

Unified Quantum Gravity Theory Driven Concepts of the Classical Laws of Physics, the Dark Energy, the General Theory of Relativity and the 'Zero-Energy Universe'

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Submitted: 21 Nov 2020; Accepted: 02 Dec 2020; Published: 09 Dec 2020

Abstract

The classical theories of physics, namely, Newton's laws of motion, the theory of an ideal gas, the laws of thermodynamics, the Stefan-Boltzmann law, Planck hypothesis of Black Body Radiation have been revisited in the light of the newly discovered theory of quantum gravity (TQG) upon linking the mathematical logic of the said theories to the depicted geometrical profiles of the physical variables of the universe of the TQG. The geometrical profile of the interrelation between the cosmological constant of the general theory of relativity and the dark energy of the universe has been presented. The existing concept of 'zero-energy' universe is being derived straight forward from the TQG.

All the above said laws in science have been redefined and have been given new shapes altogether in this article.

Introduction

The entire world scientific community is well acquainted with the classical laws of physics, the thermodynamic laws, the Planck hypothesis, the relativity theories.. etc.. and so on for many years but the main essence of the said theories have not reached to many people, and as a result of that, as on today even, some 'grey' areas are still left in the above said theories primarily due to the fact that the physical variables like 'time', 'mass', 'acceleration', 'gravitation',... etc. had been left-out in their 'abstract' forms in the said theories. The principal underlying reason behind the same, is the lack of the whereabouts of pictorial or geometrical representations of the above said physical variables. The recently discovered TQG [1] has however, revealed the geometrical shapes of most of the principal physical variables of the universe and could become able to explain the many cosmic mysteries of the universe, the geometrical profile of the chemical reactions [3] and the equilibrium constants of the chemical reactions [5], the black body radiation phenomena [1], the cosmos 'graviton cycle' [1], the cold nuclear fusion phenomena [1], the dimensionality of the universe [1], the origin of the existences of the seven number of colors of VIBGYOR [1] and apparent grey look of the universe, the dark energy/dark matter [5] and many others [1-103].

In this article, first of all, it has been established that none of the above said theories remain to be 'abstract' when the TQG is imposed

on them and also one can, as if visually encounter the said theories in front of their eyes, and can very clearly understand their limitations too.

The main essence of the following theories have been evaluated through TQG concepts and labelled with the relevant pictorial representations:

- a. The ideal gas equation and the 3 laws of thermodynamics
- b. The Stefan-Boltzmann law
- c. The Planck hypothesis of black body radiation
- d. The cosmological constant of general theory of relativity and the dark energy model of Friedman
- e. The concept of 'zero-energy' universe
- f. The Newton's Laws of Motions

The present level of understanding of the global physical science about the 'geo physics' of our 'cosmos' is promoted to the next higher level at this proposition.

The Shapes of the Principal Physical Variables of the Universe and the Geometrical Concepts of the 'Energy' and 'Work done' and the 'Ideal Gas Equation'

The geometrical shapes of the different principal physical variables are reproduced here at first, as a recapitulation exercise in Figure 1:






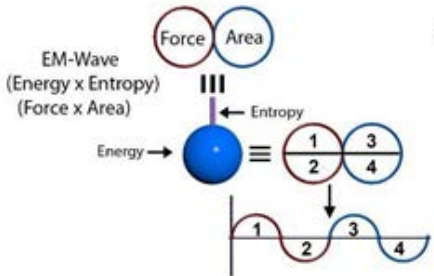
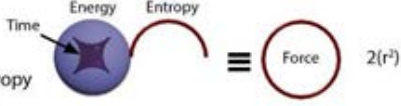
Graviton Type	Geometrical Shape	Dimension
(1) Entropy/Distance		$1(r^1)$
(2) Temperature/Force		$2(r^2)$
(3) Time		Inverse $2(r^{-2})$
(4) Volume/Energy		$3(r^3)$
(5) Mass		Inverse $3(r^{-3})$
(6) EM-Wave (Energy x Entropy) (Force x Area)		$4(r^4)$
(7) Atom (Energy x Entropy x Time)		$2(r^2)$

Figure 1: Geometrical shapes of the different ‘push-forward’ and ‘pull-back’ gravitons of the ‘Theory of Quantum Gravity’

The geometrical shapes of the physical variable volume and inverse volume (or mass) shown below in figure 2 as per TQG

