A Full-Scale Fifth Spacetime Dimension:
The Key to the Theory of Everything?

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Introduction

There exists a full-scale fifth spacetime dimension where the universe expands along two degrees of freedom, parallel and normal to light. A tetherball's path around the pole represents the parallel path. The radial path away from the pole increasing by one radius per revolution is the normal path. At the inception of the Universe, near infinite mass density created near infinite spacetime curvature. Since then, the universe has expanded as unwinding spacetime through the fifth dimension as mass density decreased - the illusion of dark energy. This alters the Einstein field equations by adding a dimension thus redefining general relativity. The gravitational constant is replaced by a new constant based on graviton interaction between the two degrees of freedom expansion. The cosmological constant is replaced by the unwinding of spacetime in the normal direction. Two degrees of freedom expansion redefines space and time. Dark matter may be accounted for by the application of a new gravitational constant to decayed antimatter via weak force charge parity violation near inception to form space dependent information with gravitational attributes. This may account for baryon asymmetry. Suggested math approaches are shown at the end of this manuscript.

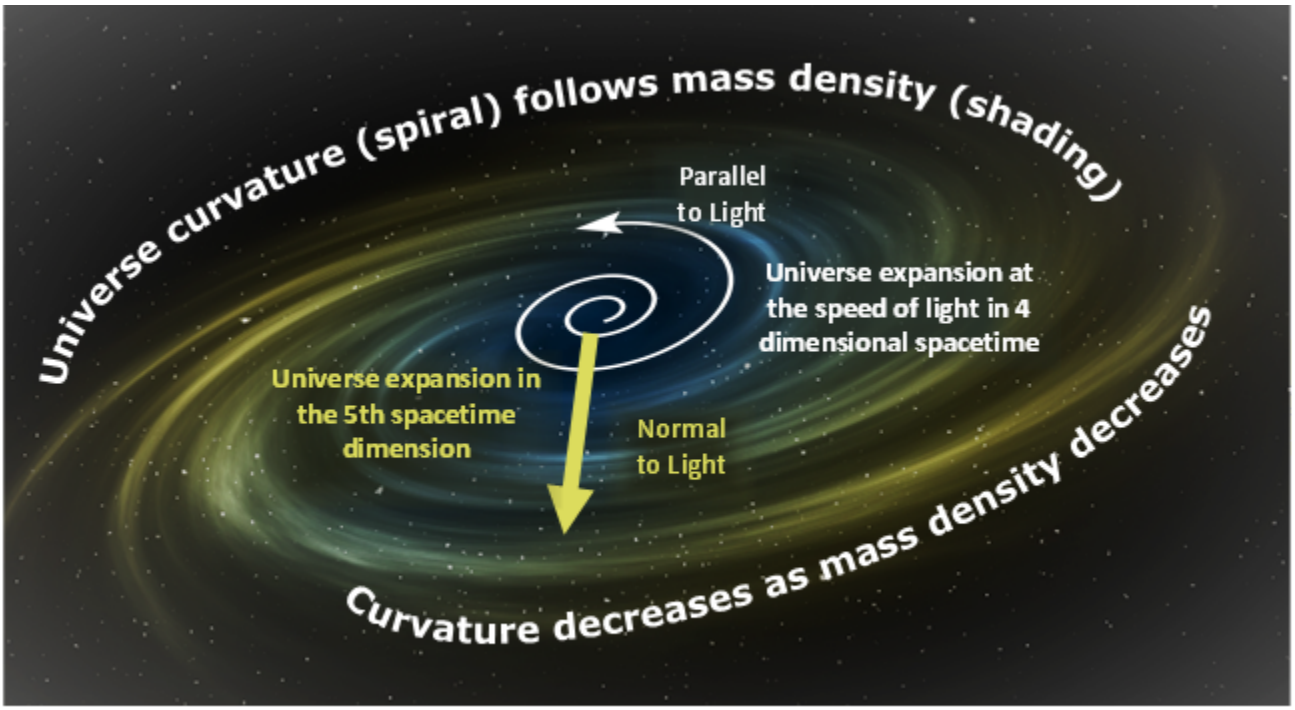

Figure 1. The universe expands along two degrees of freedom – parallel and normal to light. Parallel is at the speed of light. Normal is many orders of magnitude slower.

Gravitons move primarily parallel to light, however light and gravitons can move through the fifth spacetime dimension via quasi tunneling. Tunneling contributes to composite gravity. The tunneling of wave/particles is quantum foam. Different magnitudes of gravity in parallel and normal expansion results in different rates of time requiring equalization events that converts time directly into energy. This might explain high energy events like gamma-ray bursts possibly down to time crystals accounting for unchanging entropy with no apparent energy input. Further fifth spacetime implications may help develop the theory of everything. Time equalization might become an energy source. It would advance precision of measurement key to developing practical quantum computers, fusion reactors, and better health care via advanced computations.

Discussion

Each spatial dimension can be thought of as being normal to the previous dimension. A line (one dimension) is normal to a point. A plane is normal to a line. A volume is normal to a plane. And four-dimensional space is normal to three-dimensional space or normal to the path of light.

The key to the fifth spacetime dimension is the Universe attributes we understand are confined to four dimensional spacetime by barrier interfaces. The wave/particles and gravitons are confined within the curved barrier interface except for quasi tunneling like how quantum tunneling functions but on a larger scale. Barriers are shown in Figure 2.

