object, and a particle of matter or energy in spacetime is not truly a "discrete" singular object. The forms we observe as matter and energy particles exist and travel simply as packets of alterations of the directions of the random motions

of all the otherwise immeasurable dark energy that has a velocity of c.

When a particle pattern at rest is forced to move, even the added motion itself, that seems to be something a particle "does", is not a property of the particle, but is in fact just all of the dark energy along the observed path, altered in a way that redirects its random motion and conforms it to be in the direction of the pattern of the particle, (conforming according to the geometry described by the superposition of wavefunctions). The dark energy itself is relatively stationary to the linear motion of the particle, just as air molecules are to sound waves or the string is (in the linear direction) to a rope wave.

Although it may seem straight-forward at first, and indeed the math as we will see, is straight forward, the object-centric perspective and the background-centric perspective will come into conflict with common intuition about force and motion. The wave nature of matter and forces must be fully accepted, recognizing that technically speaking, the concept of a particle is simply a delineation used as figure of speech, relying on the more fundamental underlying dynamics for the complete description.

The concept to keep in mind is the fact that the structure and the communication are the same mathematically. The diffusion action of dark energy acts like a single "expansion" force at all points in space, an action which is forms the definition of the shapes of things and communicates the shape of things radially as force, all based simply on the direction of any vector of dark energy at any point Q, compared to the Q next to it. When a lower energy, (less conflicting direction arises, that energy at that point will turn that direction). This dynamic is all that is required to form the objects and object interactions we observe, and that "texture" of acceleration state fills all the space between objects, (beyond those interaction boundaries we call the particles) and to infinite resolution in spacetime.

Although it is true that at the quantum level, particles are fully sustainable because the "Q does not experience dispersion waves", (in the way classical waves do to lose energy), this statement is incomplete. In truth, at the quantum level, the action is 100% pure dispersion (via diffusion), and the periodic structures that form are the simplest geometries of stable reciprocation of that diffusion, modulated on top-of and giving stability-to the underlying simpler, 2-D pure-angular Q action to diffuse.

In this way, the energy format that is the substance of a particle, along with its force interactions (and as we will see, even its acceleration/motion), are all just

variations in the communication of vector-direction data that is constantly taking place within the dark energy of spacetime in that region, conveying whatever periodic pattern is put to it Q-to-Q, particle or not, sustainable or not. .

So a crucial distinction that strikes at the heart of the existential difficulty in contemplating spacetime is the difference between wave state diffusion data that is radiated and travels away from a particle and that wave state data that is reciprocated to immediate neighbors to constitute a particle's structure. All of spacetime is always, "radiating" from every individual region, (communicating state data @c finding lowest E paths to infinite resolution), but it is important to see the different rolls being played by the state data that is communicated radial-to the group of Q that is the particle, and the data that is communicated tangentially and is being re-absorbed, so to speak, (reinforcing the particle) between the neighboring Q within the geometry of the particle.

Propagation by Diffusion

Before we get farther into specifics, we will use another analogy to insure that we have the intuition for the dark energy state-propagation in the vacuum. The concept of propagation of state, and indeed the propagation of particles, will be based on that constant spacial-averaging of vector trajectory of dark energy.

Imagine a long line of people, all with a few dollars in their pockets. Each of them has some number of dollar bills between one dollar bill and 10 single dollar bills. They all start out with a random number 1-10. When we say "go" they must all ask how many dollars the person next to them has and exchange money so that every person has an amount that is the average of the 2 people next to them. Once this happens it must be repeated again and again. In the analogy, the amount of money in each person's pocket can be equated to a component of direction of velocity c at any point in spacetime, (the x component for instance where the reality is that x,y and z are each averaged). The difference in the amount of money between them is like the relative velocity between Q, (the overlap of the planar pure-angular action to diffuse).

When the amount in one person's pocket changes, it is like the velocity rotating direction (imagine a gauge with a needle reading $1-$10 that rotates). Now , if instead of a line of people, we imagine a square grid of people, we can start to see that the amount their "money gauges" changes is directly related to how big the difference is between the amount of money the neighbor has on one side vs the

neighbor on the other side. When the difference in money on one side is much bigger than the other, the needle moves allot, (i.e. we can begin to see the differential equality we find in the heat equation between the time derivative of velocity and the second spatial derivative).

The process of all of them trying to reach the same average and seeking a stable equilibrium would have them continually exchanging money, and their gauges continually rotating. We can note that it is the imbalance between adjacent neighbors, (the difference of the difference) that actually causes rotation of the gauge to keep happening, (a second gradient), because otherwise the system would average out and come to equilibrium, which is something this analogy, (as is) would quickly do. If we suddenly hand an extra 5 dollars to one person in the grid, there would be an imbalance (or curvature) in the system and that person's gauge would rotate more drastically than the others and there would be a larger imbalance in the number of dollars between that person and their immediate neighbors.

The $5 infusion would then propagate a change out from the initial person. The way it propagates is of primary importance in this analogy. Although $5 was handed to the first person, the change in state (acceleration to that person's dollar count) propagates out, "travels" by way of averaging with every state along the way (every person), along the way. This seems like an incidental point but it is crucial to keep in mind, since all the classical notions of object boundaries, objects moving and objects interacting are simply the alterations of states in this way, but dealing with exchanges of dollar bills that are periodic.

