A Geometric Model Based on Frequency That Reveals the Nature of Time

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Abstract

The purpose of this paper is to present a hypothesis: that frequency is the key to understanding the fundamental nature of time. Time and space are mirror images of each other and they are two different ways of expressing inverse frequency. The reason this is important is because, by starting with frequency the relationships of physics can be expressed by linear equations. It is known that frequency is directly proportional to and thus equivalent to quantum energy. By expressing the relationship of spatial frequency vs. temporal frequency as a simple geometric model, several well-known relationships fall into place without having to stretch the model into warped expressions of spacetime that require complicated hyperbolic functions or field equations. The result is a sensible interpretation of the meaning of time, spacetime, quantum particles and quantum wave functions. The model also lends itself directly to an understanding of how space and time become dissociated and transform into quantum bits of information, which automatically models reality as a quantum computer. The implications of these interpretations provide a bridge between physics, as a physical science, and life sciences that take in information from their surroundings, convolve it with itself as particles and thereby shape and reshape matter, allowing living organisms to change with time and adapt to their environment.

Introduction

There have been many books and articles about the nature of time, especially since Stephen Hawking, brought it to the forefront in his book *A Brief History of time*. (Hawking 1990) Physicist Lee Smolin said that understanding the nature of time might be the most important question for this generation of physicists to answer because time holds the secret to understanding the universe. (Smolin, Time Reborn:

From the Crisis in Physics to the Future of the Universe 2013) He concluded that time is real in the sense that: “Whatever is real in our universe is real in a moment of time, which is one of a succession of moments.” Another physicist, Richard Muller, explained that the Big Bang as a 4-dimensional explosion “continuously creates not only new space but also new time.” (Muller 2016) But many others still think that time is an illusion (Barbour 1999). And there are a few who consider time to be something that can be viewed as an intrinsic geometric property of three-dimensional space. Chappell, *et. al*. presented this using Clifford geometric algebra. (Chappell, et al. 2016) However, they “absorbed time into an expression of an *invariant spacetime distance”.* So rather than explaining the nature of time, they hide it in the square of a quaternion, which agrees with what most Cosmologists believe: that time is somehow mixed with and thus hidden in space to create spacetime.

However, the nature of spacetime is even more mysterious than time. General relativity theory is the main framework that has been used to approach the problem of understanding spacetime, and it has served to explain a large body of observational information, including the red shift in light from far-away stars and galaxies, nuleosynthesis, (which predicts the amount of hydrogen that should have fused into helium) and the microwave background radiation, believed to be the “echo” of the Big Bang. (Kaku 1993, pg. 643) But this has generated even more questions and complex theories, like String Theory, M-Theory, Causal Set Theory, the Amplituhedron Theory and Loop Theory.

According to George Musser, contributing editor at Scientific American and author of *Spooky Action at a Distance* (Farrar, Straus and Giroux, 2015) and *The Complete Idiot’s Guide to String Theory* (Alpha, 2008), “If physicists have learned anything from the long slog to unify their theories, it is that space and time form a system of such staggering complexity that it may defy our most ardent efforts to understand.” (Musser 2018) “The bottom-line lesson of quantum gravity” said Musser, “is that not all phenomena neatly fit within spacetime. Physicists will need to find *some new foundational structure*, and when they do, they will have completed the revolution that began just more than a century ago with Einstein.”

Rather than proposing a new foundational structure, this paper reflects on and reconsiders how the old foundations were interpreted. According to E. A. Burtt in *The Metaphysical Foundations of Modern Science*, before the days of Newton, the treatment of time as an independent entity was considered by many to be a philosophical blunder. (Burtt 2003, pg. 158)

> *"Clearly, just as we measure space, first by some magnitude, and learn how much it is, later judging other congruent magnitudes by space; so we first reckon time from some motion and afterwards judge other motions by it; which is plainly nothing else than to compare some motions with others by the mediation of time; just as by the mediation of space we investigate the relations of magnitudes with each other."*

In other words, a unit of time is just a unit of motion that is captured or "clocked" by a cyclical *motion device* as a unit measured in the past, to be used as a common denominator for other motion. Spacetime then is simply a spatiotemporal *process* that implicitly flows and we experience it as motion. But it must be *expressed* as a pair of explicit measurable quantities that appear to "dance with each other" and move independently with an inverse relationship. This inverse relationship will be explained and illustrated below in a simple geometric model.