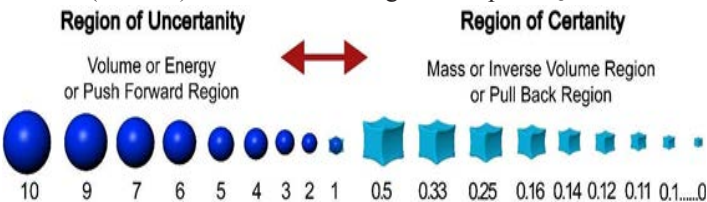


Figure 2: Geometrical presentations of volumes and inverse of volumes

The ideal gas equation for a unit mole is,

$$PV = RT \quad (1.1)$$

Here P stands for pressure, V stands for volume and T stands for temperature in Kelvin and R stands for the ‘Universal gas constant’. However, as far as the concept of TQG, the ‘pressure’ is a dimensionless parameter. It had been proved that the Planck unit of ‘pressure’ also leads to a dimensionless state of the said physical variable ‘pressure’ upon breaking it up through the TQG defined definitions of the basic fundamental variables like Planck’s constant ‘h’, Gravitational constant ‘G’, velocity of light ‘C’, electric charge ‘q’ and Boltzmann constant, ‘k_B’. Under the condition of equilibrium,

$P=1$. So, the pressure term can be removed from equation (1.1) and then the equation turns to

$$V = RT \quad (1.2)$$

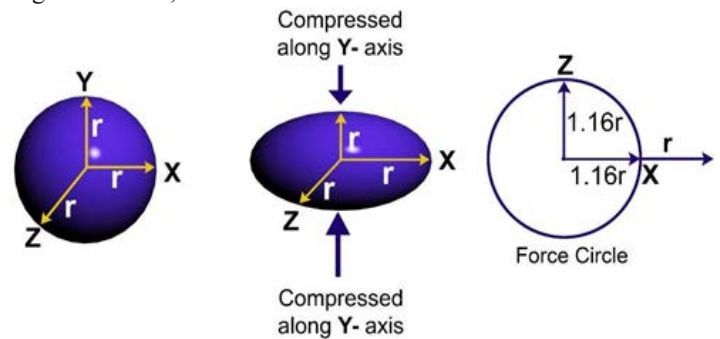
Now as per TQG [1], the energy density is a constant quantity and is represented as $E=3V$, where E is the energy and hence one can write,

$$E = 3RT \quad (1.3)$$

The universal gas constant has been proved to be a distance or a directional entropy and the ‘temperature’ has been proved to be a ‘push forward force’ in the form of a circle. So the ‘energy’ variable is nothing but a 3D sphere and one can express equation (1.3) as

$$\text{Energy Sphere} = 3 \times \text{distance} \times \text{force} \quad (1.4)$$

The geometrical interpretation of the ‘work done’ and ‘energy’ as the subject of thermodynamics deal with can be found from the Figure 3 below,



$$\text{Energy} = \text{Work Done} = \text{Force} \times \text{Distance}$$

Figure 3: Quantum gravity theory driven geometrical presentation of ‘Ideal Gas Equation’.

It is being clearly understood that energy and work done are very much interchangeable for the very obvious geometrical co-relation between the two. While compressing/twisting the ‘energy’ 3D sphere of radius ‘r’ for example, from X, Y and Z directions respectively, as shown in figure 3, in each case of compression, two numbers of ‘r’ remain inside the transformed 2D circle and one of the ‘r’ just comes out of the 3D energy sphere as ‘distance’ or ‘entropy’. This sort of compression is unique in the sense, the compression in 3 dimension is transformed to an expanded force 2D circle with higher radius (1.16r) than the radius(r) of the 3D energy sphere. So the summation of all three numbers of emerged ‘r’ (=3r), is the total entropy of an ideal gas. For a fixed volume of an ideal gas or for the fixed volume of the 3D energy sphere of an ideal gas this 3r remains to be a constant. This geometrical analysis would lead one to conclude that for per mole (means fixed volume too) of an ideal gas the work done is constant in the form of (force x distance) or (area of 2D circle x distance) as shown in Figure 3 above and the said constant in the form of work done is the universal gas constant ‘R’ (=3r).

So total entropy = 3r = 2r+r = (combinatorial entropy, 2r) + (non-combinatorial entropy, r)

The combinatorial entropy remains within the 2D force circle since

the 2 numbers of r's are continually changing their position al through the said force circle but the non-combinatorial entropy, remains to be pointed to a specific direction and that's the reason it is being called specific or non-combinatorial or directional entropy. In a Carnot Engine, this directional entropy is being extracted out from the system (the working substance of the Carnot Engine) by an adiabatic expansion of the working substance and followed by an isothermal compression of the same as very elaborately described in TQG [1]. This directional entropy pushes forward a vehicle to a definite direction.

So for an ideal gas the energy can be fully converted into work. In fact in the case of an isothermal reversible expansion of an ideal gas, the supplied heat or energy is fully converted to work. For a real gas or for any baryonic matter of the universe, this however, is not possible for the very valid reason there off and is being discussed later in this article.

