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A Comparison of the Quantum of the Void and the Quantum of the Physical Universe

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Abstract

The Quantum of the void is dimensionless. It has Energy in the form of photons in quantum levels "n". This Photon (Dark) Energy is used to create the Quantum of the physical Universe with different quantum numbers n^* and the "$n + 1$" dimensions of the Matter and Antimatter Multiverses by creating space, time, mass, and charge. The quantum numbers n^* of the physical Universe can range up to very large values compared to the quantum levels "n" of the void because they serve a different purpose which is to connect Quantum Mechanics to Classical Mechanics which does not exist within the void. Photons have a wave-particle dual nature in the Quantum of the physical Universe which is non-existent in the void. Photons exist in spin-up and spin-down states in the Quantum of the void. The four Fundamental Forces of nature exist only in the physical Universe. Energy that exists in the void is the creator of all physical things while the Entropy within the void annihilates the creation to send all the energy back into the different "n" levels of the void to reestablish the equilibrium of the system.

Keywords

Quantum, Void, Physical Universe, Multiverses

1. The Quantum of the Void

The void is dimensionless. The energy from within the void is being used to build dimensions in both the Matter and Antimatter Multiverses. The void contains no space, no time, no mass, and no charge. It contains only photons of stable energy in different quantum levels "n". Things that are dependent on space, time, mass, and charge such as Velocity, KE, PE, Temperature, and charged particles cannot exist within the quantum of the void. No time implies all effects are instantaneous and no time also means no frequency (cycles/second) which im-

plies waves cannot be generated in the Quantum of the void. No space implies all effects are dimensionless since photons that carry the energy are dimensionless. No mass means no gravity and no charge means no Electric and Magnetic fields. Energy from within the void can create mass, space, time, and charge in the physical Multiverses [1] [2]. Since the Energy of the void can create both Matter and Antimatter Multiverses [3] with opposite spin, this implies that the photons of the void can carry either clockwise or counterclockwise spin for Quantum Entanglement between opposite spin photons to take place. Photons are separated only by their Energy of quantum levels "n". Low quantum level $n = 0$ implies the lowest energy and highest entropy. Here photons act incoherently and with a smaller intrinsic spin containing a lower amount of energy. High quantum level "n" implies high energy and low entropy whereby the system becomes unstable for the next highest quantum level "$n + 1$". For the highest stable level, "n" photons act coherently and with a greater intrinsic spin containing a larger amount of energy. The $n = 0$ level is the most stable. The value of "n" between $n = 0$ and the final "n" value with stable energy in it implies partially incoherent and partially coherent energy as occurs between the two limiting cases stated above. The mechanism that allows for the transfer of information between photons in the void is Quantum Entanglement as that which also occurs in the physical Universe. For $n = 0$, there are many more different pairs of photons that are quantum entangled because most of the photons are in different sublevels, and this is the state of highest entropy. In the final level "$n + 1$", all the N photons are in the same lowest sublevel, and they are all quantum entangled together, which is the state of lowest entropy and hence the system becomes unstable because information is being exchanged between all of them simultaneously and this leads to an overload of the system. Without enough stable Energy in level "$n + 1$" of the void to create the $(n + 2)$nd dimension, the final $(n + 1)$st dimension of the Multiverse created by level "n" will collapse into level "$n + 2$" of the void that the $(n + 1)$st spatial dimension surrounds, once it uses up all the energy provided by level "n".

A secondary way for ending the Multiverse would be that if the energy required to build the next higher dimension contained in the void is less than the energy in all the previous dimensions, of which the Multiverse is made up of, that is when that level of the void will not have enough energy in it to build that next higher dimension.