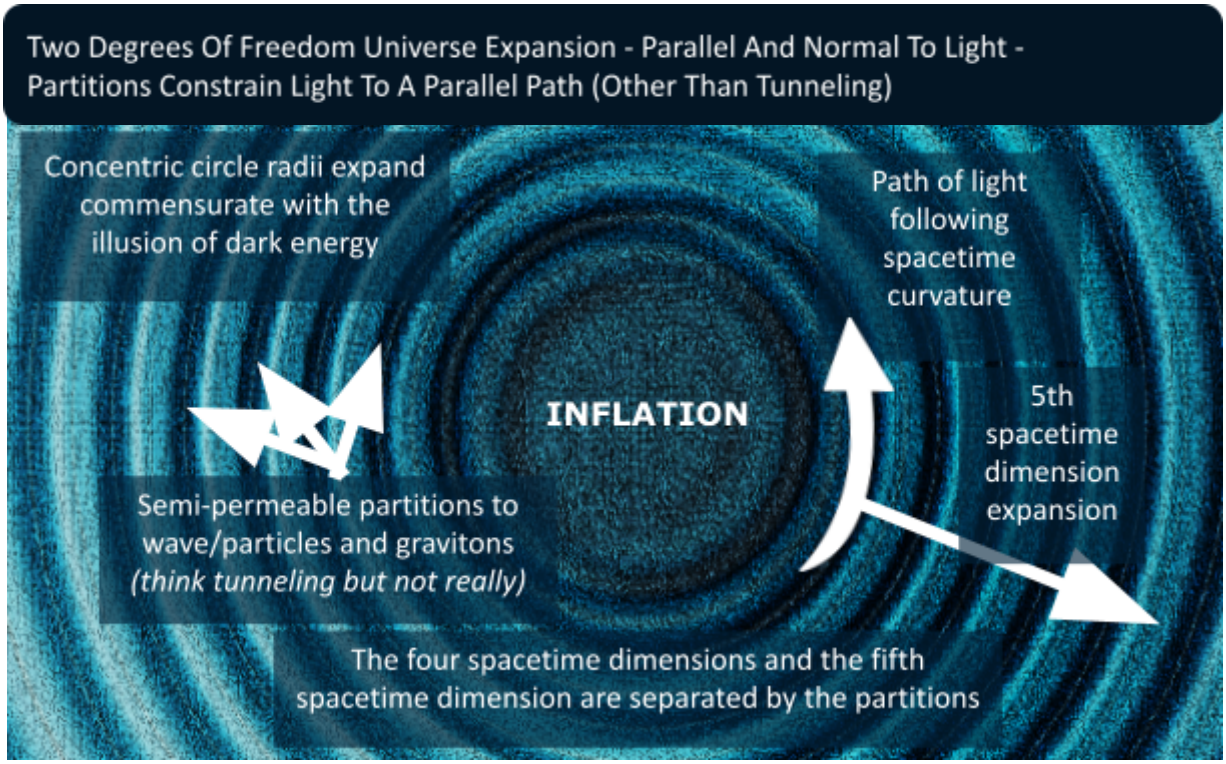

Figure 2. Partitions are required to keep what we know within four dimensional spacetime with the exception of quantum tunneling.

We only see in two dimensions, but sensory input makes the third dimension evident. The attributes of the fifth spacetime dimension are too large for sensory recognition. Here other information is required to perceive the fifth spacetime dimension like the illusion of dark energy. Dark matter, composite gravity, and quantum foam are attributes of the fifth spacetime dimension and can help understanding the proposed dimension.

Figure 3 shows how quasi tunneling is in play for both particle/waves and gravity. Conservation of energy is in effect for particle/wave tunneling of the barrier interface. It is not in play for tunneling of gravitons.

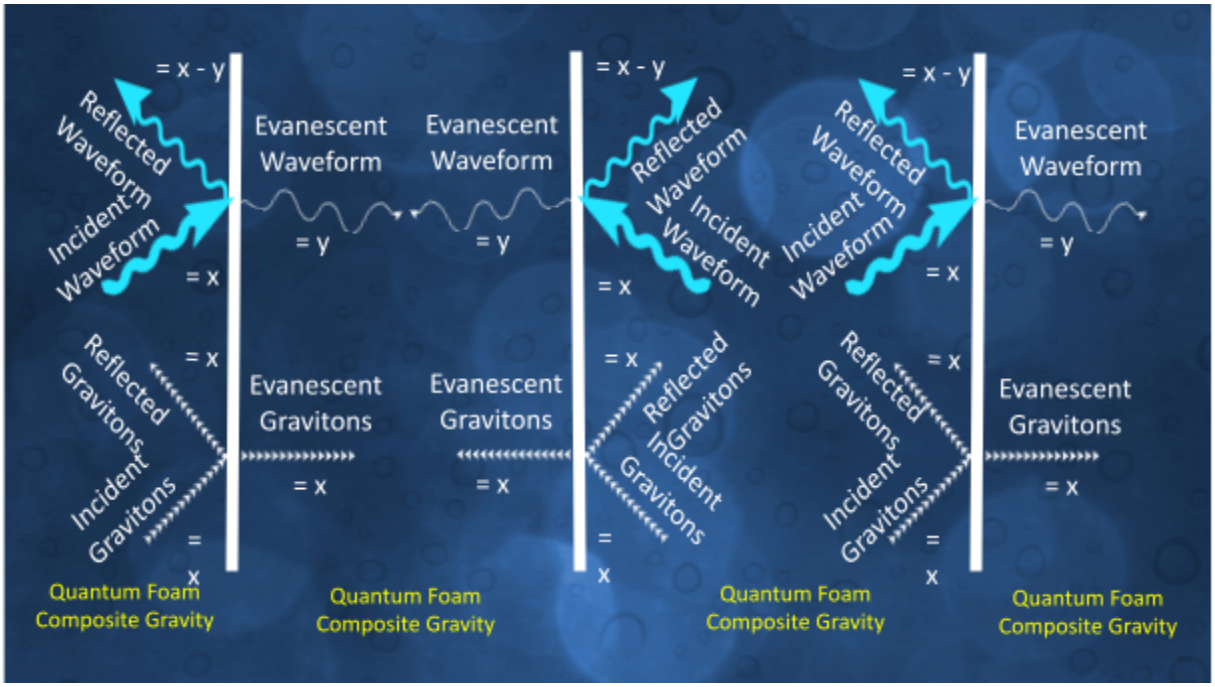

Figure 3. How gravity and wave/particles interact with the partitions resulting in quantum foam and composite gravity.