Quantum Gravity Driven Geometrical Presentations of the Laws of Thermodynamics

First Law of Thermodynamics

The first law of thermodynamics is a very primitive law of classical physics and is well known law of 'conservation of energy' and the phenomena of 'mutual interchange of energy from one form to the other form of energy, maintaining the constancy of the total amount of energy'.

Here, TQG brings forward a distinct geometrical presentation of the first law as is shown below in figure 4

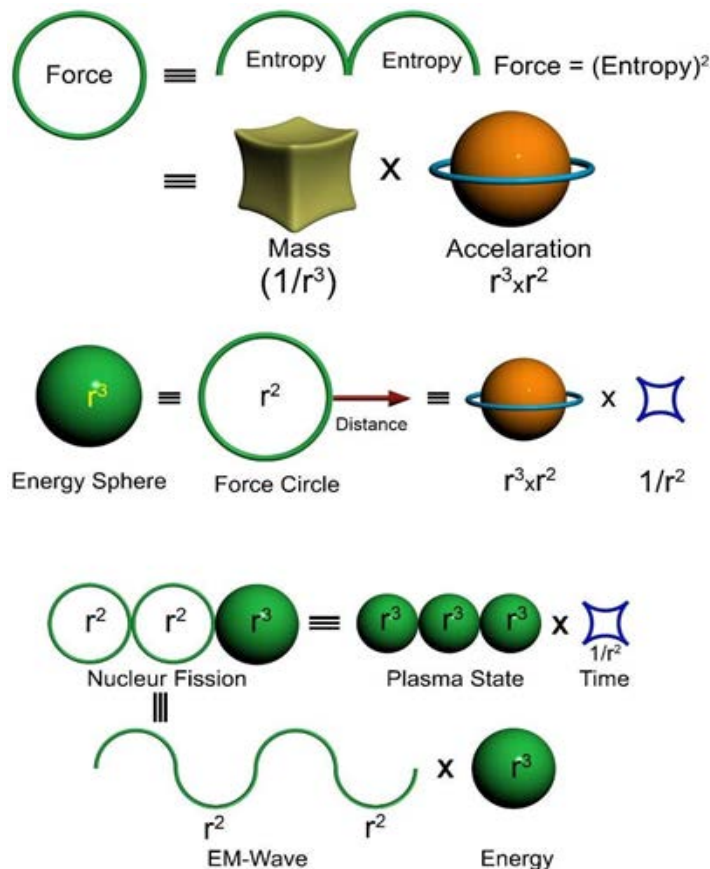


Figure 4: Quantum gravity theory driven geometrical presentation

of 1st law of thermodynamics

From the above geometrical presentation in Figure 4, it is being very clearly understood that energy can be represented by numerous other permutations and combinations in the hybrid form of 'push forward' and 'pull back gravitons'.

Coming out of the very specific physical variable 'energy', of the first law of thermodynamics, one can put the first law of thermodynamics in a very broad frame in altogether a different fashion as **"Any physical variable of the universe could be observable either in the form of a push-forward or pull back graviton or in numerous permutation-combination hybrid forms of the different gravitons, retaining the magnitude of the physical variable being unchanged."**

The above statement of first law of thermodynamics stands to be the most updated statement as far as the newly discovered TQG is being concerned or taken into account.

Second Law of Thermodynamics

The geometry of an atom of a baryonic matter of the universe in regard to TQG is being reproduced below,