We know that the $n = 0$ level of the void is the most stable because the energy from the higher levels shows up in the physical Universe as elementary particles of these higher dimensions that are heavier and hence decay into the elementary particles of the first dimension formed from the $n = 0$ level of the void viz. up and down quarks, electrons, and the mediating particles: gluons, photons, and the $w^{\pm}$ and z^0 bosons. The exceptions are the neutrinos of the first three dimensions; since electron, muon, and tau neutrinos, and by extrapolation all the higher dimensional neutrinos yet to be formed, have been known to change flavor. Only fundamental particles of the first column of the Standard Model (the

first dimension of space) exist in all dimensions of both Matter and Antimatter Multiverses, all higher dimensional particles being unstable as has been stated above.

The combination of space and time intervals that is invariant: $ds^2 = dx^2 + dy^2 + dz^2 - c^2dt^2$ tells us that when the Energy from the Quantum of the void creates additional dimensions of space in our physical Universe it must also slow down the time interval (clocks slowing down) by increasing dt^2 in order for ds^2 to be invariant. Hence time slows down in higher dimensions of the Multiverse. When the Energy from the void annihilates space, it must also speed up the time interval (clocks speeding up) by decreasing dt^2. Light has zero speed in the void because space and time do not exist in the Quantum of the void and therefore $ds^2 = 0$ in the void. Since ds^2 is invariant, we get $0 = dx^2 + dy^2 + dz^2 - c^2dt^2$. The speed of light in our 3D space is given by $c^2 = (dx^2 + dy^2 + dz^2)/dt^2$.

Since time starts from within the Quantum of the void, time moves in the forward direction while the Matter or the Antimatter Multiverses are being created, moving slower and slower as the nth dimension increases. Time moves in the backward direction while the Matter or the Antimatter Multiverses are being annihilated moving faster and faster as it approaches the first dimension since backward time copies forward time, like watching a movie and then watching it again as it unwinds at a faster rate. Energy from within the void is forcing time to slow down while decreasing the Entropy of the system but for the backward motion, there is no Energy to restrain times motion as it begins to stabilize the system by returning the Entropy of the system to their original values. Therefore, the total forward time of creation is much longer than the total backward time of annihilation.

Einstein had a problem with Quantum Mechanics because in the Quantum of the physical Universe, certain effects such as Quantum Entanglement can occur instantaneously which went against his theory of Special Relativity that predicts nothing can travel faster than the speed of light and therefore Einstein called it spooky action at a distance. Einstein was unaware of the existence of the Quantum of the void and hence he could not predict that everything in the Quantum of the void occurs instantaneously and since the Quantum of the physical Universe is a replica of the Quantum of the void its effects must show up in the Quantum of the physical Universe. Another such example would be that in our Matter Universe we can create antimatter particles since the Quantum of the void creates both Matter and Antimatter Multiverses. Matter and antimatter travel through time in opposite directions as was first predicted by Richard Feynman. Equal amounts of matter and antimatter annihilate each other as time goes to zero because their opposing times cancel one another. A 7^{th} dimensional Matter Multiverse would annihilate a 5^{th} dimensional Antimatter Multiverse, leaving the 6^{th} and 7^{th} dimensions of the Matter Multiverse intact.

The Uncertainty principle has no bearing within the Quantum of the void, both Δx and Δt being nonexistent, as there exists no space and no time. The Schrodinger Equation which is a wave function that changes with space and time

is also not valid in the void. The Special and General theories of Relativity do not apply in the void because photons are not moving through space at the speed of light for Special Relativity, and there is no mass to curve space-time for General Relativity. Space-time does not exist in the Quantum of the void. Hence Einstein's work on Relativity, both Special and General, can only be applicable and appreciated in the macroscopic physical Universe as a Classical phenomenon, which is a totally new situation added by the Energy of the Quantum of the void.

The Quantum of the void has Dark Energy, but no Dark Matter in it which is part of the next higher dimension of the Multiverse being built. Hence our Dark Matter exists in the 4D part of our 3D Universe sent there through our Black Holes [4].