Gravity is in effect in both degrees of freedom universe expansion and as such is subject to vector addition shown in figure 4 where the gravitational constant is redefined.

The vector addition of normal and parallel gravity results in composite gravity that is a component of dark matter. The magnitude of composite gravity is the force multiplier applied to the equivalent gravity of decayed antimatter to fully account for dark matter. Composite gravity is only seen in normal universe expansion thus it is too small to be

detected locally but is evident on the galactic scale as a component of the illusion of dark matter.

The vector addition is not as simple as shown in Figure 4 because the unwinding of spacetime being the illusion of dark energy is in play at large scales. The unwinding is a function of five spacetime dimensional general relativity that is defined by a new five-dimension field equations. It is suggested all the conjectures presented herein are required for solving the math calculations required to successfully model the universe.

Such may be a challenging effort considering it took Einstein 10-years to complete the field equations with help from some of the finest minds of the time. Work with fifth-spacetime dimension calculations by many such as Y. Balytskyi, D. Hoyer. A. O. Pinchuk, and L. L. Williams[1] could be help define the fifth dimension. And insight may come from all working on String theory math.

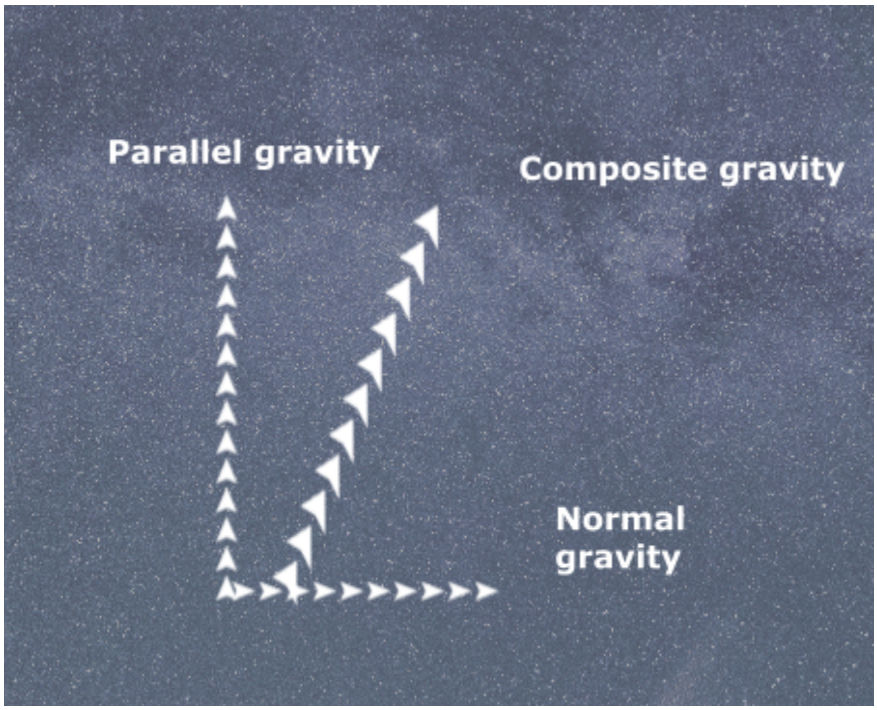

Figure 4. Composite gravity is the vector addition of parallel and normal gravitons across the partitions delineating the two degrees of spacetime freedom.

Figure 5 indicates the rate the fifth spacetime dimension expands with time. This rate would be far less than the speed of light. Recall Zeno's paradox of the tortoise and the hare that Aristotle included in his Physics. Why would Aristotle do that with something so ridiculous on its face? Could he have been referring to no matter how fast the hare travels nor how slow the tortoise, the tortoise always moves normal to the hare keeping

it perpetually out of reach. Are there other examples where the ancients seemed to know stuff far beyond what the knowledge of their day supported?

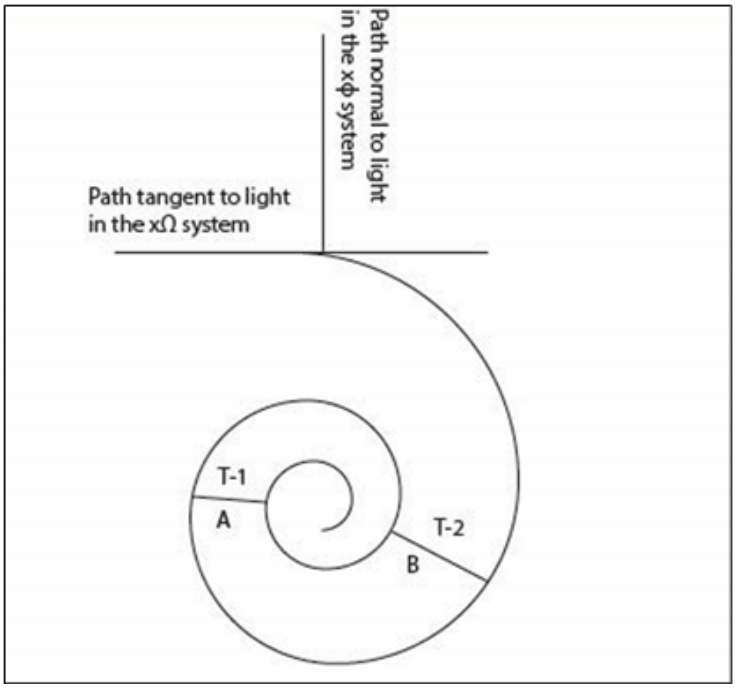

Figure 5. Line A is the magnitude of xφ dimension at time T-1. Line B is the magnitude of the xφ dimension at time T-2. B-A is how far the xφ dimension expanded for T-1 or T-2. Time equilibrium events result in lost time with concomitant loss of distance of travel. The result is a slight reduction of universe volume

Antimatter decayed into space dependent information with gravitational attributes via weak force charge parity violation. The universe prior to inception and in singularities held all mass/energy as space independent information. At universe inception all was the primal element information like how the information in DNA at inception creates physical attributes in a living being.