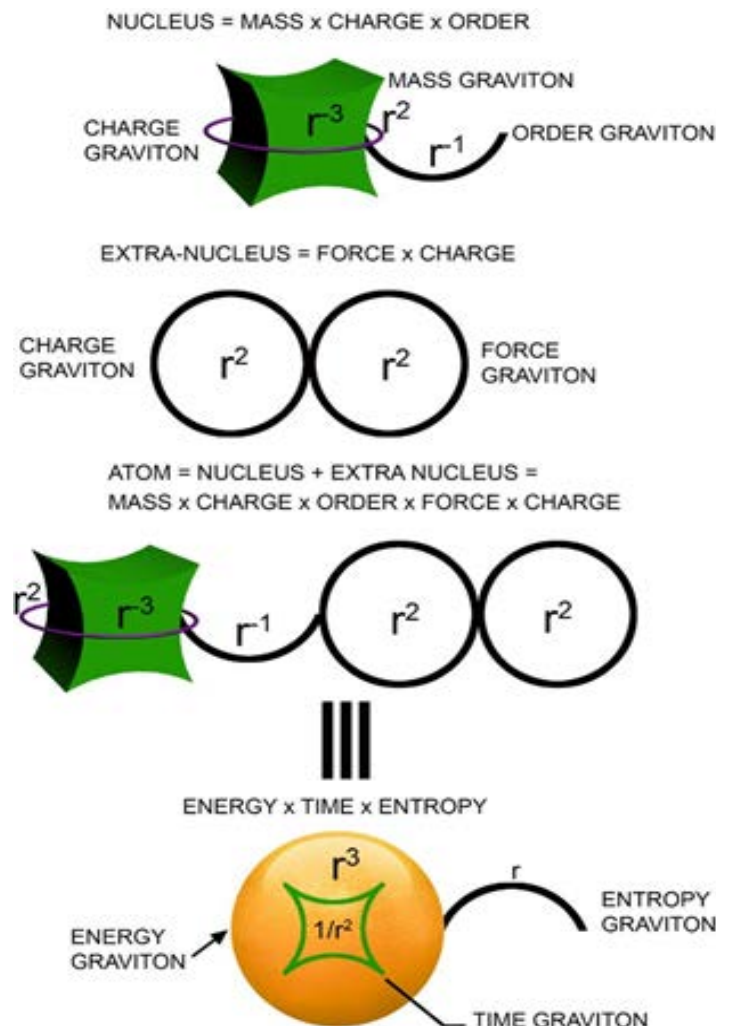


Figure 5: Quantum gravity theory driven geometry of an atom of a baryonic matter

An atom could be represented as either (energy x entropy x time) or as (mass x energy x force) as shown in figure 5 above. Unlike the case of an ideal gas as discussed in the previous section, in case of a real gas or any baryonic matter, the 3D-energy sphere contains a '2-dimensional time saddle' or 'time graviton'. This 2-dimensional saddle (or 2D-inverse circle) is representing the 'time' variable of the universe and is very much attractive one. The principal difference between an ideal gas and a real gas/baryonic matter lies in the fact that in the case of the former there does exist no attractive forces among their molecules but in the cases of the latter this said attractive force does exist very much. This leads to the evolution of time graviton there in.

While compressing or distorting such an energy 3D-sphere of a baryonic matter like the way as shown in Figure 3, the time graviton being attractive in nature, does not allow the 'r' to fully come out from the energy 3D-sphere and as a result of that, the directional entropy which comes out of the said energy sphere is lesser in magnitude than 'r', the radius of the sphere. This phenomena is being shown very clearly below in figure 6.

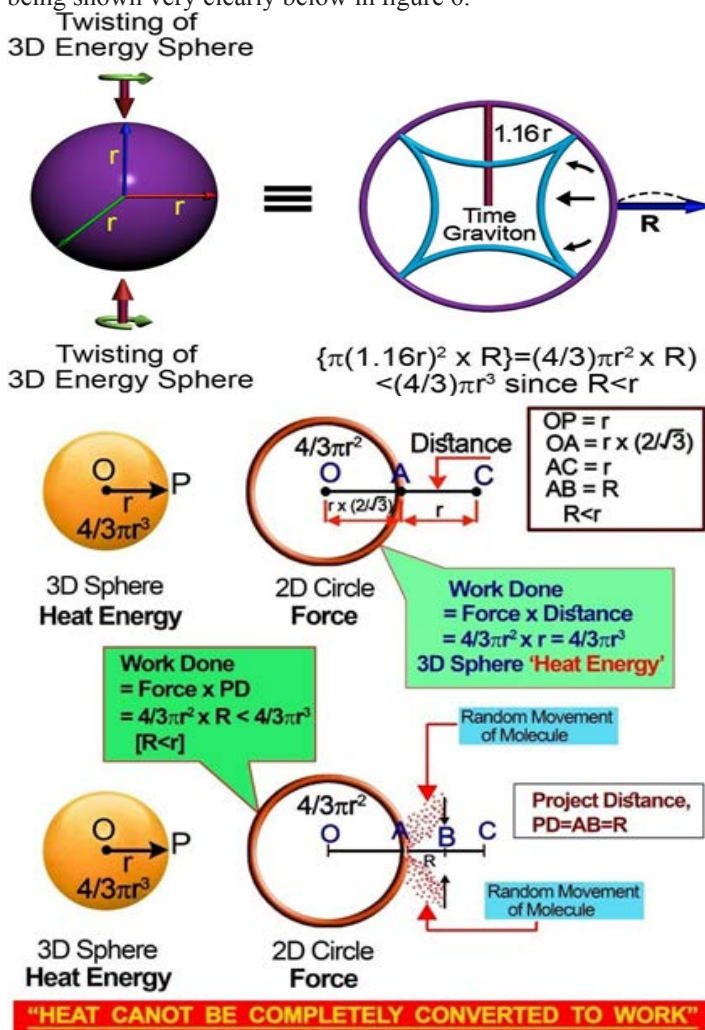


Figure 6: Quantum gravity theory driven geometrical presentation of second law of Thermodynamics.