2. The Quantum of the Physical Universe

There is a big difference between the Quantum of the void and the Quantum of the physical Universe. The Quantum level "n" of the void is used to build Multiverses while the Quantum number n^* of the physical Universe is used to get an agreement between Quantum Mechanics and Classical Mechanics. **The Quantum numbers n^* appear in each of the different physical dimensions created by Quantum levels "n".** To connect Quantum Mechanics to Classical Mechanics the quantum number n^* can take on very large values beyond "n" = 9 to create the 10^{th} dimension as the highest spatial dimension as predicted by String Theory.

$E = n^* hf\,(n^* \geq 1)$ applies in both the Quantum and the Classical regions of our physical Universe. For small n^* we are in the quantum region but for large n* as in n^* = 10,000 we are in the classical region. Hence Energy goes up in steps for small n^* but for large n^* the steps are so small compared to the Energy that the steps begin to resemble the continuum of Classical Mechanics. Since $\Delta E = hf$, $\Delta E/E = 1/n^*$, large for small n^*, but small for large n^*. $\Delta E = E$ for $n^* = 1$ and $\Delta E = E/10{,}000$ for $n^* = 10{,}000$.

The energy of level $n = 0$ is incoherent because all pairs of photons act independently of each other adding their energies as N, with N being the total number of photons existing in each quantum level "n". N is a very large number because photons are dimensionless and that is the reason the Quantum of the void has enough Energy to build Multiverses. The energy of the final level "n" is coherent because all photons act as one unit adding their energies as N^2 [5].

$E = hf$ and $E = pc$ both apply in the Quantum of the physical Universe according to Plank's quantization rule and Einstein's Special Relativity. $E = hf$ implies the higher the frequency the more the Energy that the photons carry, but photons can also generate their Energy from $E = pc$ and their momenta p by increasing its intrinsic spin. Since $pc = hf$, then as frequency f increases from radio waves to gamma rays, then p must also increase implying the intrinsic spin of the photon must increase and therefore its momentum and energy also increases. This implies that the intrinsic spin of the photon can be different from +1

that is allowed for photons based on calculations that combine Quantum Mechanics with Special Relativity. Special relativity limits the speed of the photons to 3×10^8 m/s in our 3D Universe, but we know from Quantum Entanglement that information can be exchanged instantaneously in our physical Universe as too it is exchanged in the Quantum of the void. Since photons are bosons, they can have spins of 1, 2, 3, 4, etc. for matter and opposite spins of −1, −2, −3.−4, etc. for antimatter. Besides photons having a greater intrinsic spin than +1 in our 3D universe, both the intrinsic spin of the photons and their Energy due to their intrinsic spin but also due to their Coherence effect begins to increase as "n" increases.

We can calculate the total energy deposited in each dimension of the physical universe up to the final 10th dimension. The first dimension is created from $n = 0$ in 10! (10 factorial) first dimensional parts while the final dimension created from $n = 9$ is a single 10th dimension that is a combination of all the lower dimensional parts as shown in Table 1.

The energy deposited in all of the 10! first dimensions comes from $n = 0$ of the void, and it is $E_1 = 10!NP_1c_1$ because the N photons act incoherently, and for the final level "n", $E_{n+1} = N^2(n+1)P_{n+1}c_{n+1}$ because the N photons now act coherently, with momenta $P_{n+1} \gg P_1$. There isn't enough stable energy in the final 10th level of the void "$n = 10$" to create the 11th dimension because instability of the energy within the void sets in. Using "n" = 9 for the final "n" with stable energy to create the ten different dimensions of the physical universe, we can write:

$$E_{n+1} = \{10!/(n+1)!\}\{n^2N^2/81+(9-n)N/9\}(n+1)P_{n+1}c_{n+1},$$

where n goes from 0 to 9.

Table 1. Number of dimensions created by the energy from level "n" of the quantum of the void.