The Hypothesis

The hypothesis presented here is that *frequency*, which is defined as inverse time, e.g. in cycles per second, should be considered the most fundamental spatiotemporal process-unit in nature. Then time, as the inverse of frequency, is simply a mirror image of a quantum unit of energy, both of which are byproducts of relative motion. We may think that we sense time, but motion, which is ubiquitous, is what we actually sense. A quantum unit of energy is just energy in motion and there is no such thing as an object at rest. An object only appears to be at rest in its own reference frame. It is always in motion relative to everything else in the universe that is moving with respect to it. The reason that time is a "problem" in the first place is because we are taught to think of it as a primary fundamental unit. And that is because doing so allowed early physicists to predict the outcome of relative motion. That is where the money is, so to speak, because metering motion and predicting time and location of arrival is extremely practical and useful. But that model separates and hides the fundamental nature of reality and fools us into thinking that the physical aspect is what is real. Eventually that model reached its limit and began to create problems, like the ones described above and other "singularity problems". (Smolin, The Trouble With Physics 2006)

The solution I submit is to recognize frequency – the inverse of time – as primary. We start with the concept of energy. The word "energy" refers to an implicit concept that just is. To say that it is implicit means it cannot be expressed, only *implied*. If we try to express it, we make it *explicit* via the expression. As implicit to the universe, energy is ubiquitous; it can neither be created nor destroyed. But once *explicated*, (see David Bohm's *Wholeness and the Implicate Order* (Bohm 1980)) it can be changed in form. And the word "form" implies a shape that can be represented by a quantity. The most fundamental unit of energy is a quantum unit, and we know from quantum mechanics that it can be expressed as a function of frequency: $E = hf$, where h is Planck's constant. In fact, the same equation holds whether f refers to temporal frequency, which is inverse time $f_t = \frac{1}{t}$, or spatial frequency, which is inverse space, $f_s = \frac{c}{s}$, where c is the speed of light. The s is usually written as wavelength (λ) as in the equation $E = \frac{hc}{\lambda}$. And since $\frac{h}{\lambda}$ defines the momentum of a photon and momentum implies the particulate form of energy (a quantum particle), spatial frequency is generally ignored. Perhaps that is because focusing on "objects" is of more interest to those who want to be *objective*. However, time is *not an object* and so it cannot be understood by focusing on objective reality.

Method

The approach used here is to present a model with one unit of energy and its equivalent – one unit of frequency – on a rectangular coordinate system, as shown in

Figure 1 (with energy represented by a vector arrow with magnitude of one), and frequencies represented as the first unit to scale the axes. So the frequency of one unit of energy would be one cycle per whatever unit you choose. And the value of *c* would depend on that choice of units. We will not choose common physical units. Instead, "natural units" are expressed (i.e. made explicit) so that each one is "one unit of energy".

Because the tip of each arrow in Figure 1 represents the "particle boundary" (this means the *energy boundary* of a quantum particle, not the physical boundary), the region outside of one unit represents the part of the universe that is not the particle. Logically, "not the particle" means the inverse of the particle; therefore, outside of the boundary on the spatial axis represents 3-D space (*s*) and on the temporal axis, it represents time (*t*).