The time graviton being intrinsically a sort of 'attractive cage' enforces the development of a curvature (randomness) to the

emerged 'directional entropy', which is being shown in figure 6 too. The randomness part is being ultimately merged with the 2D force circle and become an integral part of it as combinatorial entropy. The net result is the length of the directional entropy diminishes and it attains a value of 'R' (as shown in figure 5) and this makes 'R < r'. So the work done (W) (in the form of force x distance) is less than the magnitude of energy (E) 3D sphere. So both the 'combinatorial' and 'non-combinatorial' parts of entropy be responsible for not allowing the energy to be fully converted to work. However, apparently the entropy is the responsible for $W < E$ but the real responsible physical variable is the 'time graviton'. The 'time graviton' is the cause and the 'entropy graviton' is the effect as the TQG very clearly is revealing above.

There does exist so many statements of the second law of thermodynamics but the main essence is "Energy cannot be completely converted to work due to the existence of randomness or entropy". The second law of thermodynamics as has been proved above geometrically driven by TQG, leaves a scope to modify the second law of thermodynamics as "Energy cannot be completely converted to work due to the presence of time graviton or time attractive cage in an atom of a baryonic matter".

The TQG being in the hand of the global scientific community, a more explicit and much broader version of the second law of thermodynamics is the need of the day as is being felt and which should not only talk about heat and work only. It has to be very broad one such that the 'directional to multidirectional' or 'multidirectional to directional' phenomena of the entire universe would come under its periphery. Such a version could be stated as "To pass on to a state of directionality from a multidirectional state, one has to adopt the route of generating as much energy (E), as possible, and then operate the same on time graviton (t) to dilute the unfavourable time attractive force (acting in opposition to generate directionality) such that the hybrid of the two, Et, results into directional entropy".

As per TQG, the hybrid of E and t is,
 $E \times t = (4\pi^3) \times (3/4\pi r^2) = 3r = \text{Entropy}$ (2.1)

One of the derived phenomena of the universe from Heisenberg's uncertainty principle is, (energy x time) = Planck's constant, h. In TQG, it has been proved that 'h' is in fact a physical variable same to same as 'entropy'.

All the above discussion as made above regarding the second law of thermodynamics leads one to very justifiably conclude that the second law of thermodynamics and Heisenberg's uncertainty principle are virtually the same though the said two laws/principle, apparently look to be dissimilar or have no link to each other.

Third Law of Thermodynamics

The third law of thermodynamics and the concept of entropy are very much related to each other. Continuing with the concept of $E \times t = h$ entropy and $t \times T = 1$ of TQG as is being shown in the following figure 7, as soon as the temperature (T) is lowered, time (t) becomes more and more stronger being the multiplicative inverse of T. This inverse dimensional stronger force insists the Et hybrid or the entropy 'r' to pass on to inverse dimensionality in the form of 'order graviton' of TQG. The said order graviton or inverse entropy graviton does asymptotically approaches zero although it cannot become exactly

be zero.

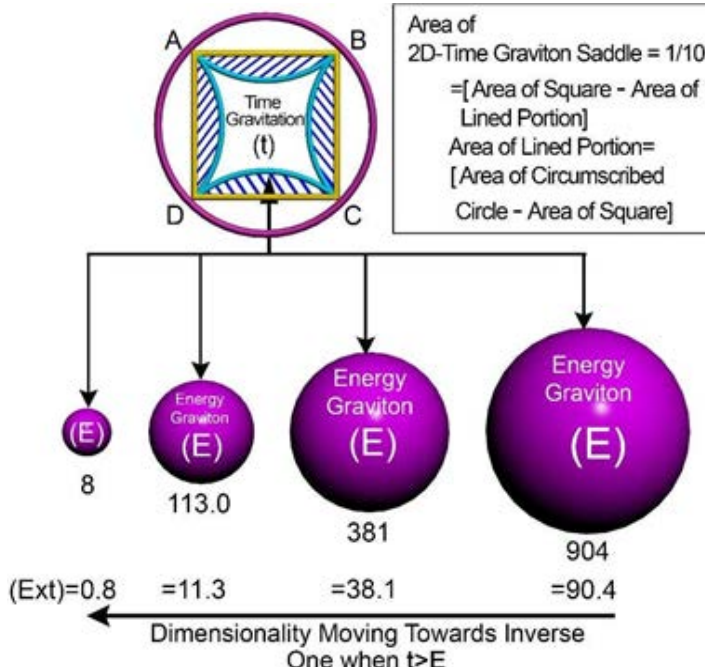


Figure 7: Quantum Gravity theory driven geometrical presentation of 3rd law of thermodynamics

The TQG showed definition or statement of third law of thermodynamics needs to be put as **“There does exist an inverse**

dimensionality (which remains in the form of order graviton or inverse entropy graviton) of the universe arising out of the hybridization of energy and time graviton when the time graviton is much stronger than the magnitude of the energy graviton and the said inverse dimensionality approaches asymptotically the state of perfect order or zero.