It should follow that space dependent information can take on an undiscoverable form other than gravitational attributes and its spatial distribution. The gravitation attribute of dark matter is created by the equivalent mass of decayed antimatter. There was more impact of the weak force on antimatter than matter at inception via charge parity violation. This decayed antimatter almost completely into space dependent information with gravitational attributes. This with the force multiplier of composite gravity is the illusion of dark matter. It is the primal element information with only spatial and gravitational attributes. It is not detectable in any other forms. This is shown in Figure 6.

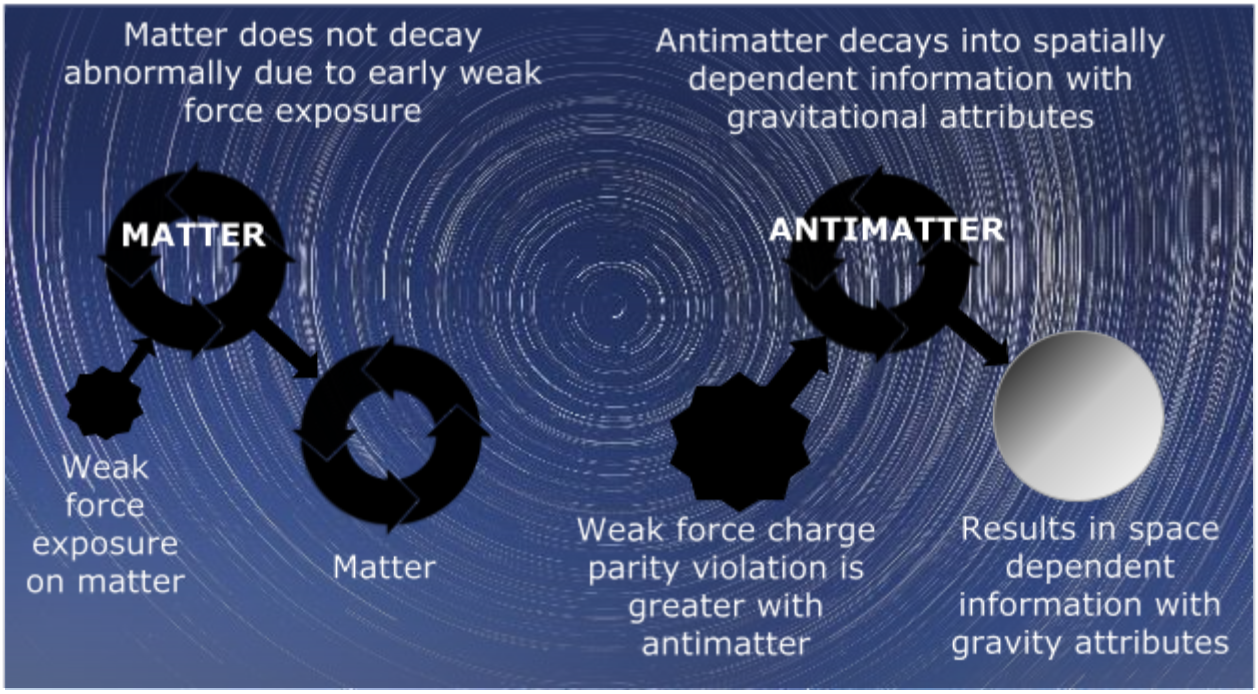

Figure 6. Near inception, antimatter decays to spatially dependent information with gravitational attributes via greater weak force charge parity violation

Adding a dimension to the field equations would redefine general relativity. This would include a new gravitational constant and Riemannian geometry would expand to five spacetime dimensions. The gravitational constant would be replaced by fifth spacetime dimension unwinding with the decrease of mass density.