"n"	Dimension Created	# Of Each Dimension Created
0	1st	10! = 3,628,800
1	2nd	10!/2! = 1,814,400
2	3rd	10!/3! = 604,800
3	4th	10!/4! = 151,200
4	5th	10/5! = 30,240
5	6th	10!/6! = 5040
6	7th	10/7! = 720
7	8th	10!/8! = 90
8	9th	10!/9! = 10
9	10th	10!/10! = 1

As stated in the earlier section E_{10} must be greater than $E_1 + E_2 + \cdots + E_9$. For very large N this implies, using Table 2 that for very large N,

$$P_{10} > 4480P_2c_2/c_{10} + 8960P_3c_3/c_{10} + 6720P_4c_4/c_{10} + 2987P_5c_5/c_{10} + 933P_6c_6/c_{10} + 224P_7c_7/c_{10} + 44P_8c_8/c_{10} + 7P_9c_9/c_{10}$$

for the energy in E_{10} to be greater than $E_1 + E_2 + \cdots + E_9$.

Having said that, the total energy of dimensions one to ten created by levels 0 to 9 of the void, that is deposited into level "n" = 11 of the void that the tenth dimension surrounds due to level "n" = 10 not having enough energy to create the 11th dimension of space is given by:

$$E_T = \sum_{n=0}^{n=9}\left\{\frac{10!}{(n+1)!}\right\}\left\{n^2N^2/81 + (9-n)N/9\right\}(n+1)P_{n+1}c_{n+1}.$$

This is also the total energy of our Multiverse.

Because of the Wave-Particle duality hf_{n+1} (Planks Constant times frequency) can be substituted for $P_{n+1}c_{n+1}$ in the above two equations.

The above formulas can be written in terms of a different general value for final dimension $(n+1)$ which we call $n(f)$ that does not have to be equal exactly to 10. Now we start with $n(f)!$ first dimensions and the above two equations become:

$$E_{n+1} = \{n(f)!/(n+1)!\}\left\{n^2N^2/\left(n(f)-1\right)^2 + \left[\left(n(f)-1\right)-n\right]N/\left(n(f)-1\right)\right\}(n+1)P_{n+1}c_{n+1}$$

where n goes from 0 to $(n(f)-1)$.

$$E_T = \sum_{n=0}^{n=n(f)-1}\left\{\frac{n(f)!}{(n+1)!}\right\}\left\{n^2N^2/\left(n(f)-1\right)^2 + \left[\left(n(f)-1\right)-n\right]N/\left(n(f)-1\right)\right\}(n+1)P_{n+1}c_{n+1}$$

Table 2. The energy contained in each dimension of the physical universe.

"n"	E_{n+1}
0	$E_1 = 10!NP_1c_1 = 3{,}628{,}800NP_1c_1$
1	$E_2 = 1{,}814{,}400(N^2/81 + 8N/9)2P_2c_2$
2	$E_3 = 604{,}800(4N^2/81 + 7N/9)3P_3c_3$
3	$E_4 = 151{,}200(N^2/9 + 2N/3)4P_4c_4$
4	$E_5 = 30{,}240(16N^2/81 + 5N/9)5P_5c_5$
5	$E_6 = 5{,}040(25N^2/81 + 4N/9)6P_6c_6$
6	$E_7 = 720(12N^2/27 + N/3)7P_7c_7$
7	$E_8 = 90(49N^2/81 + 2N/9)8P_8c_8$
8	$E_9 = 10(64N^2/81 + N/9)9P_9c_9$
9	$E_{10} = N^2 10P_{10}c_{10}$

We now have two unknowns which are N dimensionless photons in each Quantum level of the void (a very large number to be able to create Multiverses) and $n(f)$ which is equal to 10, minus a few digits.