Summing up of TQG Definition of the Laws of Thermodynamics

In a very nutshell, all the three laws of thermodynamics are the consequences of energy (E) and time (t) interacting with each other. The sum-up of the above said definitions are as under:

- I. The first law of thermodynamics is suited to any range of domain of E and t or any phenomena of the universe.
- II. The second law of thermodynamics is suited in the domain of the universe when $E > t$ (in the multiplicative inverse sense) from energy/work to EM-wave/dark energy flow to space expansion to photo-electric phenomena to nuclear fission to X-ray, gamma ray to plasma state to dark energy.
- III. The third law of thermodynamics is suited in the domain of the universe when $t > E$ (in the multiplicative inverse sense) from order to mass to gravitational lensing to space inversion to nuclear fusion to black hole to dark matter or dark mass.

Atom of a Baryonic Matter Vis-A-Vis the Laws of the Thermodynamics

In TQG, the atom of a baryonic matter in the form of (energy x entropy x time) or (energy x entropy) or (energy x time) are the ideal models of the 3 laws of thermodynamics. The following table explains the same.

Table 1: Representing the ‘TQG Geometrical Profiles of Atoms of Baryonic Matter’ as Role Model of the Classical Laws of Science

Form of atom of baryonic Matter	Significance of the form of atom	Role model of the Classical laws of science
(energy x entropy x time)	<p>An atom of baryonic matter as per TQG in the said form represents force and one can write { In TQG , time = 1/ (distance)² = 1/r², entropy = distance=r }, (energy x entropy x time) = (energy x distance x 1/(distance)² = (energy/distance) = force Or Work or energy = (force x distance)</p> <p>This is what on which all the three laws of thermodynamics are resting</p>	<p>The atom of a baryonic matter in the form of (energy x entropy x time) is the perfect role model of all the</p> <p>‘3 LAWS OF THERMODYNAMICS’</p>
(energy x entropy)	<p>The form (energy x entropy) is being originated from (energy x entropy x time). In TQG , Tt =1 , or (temperature or push forward force x time) = 1.00. When the physical variable ‘time’ which is an inverse circle is being swallowed by developing an extra push forward circle , what is being left is (energy x entropy) since the result of multiplication of ‘time graviton’ and the said extra push forward circle is dimensionless. Although Classical physics had not made any demarcation between ‘energy’ and ‘EMwave’ but TQG has established by mathematics, geometry and physics that flow of energy is 4D EM –wave.</p> <p>Now energy being 3 dimensional and entropy (being basically a distance) uni dimensional , the hybrid form of (energy x entropy) is a 4 dimensional physical variable and so this represents 4D EM–wave. In Figure 1 it has been shown geometrically how 4- dimensional EM-wave fronts are being originated from two numbers of circles.</p> <p>This is the concept of ‘EM-WAVE GRAVITONS’ of TQG and which does represent the flow of ‘energy’ and hence Einstein’s concept of ‘Photon’ (which is being an abstract in the sense photons are massless , they have particle nature, they are also waves) needs to be abandoned.</p>	<p>‘EM-WAVE GRAVITONS OF TQG’</p> <p>Planck’s hypothesis of Black Body Radiation talk about ‘discrete’ quantum of energy and Einstein’s photons are being described as :</p> <ol style="list-style-type: none"> Photon is a type of elementary particle. It is the quantum of electro –magnetic radiation It is the force carrier of the electro-magnetic radiation. They always move at the speed of light since they are massless <p>In one hand photons have been described as particles and on the other hand they are called assless.</p> <p>How come a particle be mass less ?</p> <p>The hypothesis of ‘since Photons are massless and hence they move at the speed of light’ is fully arbitrary. The statement that ‘photons are the force carriers’ is not supportive since force is a hybrid of mass and (change in velocity/ time) or acceleration and the geometries/ dimensionalities of mass , velocity, time.. etc. have not been clearly defined. TQG definition of EM wave is, EM –WAVE = (FORCE)² And it has been shown geometrically how a EM-wave is being generated from the hybrid of 2 nos. of ‘force’ circles.</p> <p>It is TQG only which could firmly establish that ‘EM-Wave Gravitons’ being 4 dimensional (r⁴)are the force carriers of the universe , and which remain in equilibrium with ‘second degree mass’ which is inverse 6 dimensional. Figure 1 is being referred in this context.</p>