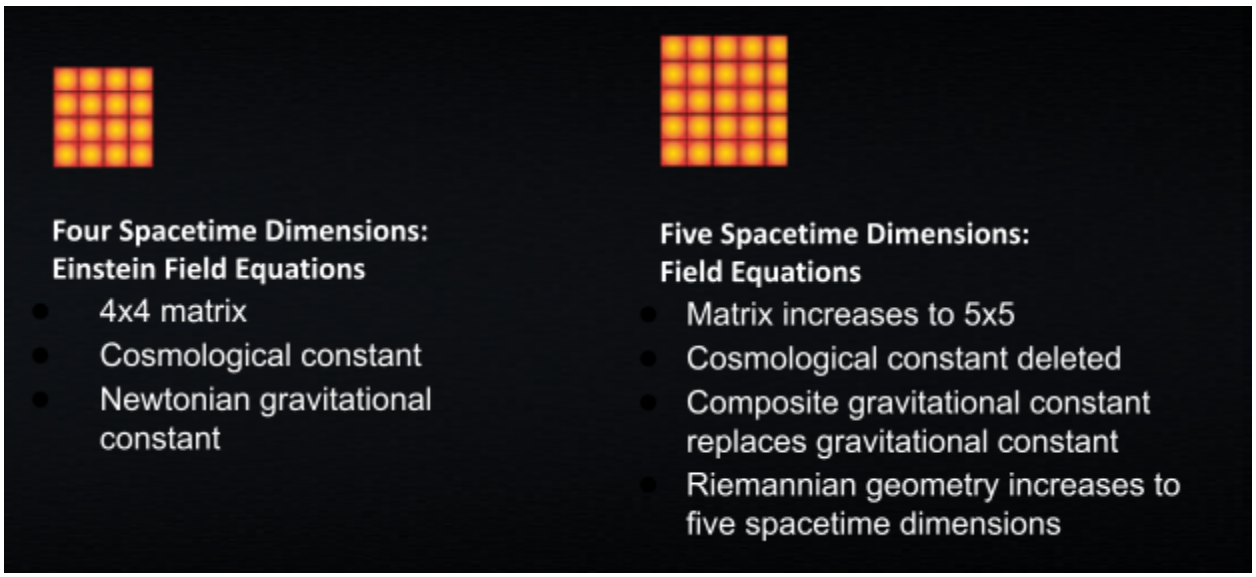

Figure 7. Four vs fifth spacetime dimension field equations

By using the altered field equations, it might be possible to extrapolate universe expansion from inception to now. The following shows how the existing field equations might be altered in the three epochs of universe expansion. The key is recognizing that all is manifested as attributes of the primal element information.

The field equations in the unconstrained epoch

$$G_{\mu\nu} + g_{\mu\nu} = \frac{8\pi G}{0} T_{\mu\nu}$$

Only information (not constrained by the speed of light) is present in the unconstrained epoch. As the speed of light has no meaning it is represented as zero. The field equations are undefined in the unconstrained epoch – better known as the illusion of inflation.

The field equations in the opaque epoch

$$G_{\mu\nu} + g_{\mu\nu} = \frac{8\pi G}{c^4} T_{\mu\nu} + RadiationPressure$$

Photons are constrained by free electrons not allowing the photons to escape, creating added radiation pressure thus increased curvature.

The field equations in the transparent epoch

$$G_{\mu\nu} + g_{\mu\nu} = \frac{8\pi G}{c^4} T_{\mu\nu}$$

Lisa Grossman discusses how dark matter might have originated as antimatter by a process involving X particles[2]. In a similar process, weak force charge parity violation might have decayed antimatter into space dependent information retaining the original gravitational attributes possibly accounting for baryon asymmetry. This would account for the illusion of dark matter.

Baryon asymmetry is believed by some to result from negligible charge parity violations where electroweak symmetry breaking occurred during one ten-billionth of a second after inception.[3, 4.]

Early on there was interest in adding a fifth spacetime dimension to the field equations. The Kaluza-Klein theory tried to unify gravity and electromagnetism and had Einstein's interest[5]. This theory is considered partially false, but the concept of a fifth spacetime

dimension remains today. Had they known about observations suggesting dark energy, they may have succeeded by realizing the fifth spacetime dimensions is full-scale, tangible, and not tightly wound. Had they incorporated these observations in their analysis, it may have led them to the theory of everything.

The SLAC BaBar project[6] and others have found small amounts of charge parity violations with B mesons that are too small to account for baryon asymmetry. It might have been possible that weak force charge parity violation on antimatter could have been sufficient at inception to decay antimatter back into the primal element information maintaining spatial and gravitational attributes.

Dark matter is the resultant vector of parallel and normal gravity applied to antimatter remnants. Xφ gravity needs to be multiplied by a gravitational constant sufficient to account for all known matter and dark matter, see Figure 4.

Continuing along this line of reasoning, five spacetime dimensions could be in play for particle physics. As Minkowski's four dimensional spacetime acquires a new dimension it may be possible to limit Hilbert space to five spacetime dimensions, possibly reducing the number of free parameters and thus simplifying quantum mechanics. As everything may be depicted as attributes of the same thing, information, it may be possible to view string theory in this respect and bring that down to five spacetime dimensions or replace it all together.

Given time equilibration may result in energy discharges, it is possible that matter and energy might begin and end in the primal element information. This would fit well with space independent information being the state prior to universe inception and within black hole singularities. Working under this assumption the universe could be thought of as:

(I)Information = (T)Time = (E)Energy = (m)Mass x (c)Speed of Light Squared.

Figure 8. The origin of everything is information, the primal element prior to universe inception and in singularities.

The Magnitude of gravitational fields regulates the rate of time[7]. The rate of time is slower in normal expansion than in parallel expansion because gravity is stronger in normal expansion. The different rates of time will require equalization much like how earthquake faults equalize stress. This may explain puzzling energy discharges such as gamma ray bursts, ultra-high energy cosmic rays and gamma ray activity in thunderstorms.

Time dilation equalization may be what links astrophysics and quantum physics. Time is consistent in behavior in both quantum and astrophysics. Particles and objects in space traveling at high speeds exhibit the same relationship with time. The faster either goes, time slows down with equal proportions.

If indeed time dilation equalization is in play in thunderstorms and time crystals, it would be likely that time dilation equalization could be evoked on the human scale. This would create limitless pollution free energy. Pure water could be distributed anywhere. Gas and oil would no longer be used as fuel but as the raw materials for nearly anything through 3D printers.