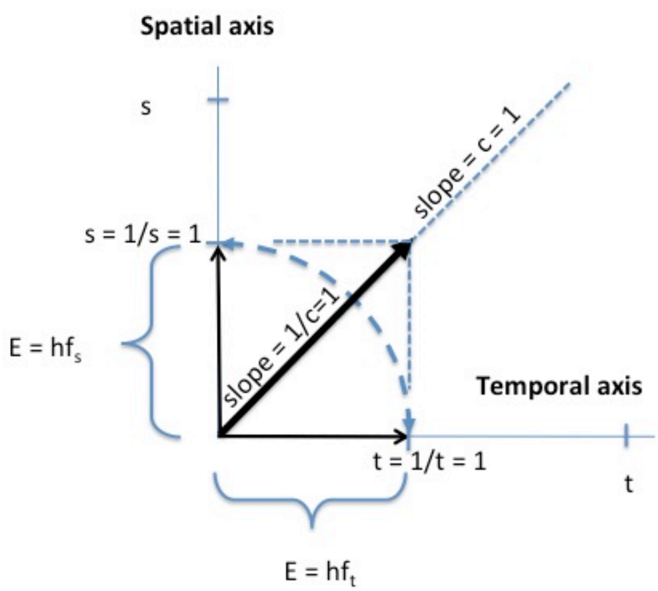

Figure 1

This may seem like an unconventional way of using a rectangular coordinate system because the units for energy are different from the units of space and time. But we do the same thing with vectors that represent motion that has magnitude and direction. It is a superposition of *relationships.* Regardless of what units of measurements are assigned, the relationships remain the same. The "outside" domain corresponds to relativistic relationships and the "inside" domain corresponds to quantum relationships. These two domains are often mixed mathematically, for example a unit of power is a unit of energy per unit time or $P = \frac{E}{t}$. In Figure 1, this uses the inside unit of energy as the numerator and the outside unit as the denominator and the result is the slope of the diagonal line. Or if you rotate the axes with temporal units as the vertical and spatial units as the horizontal, the slope would represent a unit of force, since force is a unit of energy per unit distance or $F = \frac{E}{s}$, where s would represent a unit of measure in one dimension – the direction of the force. (Halliday, Resnick and Walker 1993)

As it is in Figure 1, the slope of the diagonal line is $\frac{s}{t} = c$ on the outside and $\frac{1/s}{1/t} = \frac{1}{c}$ on the inside. In Hartree natural units, $c = 1$ is the speed of light and $\frac{1}{c} = \alpha$ is the fine structure constant, which is considered by most to be a fundamental constant in nature (Nair, et al. 2008). In the general relativity framework, it is a fundamental physical constant characterizing the strength of the electromagnetic interaction between elementary charged particles. But it has multiple physical interpretations (see https://en.wikipedia.org/wiki/Fine-structure_constant) and some even suggest that it may not be strictly constant (Webb, et al. 1998). According to the model presented here, it is simply a clue that the expression of the quantum domain is the mirror image of the relativistic domain.

Presenting space and time in this way allows several other relationships to fall in place as well, as shown in Figure 2, where the subscript in E_d stands for deBroglie, to distinguish it from E_o, which is rest energy and E_T, which is total energy. (Reproduced from Figure 6 of (StJohn, The Holomorphic Process-Understanding the Holographic Nature of Reality as a Metamorphic Process 2018))