If we want to take the analogy one step further, we can get a preview of how the differential relationship gives rise to sustainable, observable periodic particles. If the $5 were given only to select people in the grid, forming a complete loop, the process of neighbor-averaging would keep the loop with a higher dollar amount longer, as the grid reaches equilibrium, because of the redundancy of the loop geometry. Of course the analogy is limited because dollars in the pocket is a one dimensional quantity and in the analogy it is possible to come to completely diffused equilibrium. In spacetime there are the equivalent of three spacial dimensions of a one dimensional quantity, all trying to come to equilibrium with 3-D neighbors. This is something that is made impossible because optimal 2-D pure angular actions to diffuse will always have overlap with neighboring such regions in 3-D, preventing equilibrium. Because of this, probability dictates that certain geometries will form that behave like these averaging loops, sustaining continuous regions of second-gradient-reduction, (regions of permanent imbalance of the average), still never resulting in equilibrium but instead

participating in a shift of gradient across all of spacetime that has a wholesale periodic effect we call entropy, which we will explore. The 3-D arrangement of minimization of a 1-D action to diffuse, never achieving equilibrium is like the differential cycle of evaporation and precipitation in weather systems, ever inverting the micro/macro distribution of its form vs force.

Rest and Uncertainty

Part of the conundrum of the quantum world is that to form a complete picture of the existences of structures in spacetime they must be viewed with two separate lenses. One lens accounts for the perfect geometries of particle structures at absolute rest, and the way their reciprocating geometries satisfy the tendency for spacetime to point its vectors in the lowest energy direction.

The other lens accounts for what happens to those perfect geometries once they are set in motion, and the subsequent randomization that is caused by the interactions between these were-perfect, equal but opposite-handed-rotation symmetrical structures. The trouble is, the data for understanding both lenses is mixed together in what we observe. It's like taking apart a pickup truck that has been driven through a muddy pond. If you were an alien visiting earth and had never seen an automobile taken one apart before, you would swear that the grit and sand you find inside every square inch of the truck was some functioning part of the mechanical design.

Perfect, absolute-rest spinor geometries are handed, meaning they have compound rotation directions in their symmetries. We will dissect these structures in complete detail, but for now, it is important to understand that when these opposite-handed (e.g. matter and anti-matter) structures overlap, (including in the phenomenon of charge bonding), they annihilate. That is, they cancel each others' compound rotation directions, (i.e. causing conflicting acceleration where there once was a minimum-acceleration path structure). Since matter is a zone of reduced ambient acceleration, when opposite particles annihilate, they represent a partially-inverse geometry, (they form a seperatve geometry made of LOSS of that "reduced-average-energy configuration". Like the cavity of water formed when a diver hits the surface, the water was at optimal equilibrium, then the diver's body created a curvature in the water's pressure. This is like the formation of a fermion in spacetime. After the diver continues deeper, the symmetry of the curvature collapses and creates a rebound of opposite curvature, (a splash that rises above the water's original

edge). This is like a boson.

Again, this will be examined in full detail mathematically but the important side-effect of this fermion and boson dichotomy is what happens when only partial annihilation takes place. More elaborate stable structures can be formed from combinations of multiple simplest-fermions. When this happens, the process of annihilation results in shape-inversions that are incomplete. In the act of bonding whole annihilations don't occur, only partial ones, where quarks, nucleons atoms molecules etc are formed via overlapped more macro stable diffusion increasing structures.

To return to the analogy, The curvature-cavity bubble the diver caused would change its shape, (it would be modulated) if there were many other people swimming in the pool, also making waves. The perfect absolute rest geometries become modulated and randomized by the lower-energy (partial annihilation) inverses that are taking place in the medium. Hence we have a system where the Newtonian world has rigid geometries and seeming absolutes but the Quantum world, (that would presumably be an even-more-predictable underpinning of laws and structures), seems to be least-certain and least-rigid.

The quantum world is so extremely clear-cut and structured that random uncertainty is part of the results of the structure. As entropy progresses and things are built, the system is modulated and changes shape with increasingly cooler longer wavelengths, with all iterations still present, resulting in absolute diversity via absolute uncertainty. Although, as we will see, controlled reference frames of reduced-uncertainty can be created by manually controlling the state of Q-state information to that reference frame. Matter particles themselves are naturally occurring versions of this type of stable reduction-of-uncertainty via organization of information. Knowing the geometry allows us to control this in an intelligent way.

We will spend the majority of this paper on the subject of the absolute rest structures and how they interact, because the subject of their behavior once randomized can be considered a fairly straightforward process applied to the geometry. Since fermions can be considered a kind of standing wave packet with Q wavelength constituent vector directions, their structures must necessarily both 1. satisfy a lowest energy configuration, (a circle suffices) but 2. must be stable and complete a full 360 without being disrupted by vector superpositions from neighboring regions that would counteract the circuit, (and so a group of neighboring circles must exist, so that group redundancy of superposition ensures stability).

If a particle was a group of soldiers that position themselves shoulder-to-shoulder, the diffusion states, (the accelerations they experience), that reach the "inside" of the particle, are defended-against with redundancy. The inside of the particle is a direction where the acceleration state is guaranteed to be phase synchronized and fixed period, giving it durability of what we identify as "superpositions" of acceleration states from the outside of the particle, which are more random (not of fixed period).

End of Section 4