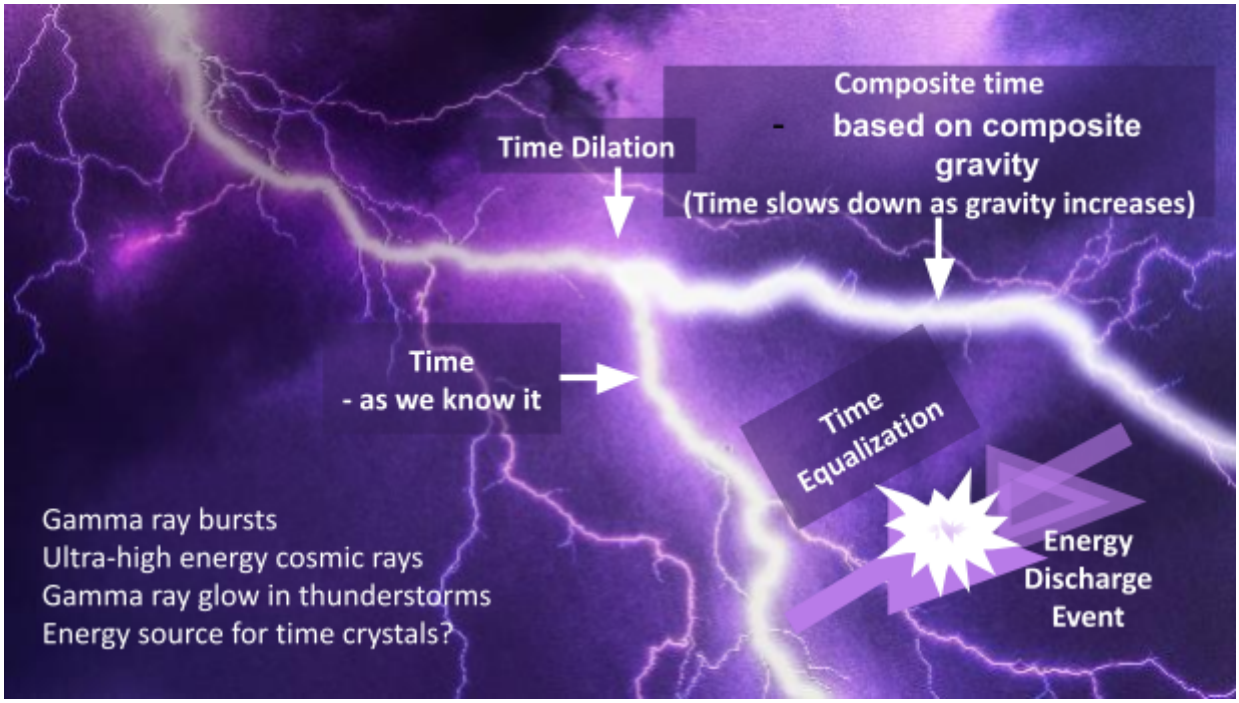

Figure 9. Time dilation equalization creates energy - Time runs at different rates due to the different magnitudes of gravity in 4 vs 5 spacetime dimensions requiring equilibration.

Gamma ray bursts and ultra-high energy cosmic rays are randomly distributed about the sky while the elements of Universe are not. NASA states, “From the early 1970s it has

been apparent that gamma-ray bursts come from all parts of the sky with approximately equal probability[8]*."*

Witze describes gamma ray production in thunderstorms[9]*.* Conditions within thunderstorms might trigger local time dilation equilibration events enabling lightning to span gaps, up to ten miles, farther than is supported by the electrical potentials therein.

This question follows - Do time dilation equalization events happen on the quantum scale? Time crystals are quantum events that appear to defy the second law of thermodynamics where there is no increase in entropy for infinite physical events? If so, time might supply the energy necessary to keep the entropy stable. Something to this effect might exist in time crystals where quantum states oscillate as a function of time appearing as a perpetual motion machine[10]. Time dilation equilibration events may be detectable on the quantum scale bringing gravity into particle physics.

Time dilation equilibration may account for the random spatial distribution of ultra-high energy cosmic rays and gamma ray bursts. Razzaque, states the following about ultra-high energy cosmic rays:

> *"A more profound result from the latest Auger data is the near independence of the spectral shape on the angle with respect to the celestial equator. This lack of anisotropy in the arrival directions severely disfavors models that assume that all the UHECRs are produced by a few bright and nearby sources. Instead, the data favor a uniform spatial distribution of UHECR sources, which implies they are extragalactic.*[11]

There are three epochs of Universe expansion. The three epochs are the unrestrained epoch, opaque epoch, and transparent epoch.

This first epoch of Universe expansion is the period now known as inflation. It is consisted of space dependent non-physical attribute information independent of the speed of light. Space was created first before information acquired physical attributes. Expansion of space containing only information sans physical attributes is not bound by the speed of light. At some volume, information acquired spatial attributes where space expansion became bound by the speed of light. Was this transition instantaneous or gradual?

The opaque epoch blocked light due to free electrons increasing radiation pressure maintaining a higher spacetime curvature thus slowing expansion in the fifth spacetime dimension. Energy levels were too high to allow non-ionized elements to form. Free electrons stifled photon travel adding radiation pressure that would have been a component of the revised stress energy tensor creating more spacetime curvature than

would be otherwise expected. The rate fifth spacetime dimension expansion would have been slower due to higher radiation pressure.

The current transparent epoch is free to expand absent the conditions of the first two epochs. This epoch began when the universe became transparent with concomitant reduction of radiation pressure as photons were free to travel.

Modeling the universe is a complex task requiring all the conjectures presented herein. But keep in mind, all subsequent conjectures are based of the assumption that there is a fifth spacetime dimension with two degrees of freedom universe expansion. These can't be tested by any means. Only the conjectures that follow can be tested. If these conjectures can be mathematically validated, then at some point it may be safe to say a fifth spacetime dimension and two degrees of universe expansion indeed exists.

One might question why substantial resources should be directed towards what this manuscript holds. This answer is resources and energy are growing sparce and the demand for resources is skyrocketing. This is a potential solution for all that. Some initial math validation efforts are well justified.