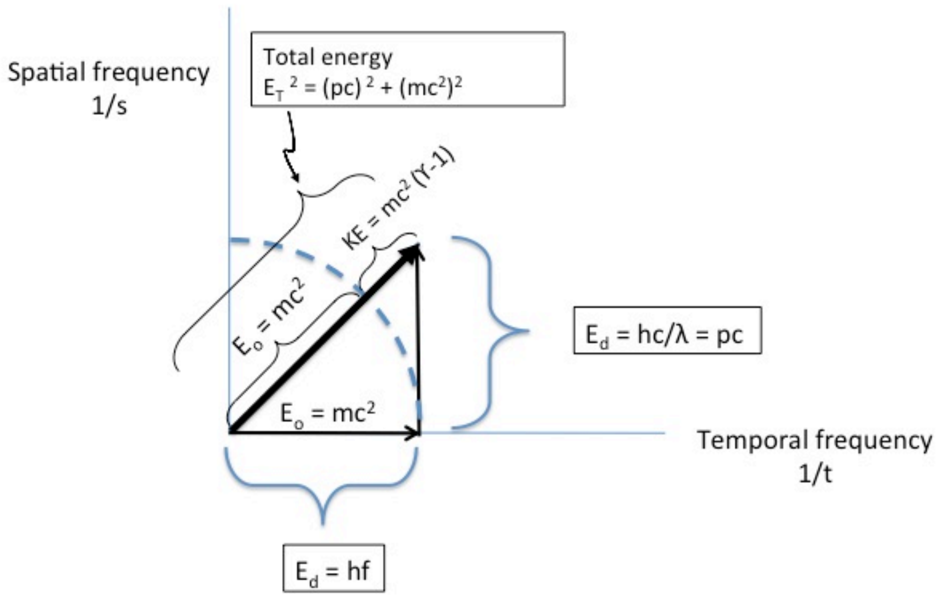

Figure 2

Notice that the kinetic energy term is represented by the part of the total energy vector that lies outside of the "particle" boundary. It is a reflection of the fact that a quantum particle is a unit of energy, geographically expressed in the energy domain, which is superimposed over the relativistic domain (*s* and *t*, not labeled in this figure). In other words, a particle, or any physical object, can be perceived as an independent object –or– as an object that is in motion relative to anything else in the universe that is moving relative to it. And the two representations can be superimposed by applying the appropriate scaling factor or coordinate transformation. The Lorentz factor, γ serves this purpose here.

Figure 1 and Figure 2 were presented to validate this model of frequency with its inverses (space and time). In order to use it to understand the nature of time, the outer (relativistic) rectangular domain will be scaled as usual, see Figure 3, with linear increments of time, and the inner (frequency) domain will be scaled with increments of inverse time. Thus Figure 3 is a two dimensional representation of a torus, with the quantum domain as the region inside the circle – the event reference or "event horizon" in black hole lingo – and the relativistic domain on the outside. The vertical axis still represents 3-D space, but we're focusing on time in this figure, so the labels are left off in the figure. All four quadrants are shown because the inner domain will be identified as a polar domain in the next section.

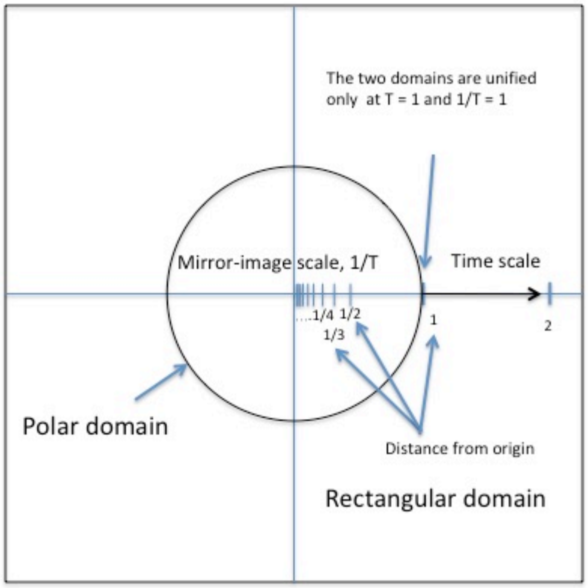

Figure 3

Historically, physicists have taken $t = 0$ to be a legitimate starting point for measurement. But according to Figure 3, $t = 0$ corresponds to $\frac{1}{t} = \infty$ or an infinite frequency. Obviously there is no such thing as infinite frequency, so using $t = 0$ as a reference point for linearly scaled motion creates a problem. The problem is that regardless of what units of measure you choose, one unit is one unit. And if the fundamental unit of motion is a unit of frequency, then units of space and time must be represented as inverses between 0 and 1. In other words, a measurement of one unit is a true measurement so using $t = 1$ as an event reference makes the model fit reality. The problem with back-projecting that measurement to zero is that it *stretches the truth,* and trying to force reality to fit the model creates a warped interpretation of reality. Without a geometric model, math doesn't reveal this problem. Differential Calculus for example, handles this stretching operation by shrinking the polar domain in terms of time down to a point: the $\lim_{t \to 0} \frac{\Delta s}{\Delta t}$, and then defines that using linear units of measure as instantaneous speed in one direction. For most practical purposes this is fine and very useful because it is accurate within the precision limits of measurement.