A different kind of physical Universe both Quantum and Classical has been created from the Energy of photons within the void, whereby even the nature of Energy changes within our physical Universe. Now we have Energy in the form of Kinetic Energy, Energy in the form of Potential Energy which appears when a force like the gravitational force acts on a particle, Energy in the form of Thermal Energy, Electric and Magnetic Energy, and Nuclear Energy. The four fundamental Forces of nature viz. the Strong Nuclear Force, the Weak Nuclear Force, the Electromagnetic Force, and the Gravitational Force do not exist within the Quantum of the void. They exist only in the physical Universe. In the Quantum of the physical Universe, gravity is the only one of the four Fundamental Forces too weak to have any effect on the creation of the atom or the molecule, and hence theories of quantum gravity are non-sustainable.

The Uncertainty Principle applies in the Quantum of the physical Universe according to $\Delta E \times \Delta t > h/4\pi$ or $\Delta p \times \Delta x > h/4\pi$ where "h" is the Planck's Constant.

The Schrodinger Equation [6] is part of the Quantum of the physical Universe based on KE + PE = Total Energy by applying the Wave-Particle nature of matter to get an equation in terms of the wave function. Quantum particles such as electrons also have a wave nature associated with them in our physical Universe according to the Wave-Particle duality. The story of Schrodinger's Cat as has appeared in novels is a scheme to sell novels for those uneducated in the Quantum Theory of the physical Universe because a cat is a classical object and hence it cannot exist in a superposition of two states, one alive and one dead at the same time when hidden in a box; very different from quantum objects like electrons that can exist in a superposition of spin-up and spin-down states in the Quantum of the physical Universe, or photons with spin-up and spin-down states in the Quantum of the void.

Quantum Chromodynamics identifies the elementary and the mediating particles of the Standard Model of the first three dimensions of space that are created by the Energy from within the Quantum levels "n" = 0, 1, and 2, of the void.

According to Quantum Entanglement in our physical Universe, Quantum Mechanics can exert its effect over very large distances of Space and hence Quantum Mechanics does not apply over very small distances of the atom only. Quantum Entanglement tells us that even if two electrons are separated by a distance that is millions of light years apart, when you observe the spin of the first electron to be spin-down it instantaneously affects the spin of the second electron to become spin-up. Hence observation is the key for Quantum Entanglement. The observation of one quantum particle instantly affects the quantum states of all other particles that are Quantum Entangled with it. The same phe-

nomenon also applies to photons in the Quantum of the void. Both space and time are of no consequence for quantum particles like photons or electrons.

3. Conclusions

The creation of the Multiverse as stated in the theory of Eternal Inflation [7] which says that Bubble Universes can be created by a Big Bang followed by inflation is an incorrect theory because it goes against the Conservation of Energy Principle. Bubble Universes do not start up from nothing; there must be an Energy source as that which exists in the Energy of the Quantum of the void to start the Multiverse building process.

The terms Quantum Mechanics and Classical Mechanics come from the fact that the Quantum of the void is Mechanical in nature as per our current understanding of it. The Quantum of the void contains only Energy in the form of photons of opposite spins that can exchange information instantaneously. Since the physical Universe we live in contains Intelligent beings with Consciousness, there must exist a source of Intelligence and Consciousness in the void that we are currently unable to comprehend because we do not know what other types of information photons are able to exchange besides their up and down spin states. Marvel Studios [8] should make a movie called Photonic Beings, dimensionless creatures that have the power to communicate by transcending both space and time to change their sex and shape by Quantum Entanglement once one of them has been observed.

Our knowledge of physics is still in its infancy because we currently reside in the third spatial dimensional Universe with three dimensional brains, with many more dimensions still to be constructed. Each higher dimension will expand our knowledge of the Quantum of the void as the dimensionality of our brains also grows with the dimension of the Multiverse we live in. The slowing down of time in the higher dimensions implies life spans in those higher dimensions will be longer. If our third dimensional minds can only understand three dimensional things but cannot even perceive what the fourth spatial dimension looks like, then our minds of the $(n + 1)$st spatial dimension created by level "n" of the void would be $(n + 1)$st dimensional in nature and be able to perceive everything physical that has been created by level "n" of the void.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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