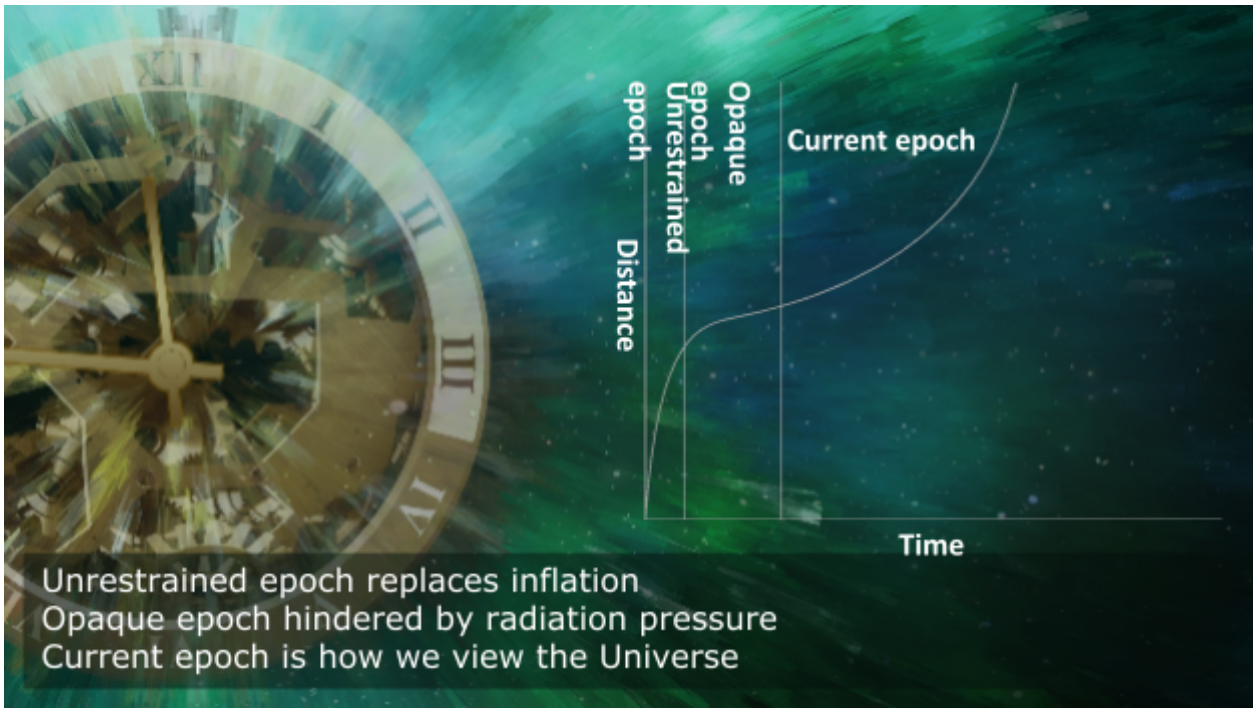

Figure 10. Three epochs of universe expansion. The unrestrained epoch produced sufficient space for information to take on physical attributes. The opaque epoch began with restricted spacetime expansion until the universe became transparent thus

releasing radiation pressure. The current epoch accelerates as spacetime curvature decreases with mass density.

If information is indeed the primal element, it might act as the DNA of the universe. If so, it might be manifested in the cosmic microwave background (CMB). Given its constant, albeit small strength, billions of years of this gentle wash of energy overrides relatively short temporal events such as star formation, supernovae, and black holes...

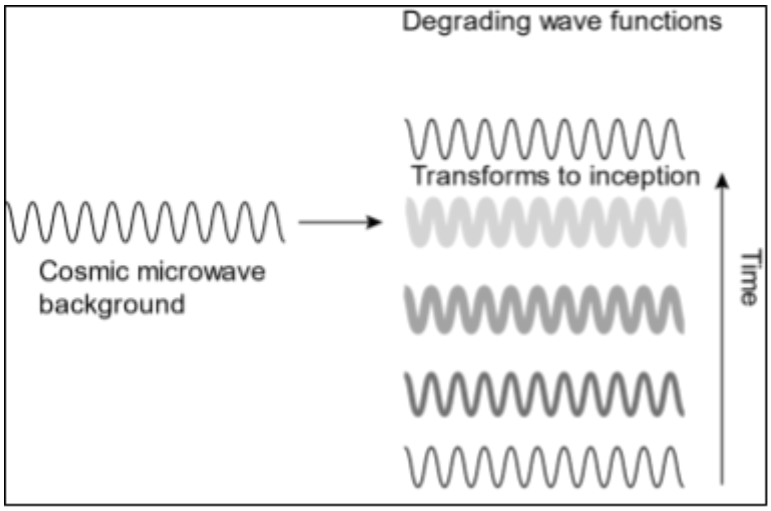

Figure 12. Wave function entropy increases with time. The cosmic background radiation interacts with wave functions via quantum teleportation to bring entropy back to the state of universe inception. This interaction occurs in the fifth spacetime dimension.