But quantum physics is all about the part inside the limit as $\Delta t \to 0$ and $\Delta s \to 0$. When it was being developed, Niels Bohr formulated the "correspondence principle", which requires that the behavior of systems described in the new quantum model must reduce to the same proven results as the classical model. But then they had to provide interpretations that did *not* correspond to reality as we know it in the "real world". They accepted that the quantum world was just weird. And physicists working with special and general relativity have accepted the same "cop out": that the cosmos is just warped and weird.

To an engineer, the problem is that physicists are not concerned with the real world and therefore, mistake the map for the territory. Engineers recognize the warping effect as an artifact that is caused by mapping, which is a required part of an engineer's curriculum because it is a standard method used for solving boundary value problems. Conformal maps preserve relationships in the form of size and attitude (sense of angles) from one domain to another. (Kreyszig 1979, pg. 599) In this case, the slope of the diagonal line in the figure is a *conformal projection* of a unit in the dimension perpendicular to the space-time plane, i.e. the motion dimension. Therefore, the model presented here is called the Space-Time-Motion or STM model. (StJohn 2018)

So the quantum point, $\lim_{\Delta t \to 0}^{\Delta s \to 0}$ is just the circle you might draw on a plane to represent the third axis coming out of the page. In control system design, engineers make great efforts to ensure that control systems avoid approaching singular points, like $t = 0$ called "poles" because they represent conditions of maximum instability in the system. (Ogata 1970, pg. 23) That, I submit, is the problem with modern theoretical physics. The models that held time as a primary fundamental unit became unstable and the back-projection "blew up" in a "cataclysmic explosion 10-20 billion years ago", as Michio Kaku put it (Kaku 1993) because they assume that there was a beginning to the universe. But if there is no such thing as zero time or zero space, i.e. no beginning to the universe, then even though real events can be fit into the model, the model still doesn't fit reality.

On the other hand, frequency is equivalent to a real unit of energy. Spatial frequency and temporal frequency are explicit units, just like space and time, but neither one is separated into three dimensions, so they work together as linear relations, commonly used as Fourier and Laplace transforms. Space and time still work as scales that can be manipulated any way you want, to build symbolic models that are appropriate for specific applications. But extending the linear scales back to the origin brushes over the meaning of the quantum unit of motion. That unit is a unit of vibration – a kernel information. And that information reflects the *meaning* of time.

So rather than stretching or brushing over it, we will use a polar coordinate system and correlate the polar domain with quantum space and the rectangular domain with relativistic space. Then we correlate vectors in relativistic space with phasors in quantum space. The benefit of this approach is that it provides interpretations that correspond to proven results in both quantum and relativistic models, described in (StJohn 2018), as well as the real world, i.e. it will be shown below that the relationships derived from this approach produce the golden ratio, which is evident in the structure of living organisms.

Phase Vectors and Phasor Diagrams

Vectors are defined by their magnitude and direction and are normally superimposed over rectangular coordinate systems. "Phasors" as shown in Figure 4 are phase vectors, i.e. they define their angle as measured from a reference (usually the horizontal axis) in a polar coordinate system. So rather than scaling the inside part of the t axis as $\frac{1}{t}$, phasors use angular frequency, ω. They are commonly used in electrical engineering to represent waves of alternating current for transmission of power or radio signals. In these applications, phasors always have constant magnitude, like E, the radius of the circle in Figure 1, so they are more useful for constant amplitude waves. Here, the portion of the vector inside the circle in Figure 2 that represents a particle "at rest" is represented as the solid phasor in Figure 4. The endpoint of this discussion will be to illustrate what this type of coordinate system reveals as time passes (the golden ratio), but was hidden when the quantum domain was ignored and thus hidden.

A phasor diagram only needs one axis to scale its magnitude and provide a reference for the angle of the phasor, but in this application we need both the quantum and relativistic systems because whatever happens in one domain also happens in the other and we will be able to jump back an forth as needed.