(energy x time)	<p>The atom of baryonic matters in the form of (energy x entropy x time) is the role model of all the 3 laws of thermodynamics as the TQG has concluded will be most firmly established here :</p> <p>When an order graviton (1/r) is artificially created and it acts on entropy (r) and does swallow it what is left is (energy x time). Now there can be 3 numbers of cases : When energy, E > t , then it does create an entropy graviton , and based on this a typical Carnot engine does work and goes on generating directional entropy cycles over cycles. The high energy E, dilutes the unfavorable ‘time graviton’ (t) (acting in opposition to generate directional entropy) and gives birth to the ‘directional entropy’. So this so called ‘time graviton’ does not permit the energy to be fully converted to work and which is the second law of thermodynamics.</p> <p>The generation of ‘directional entropy’,r, in the form of hybrid of (E x t) is a consequence of Heisenberg’s uncertainty principle of ‘ Hybrid of energy and time is planck’s constant,h (in TQG this h has been established as entropy)</p> <p>In the case when t > E , the inverse dimensionalities are formed in the form (1/r) and has already been discussed in this article. Lastly when t=E , the result is the equilibrium existence of push forward and pull back gravitons in the form ‘ Time x Temperature =1.00’.</p>	<p>3rd law of thermodynamics</p> <p>Heisenberg’s uncertainty principle.</p>
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Stefan-Boltzmann Law and Planck Theory of Black Body Radiation

The Planck theory of black body radiation has already been given a new interpretation in regard to TQG. However, it is being explained below that the Stefan Boltzmann law and the said Planck theory do stand at the same stead and converge to the fact that ‘energy density of the space is constant’ though TQG has already established this fact very straight forward from very simple logics of physics, mathematics and geometry. This is to firmly establish here that the TQG approach or the TQG path is the right most path to make our understanding of the cosmos much easier and distinctly visible.

Stefan- Boltzmann law is,

$$E = \sigma T^4 \quad (3.1)$$

Where, E = energy radiated from a black body per unit of time per unit area, σ = Stefan-Boltzmann constant and T is the temperature in Kelvin scale. The constant σ is given an expression, in the form of the Boltzmann constant (k_B), velocity of light (c) and Planck’s constant, h

$$\sigma = (2\pi^5 k_B^4) / (15c^2 h^3) \quad (3.2)$$

If the TQG defined dimensional expressions of the all the physical variables of equation (3.2) are being put in the equation, we get the following result,

$$\sigma = (\pi^3/120r^5) \quad (3.3)$$

As per TQG,

$$kB \text{ or } k = r, c = (4\pi r^3/3) \text{ and } h = 3r, t = \text{time} = (3/4\pi r^2),$$

$$\text{Temperature/Area/Force} = (4\pi r^2/3), \lambda = r, \nu = (c/\lambda) = (4/3\pi r^3)/(r) = (4\pi r^2/3)$$

So Stefan-Boltzmann constant is truly the ‘space inversion’ graviton or ‘object color’ graviton.

Now if we multiply the RHS of equation (3.1) by area and time as per the TQG definitions of the physical variables as stated above, we get the total energy, E_T

$$E_T = (\pi^3/120r^5) \times (4\pi r^2/3)^4 \times (3/4\pi r^2) \times (4\pi r^2/3) = (\pi^3/120r^5) \times (4\pi r^2/3)^3 \times (4\pi r^3/3) \times (1/r) \quad (3.4)$$

$$\text{So, } \{E_T / (4\pi r^3/3)\} = (\pi^3/120r^5) \times (4/3)^3 (\pi^3 r^5) \quad (3.5)$$

So, (Total energy/Volume) = constant = energy density

So what is obvious from the above analysis that the energy density of a Black body radiation is a dimensionless entity as per the law of Stefan- Boltzmann and is a constant one. The numerical value the said constant which would be equated to the energy density is not the objective to be highlighted here. The point of highlight is the hidden underlying truth of the dimensionality and constancy of ‘energy density’ of the said laws. The ‘energy density’ is indeed found to be a dimensionless constant.

If the logics and philosophies of TQG are being placed vis-a-vis

the same of classical physics, the current standard model of physics, quantum mechanics, etc, one can at ease, come to understand that in the later, the magnitude or the values of most of the physical variables are assigned against some or the other internationally decided arbitrary unit standards of the concerned physical variables. In contrast to that, in TQG, the magnitudes of the physical variables are related to the pre assigned geometrical shapes of the physical variables and their values are mostly the geometrical volumes occupied by the numerous ‘ π -gravitons’ or ‘anti π -gravitons’ in their absolute or hybrid forms. So any attempt, to try to match the TQG derived magnitude of any physical variables or their hybrids to the magnitude offered by the conventional physics will not be a justified gesture altogether. As a matter of fact, the dimensionalities of the physical variables of conventional physics are being in the ‘latent’ form and the unprecedented task what TQG has done, is the exploration of all those ‘latent’ dimensions and have very firmly established those dimensions by giving altogether the new shapes to the numerous ‘Planck units’ either in the form of ‘push forward π -gravitons’ or ‘pull back π -gravitons’ or their hybrids and firmly established the ‘inverse dimensionality domain of the universe’.