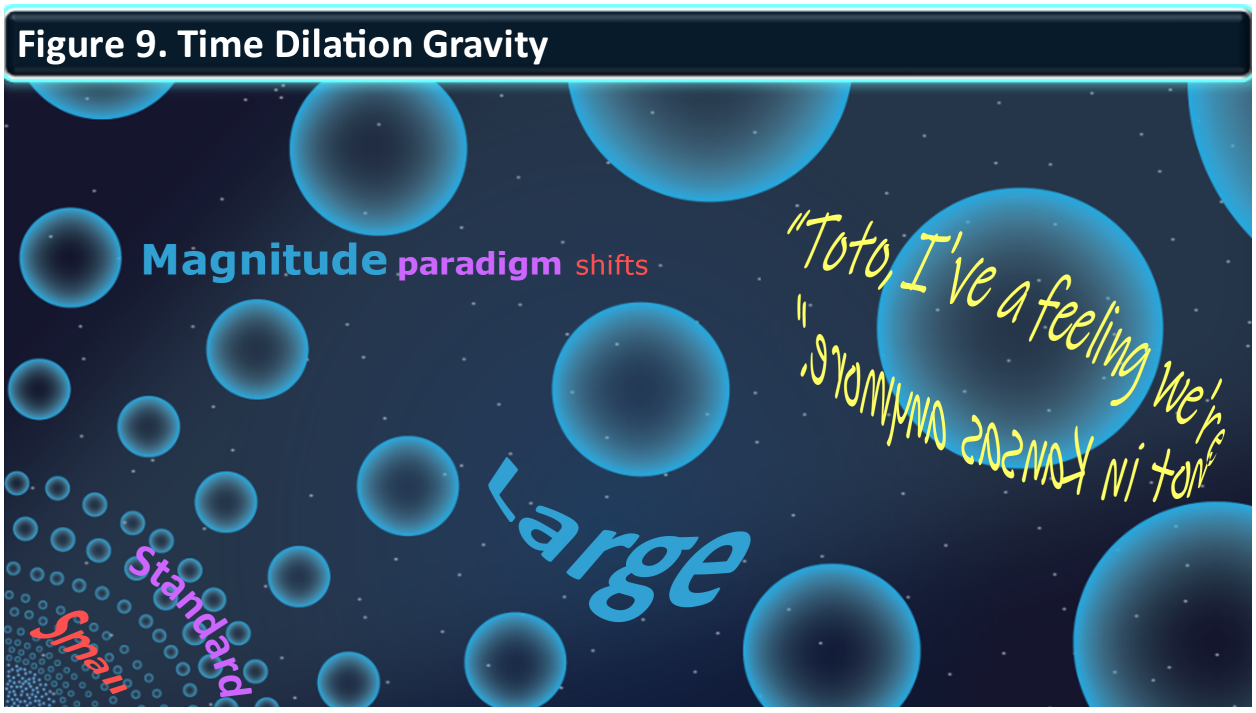

Figure 13. Gravity enters a paradigm shift at strong and weak values. As the Universe expands weakening gravity hits a paradigm shift where objects fly away faster than

expected. At strong gravity like black holes and neutron stars, a paradigm shift may occur.

Time is a function of gravity, but one might consider that gravity is the function of time and as such time defines mass. Evidence of this would only be at very strong and weak gravities. The accelerating universe might be evidence of a gravity paradigm shift based on time as general relativity fails to fully account for phenomena independent of weird stuff such as dark matter.

Gravity waves from mergers tell the story. However, the resolution of LIGO and such are too small to see this effect if it indeed exists. There should be mirror images of gravity strength at both ends of the spectrum. The resolution of measuring gravity sufficiently increased should make possible a proper evaluation of time dilation gravity. This is certainly a long way off, maybe dependent of the added precision that these conjectures will enable.

Conclusion

The fifth spacetime dimension is easily derivable from the other four. This paper suggests the ramifications of the fifth spacetime dimension. All the conjectures are required to allow the math to work from the large to small scale. The intent here is to suggest an approach to the theory of everything for consideration by those capable of doing the math and physics to determine if any of what is presented here might be valid. The suggestions here are certainly bold and disregard many tightly held boundaries. But the possibilities are enough for preliminary math examination of the conjectures. Time is growing short and there are few if any other far-reaching theories out there. Observation from the James T. Webb space telescope will certainly throw new unexplained discoveries into the mix. Such will either support or dissuade from what is presented here - no matter, exciting times are upon the horizon.

Potential Math Approaches

The following is a list of possible mathematical approaches that would use available data to shed light on the above conjectures:

1. Calculate how much parallel gravity must be multiplied by to achieve all known matter and dark matter mass considering antimatter decayed to space dependent information with gravitational attributes. This is the new gravitational constant Ψ.

2. Increase the Einstein field equations to five spacetime dimensions and add the Ψ gravitational constant. With known mass and gravitational constant, extrapolate universe expansion along the three epochs using the expanded Einstein field equations.

3. In this new five spacetime dimension space, consider information attributes as an alternative to strings and consider restricting string theory to five dimensions.

4. If the CMB is coupled with particles and fields in the universe, there should be a temporal relationship between the CMB and the universe. If such is the case, it may be most evident in related harmonic components in molecular cloud turbulence. If true, it should be possible to correlate the temporal attributes of the CMB and molecular cloud turbulence by processes like signal averaging. The first step is to determine what the harmonic components of molecular cloud turbulence are, if any.

   The goal is to partition molecular cloud turbulence data in time durations that are an interval of the harmonic attributes. Not knowing the temporal attributes requires sampling techniques that will zero in on a desired harmonic interval. One way to do so would be to run small increments of time duration samples through the signal processing until the magnitude of the results is significantly greater or less than the magnitudes of random sampled durations.

   If a temporal attribute is detected in molecular cloud data, it can be applied in the same way to the CMB to determine if that temporal attribute exists in the CMB. If that is the case, one could conclude that the CMB holds influence over particles and fields in the universe in general. The state of CMB data may make this impossible now, however it is a way to look at the CMB for correlation to known phenomena.

5. General relativity and particle physics are incompatible because precise information on momentum and location are required for the field equations where this is not permitted at the quantum scale by the uncertainty principle. This contradicts the uncertainty principle that claims it is impossible to precisely know location and momentum at the same time... The uncertainty principle is based on four dimensional spacetime. This should be explored with respect to five dimensional spacetime.

   It may be possible to reconsider the uncertainty principle with respect to five spacetime dimensions where additional information about particles might be known. It should be possible to define everything as attributes of information and

explore this in context with five spacetime dimensions. While the uncertainty principle will hold for most of particle physics as Newtonian physics holds its sway, there should be cases free of such constraints.

6. Simulate lightning to scale energy input to create gamma ray after glow. Does energy output exceed energy input? If so, the source might be time equilibration energy discharge.

7. Estimate the energy to be generated from time dilation equalization on the Universe scale extrapolated from larger scale potential examples for relevance to keeping entropy at a steady state in time crystals. Will this unify quantum and astrophysics?

8. Create parameters that would link both ends of the spectrum of time dilation gravity and see if reasonable values comport with universe dynamics.

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