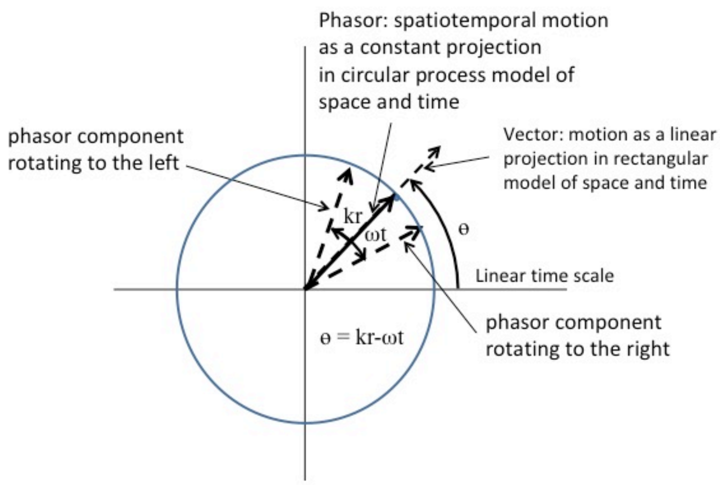

Figure 4

Even though energy appears to be collapsed and localized into a particle, a particle is still in motion relative to everything else in the universe, so it must be expressed as a spatiotemporal unit. This can be accomplished by separating the phasor in Figure 4 into a spatial component (at an angle kr to the left dashed phasor) and a temporal component (at an angle ωt to the right dashed phasor). The difference angle $\theta = (kr - \omega t)$ represents the phase difference between the two. As time passes, these two express as separate waves, but $\theta = 0$ represents the phasor that remains constant to represent the solid phasor (not the ones that are dashed lines), collinear with the relativistic vector E_T in Figure 2.

The phase angle is the same expression used as the argument of a transverse wave, such as $y(x,t) = y_m \sin(kx - \omega t)$, where y_m is the maximum amplitude of the wave, $k = \frac{1}{\lambda}$ and $\omega = \frac{2\pi}{T}$. But in that case, the model is used to plot the wave moving either in space or in time while the other is held constant. A phasor diagram allows them both to change together as inverses of each other. So one phasor in Figure 4 must rotate to the left as the other rotates to the right at the same constant angular rate. Again, this leaves the original diagonal phasor, the total energy of the quantum particle, to remain unchanged.

As the left vector begins to rotate left and get a higher slope $\left(\frac{s}{t}\right)$ in reference to the relativistic frame, (as shown in Figure 4), this would be interpreted to mean it is increasing speed and since the vector component projected onto the space axis is getting larger, that suggests that the particle is getting bigger or diffusing. Similarly, the right vector projects as if it were slowing down and getting smaller or collapsing. So this would mean that the particle is beginning to separate itself into an inner sphere and an outer sphere. In reality, one would argue that this is related to the Heisenberg uncertainty principle, and nothing is happening to the actual particle. It's the model that must change in order to represent change that results from the passage of time. And since the appearance of the physical particle doesn't change, the spatial part of the expression has to be renormalized, moment-by-moment, whereas the temporal part does not. The question is, what defines that "moment". That is where the golden ratio appears in the model.

Result: The Golden Ratio

There is a point in the two phasors' rotation where the two slopes reach a very special value. Figure 5 shows this for the left phasor (kr) and Figure 6 for the right phasor (ωt). That special value is the point where the slope, which is a ratio, reaches the golden ratio, $\emptyset = 1.618 \ldots$ What's so special about the golden ratio? It is the solution to the relation $\emptyset = 1 + \frac{1}{\emptyset}$. If $\emptyset$ is the slope of the left phasor, this means that if the reference scale shifts by one unit on either axis, i.e. one moment in time and one moment in space, then the rotated phasor with the slope, $\emptyset$, can be replaced by a new phasor (shown as phasor 3) with the same slope as phasor 2, except as referred to the outside reference frame (just as c and $\frac{1}{c}$ were shown in Figure 1) and shifted by one unit as shown in both Figure 5 and Figure 6.

And there is a “twist”: Since the angle of each phasor is found by taking the arctan (the opposite over the adjacent sides of the right triangle), it is easy to calculate that the two new phasors are rotated (ergo twisted) by 13.28^{o} in opposite directions as compared to the old vector, phasor 1.

As mentioned above, just before the shift, the “size” of the “new particle” in the unshifted reference frame (the projection of phasor 2 on the space axis in both figures) is different from the original particle (phasor 1). The projection of the left (spatial) phasor in Figure 5 suggests that the particle is growing, but because it doesn’t appear to be physically larger, the scale of the space axis has to be renormalized. In effect, the “new” phasor, phasor 3, seems to have collapsed along with the new renormalized coordinate system. So we can imagine that the particle expands for a “golden moment” then collapses back to the original size. Or we could say that the rectangular coordinate system rotated to put phasor 3 back at 45^{o} giving the particle its characteristic angular momentum or spin. When that happens, the temporal phasor must also rotate to the right to account for the 13.28^{o} to keep $\theta = 0$. The result is the same particle that contains a “module” of inverse-temporal information, i.e. it is a *frequency modulated* unit of information (what Nassim Haramein calls a Planck unit that makes up the unified field).

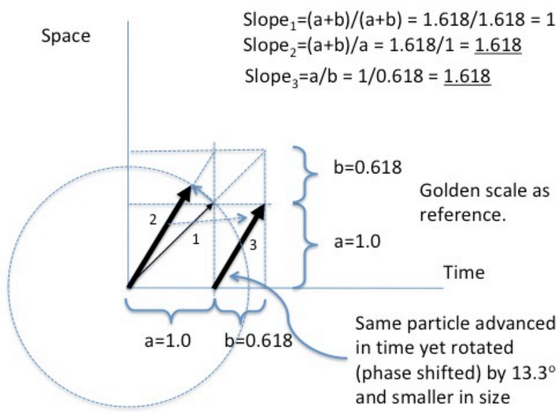

Figure 5

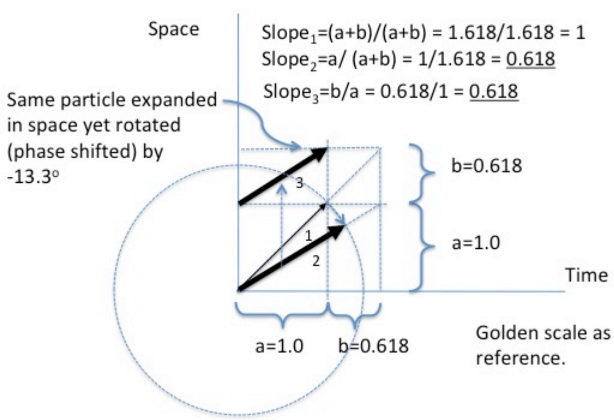

Figure 6

So even if nothing physical about the particle itself changed, the observer's perception changed because the particle appears to have rotated in space and time. We sense the motion in space because it has momentum, and "pulls" the surrounding space inward, which we measure as gravity. And we sense that it has moved in time, but we *interpret it* to be unchanging in time. Rather than thinking that the particle changed in time, we think that time has changed independent of the particle. And that is a perfectly legitimate interpretation for most practical purposes. But if that is true, where did the time go?

It went inward as a moment of inverse time and its reflection went outward as our normal notion of a moment in time: i.e. the classic "arrow of time". Because the space axis was renormalized but the temporal axis was not, the old temporal phasor still appears to represent a smaller particle (projection of phasor 3 on the space axis), which we could imagine *objectively* as an "event-particle" (a term from Process Philosophy (Whitehead 1929)) or qbit of information collapse *inside* toward the infinitesimal center of the physical particle. This suggests that a torus is a better model than a sphere to represent quantum particles. And it might correspond to energy levels that represent electron orbitals in the current models of physics, but that has not been verified. And if this model represents a living being, it suggests that the inner "event-particle" might be associated with our memory and with our genetic code stored as quantum units, twisted in the helical form of DNA, being programmed in real time.

Keep in mind that the projections on the space and time axes do not represent total energy of the particle, but rather waves in space and time. But the difference in phase angles between the new and old particle can be represented as a different wave that modulates the particle frequency. And as a wave, it is a unit of information. This supports the idea that perhaps Information Theory provides a better approach to understanding reality than the Standard Model of Particle Physics. (Davies and Gregersen 2010)

It is also important to note that the golden ratio can be written in the form $\emptyset^2 = 1 + \emptyset$. So this refers the slope back to the inside domain of the original reference frame and presents the old energy term as being squared. In classical wave theory, the square of a wave amplitude refers to intensity, i.e. the amount of energy that passes through a unit area perpendicular to the wave direction in time. In this case, that direction is inward.

The golden ratio has been known for centuries and used in art and architecture because applying it to determine proportions for figures and buildings creates aesthetically pleasing results. And it appears as a common pattern in leaves, plants, fruits and flowers (very obvious in pineapples and pine cones) as well as seashells (for example the nautilus) and animals, including humans. Clearly the golden ratio is much more than a tool for art. According to the STM model presented here, it is the relationship that shapes every fiber of our being and every moment of space and time. And as projections of life, we literally resonate with it.

Conclusion

This process, which I call the holomorphic process, by which the unified field separates into two domains, projects itself inward and outward, reflects on itself (at the point that its motion reaches the golden ratio) and reunifies, is how three dimensions of space are mixed with one dimension of time to make spacetime seem to be some kind of weird phenomenon different than energy when in fact it is just information-modulated energy, which is called "truth" since it actually happened. If space is represented as a sphere on three-dimensional coordinate system, then time is just the inward-outward direction. It is as simple to understand as considering the radius of a sphere to be a fourth dimension, except that each sphere captures the implicit process as information. We just happen to scale it by a standard clock. There's nothing special about standard clock time. It was a measure of motion that was recorded and is now "clocked" as a reference at the National Institute of Standards and Technology (NIST). So it is effectively anointed and treated as being a sacred unit.

The logical twist (thinking that time itself is different than inverse frequency) and strict definition of time as an unchanging unit, *objectifies* and hides the *meaning* of time, because it ignores the convolution process. Convolution means that space and time form a convoluted whole, i.e. the information present on the outside is continuously convolved, with the particle. This process *shapes* the particle into a form that can be perceived at the macroscopic level as being at rest. It's the form or shape that *implies* the information and dictates its behavior. This is exactly how anatomical information gets infused or implied in an x-ray or holographic film. But, whereas the information in a hologram must be deconvolved by illuminating it with another laser, the information in a quantum particle is automatically deconvolved by relative motion (its behavior).

One example, of how relative motion deconvolves information, was demonstrated by Albert Einstein when he used statistical analysis of Brownian motion (random motion of dust particles) to prove that their motion *implied* the existence of forms we now know as molecules. In his 1956 paper, *Investigations On The Theory of the Brownian Movement,* he hypothesized that the movement of dust-particles on the surface of a spherical drop of liquid was the visible macro process implied by random collisions with molecules. He developed an equation for the distribution of the number of particles per unit volume as a function of time (t) and position (x). He said, "we will calculate the distribution of the particles at a time $t + \tau$ from the distribution at the time t." Then he solved for the *moment* of the distribution. As with any statistical distribution, the "moment" provides us with a single measure of a collective behavior, deduced from the shape of the distribution. That means that the shape evolves by convolving the function, defined by the implicit nature of the micro system, with time. By expanding and rearranging it, he effectively deconvolved it and solved for the diffusion coefficient. This deconvolved expression was then verified by experimental observation of dust particles.

As each moment of time passes, the *quantum bits of information* that are present – *in the present* – (on the surface of every quantum particle) collapse inward and become infused into the particle as bitwise recordings, collectively called "the past". So a unit of inverse-time is interpreted as a "moment of the past" – a single "logical" quantum bit of information stored in three "physical" dimensions. Collective, it forms a four-bit qbit. As part of a larger quantum computer, it self-programs, self-corrects and runs itself, which is an idea that is currently being studied. (Lloyd d'Arbelof n.d.) (Lloyd 2007) (Almheiri, Dong and Harlow 2015) (Wolchover 2019) The outward-pointing vector simply corresponds to the mysterious arrow of time.

The most profound implication of this is that all physical matter, including a living organism, is recording every moment in time. So we are a reflection of every event, action and word that we experience including those that we generate. These interpretations provides a bridge between physics, as a physical science, and the life sciences, which must include information from the environment that convolves with particles to allow life to grow, change and adapt.

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