The TQG driven geometrical presentation of the Stefan-Boltzmann law is given below in Figure 8 and which is self-explanatory.

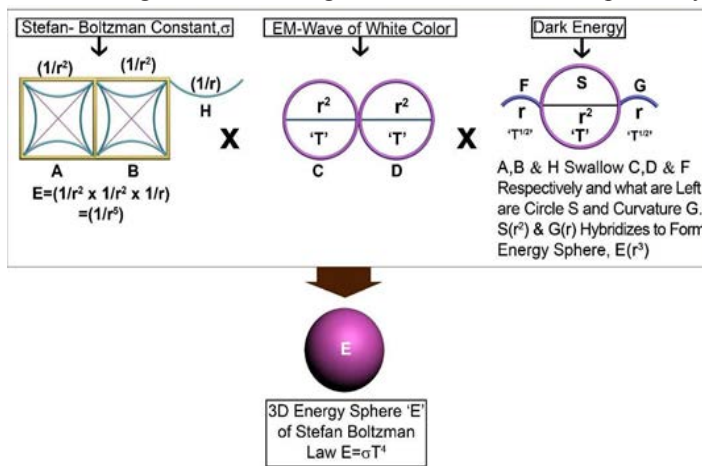


Figure 8: Quantum Gravity theory driven geometrical presentation of Stefan Boltzmann law the mathematical statement of the Planck hypothesis is,

$$I(v,T) = (2hv^3/c^2) \times (1/e^{hv/kT}-1) \quad (3.6)$$

$I(v,T)$ is the amount of power per unit surface area per unit solid angle per unit frequency. Now Power = (Energy/time) and a solid angle being the ratio of two areas is dimensionless, the above mathematical expression could be written as in regard to TQG, (to be noted that, hv/kT is, $\{3r \times (4\pi^2/3)/r \times (4\pi^2/3)\}$ is a constant and hence the exponential part of the above equation is a constant too and is being represented as ‘a’ here)

$$\begin{aligned} \text{Energy}/(\text{time} \times \text{surface area} \times \text{frequency}) &= (2 \times 3r) (4\pi^2/3)^3 / (4\pi^3/3)^2 \times a \\ \text{So, (Energy)} &= a \times (2 \times 3r) (4\pi^2/3)^3 / (4\pi^3/3)^2 \{(\text{time}) \times (\text{surface area}) \times (\text{frequency})\} \\ &= a \times (2 \times 3r) (4\pi^2/3)^3 / (4\pi^3/3)^2 \times (3/4\pi^2) \times (4\pi^2/3) \times (4\pi^2/3) \\ \text{So, (Energy)} / (4\pi^3/3) &= a \times (2 \times 3r) (4\pi^2/3)^3 / (4\pi^3/3)^2 \times (1/r^3) \times \end{aligned}$$

$$\begin{aligned} &(3/4\pi r^2) \times (4\pi^2/3) \times (4\pi^2/3) \\ \text{So, (Energy/volume)} &= a \times 2 \times 3r \times (1/r^3) \times (4\pi^2/3) = a \times 2 \times 4\pi = 8\pi a = \text{constant} \end{aligned}$$

So upon showering the light of TQG, the Planck’s theory of ‘Black Body radiation’ also leads to the same conclusion as that of Stefan-Boltzmann law that the ‘energy density of space is constant’.

General Relativity Defined Cosmological Constant vis-à-vis Friedman’s Cosmological Constant and Dark Energy of the Universe

Once establishing the fact that the energy density of space is constant, the underlying dimensions of general relativity [36-39] ‘measure of curvature of space’ and ‘cosmological constant’ would be analysed thoroughly in this section.

The expression of the measure of curvature of space (RE) of Einstein/Friedman is

$$R_E = C / (4\pi G\rho)^{1/2} \quad (4.1)$$

Here, C is the velocity of light, G is gravitational constant of Newton and ρ is density of matter in the universe. However, the expression of cosmological constant (Λ_E) of general relativity is the inverse of the square of RE

$$\Lambda_E = (1/R_E)^2 = (4\pi G\rho)/C^2 \quad (4.2)$$

General relativity described the universe as a static one of hyper spherical geometry such that the attractive forces of gravity is counter balanced by some sort of dispersive force/energy. However the dimension of the cosmological constant is of inverse area dimension, as one can obtain from equation (4.2) and the measure of curvature of space is found to be of dimension of length from equation (4.1) using the conventional dimensions of physics (L, M & T for length, time and mass respectively). While the general relativity being the first proposition of distorted 4D ‘Time-Space’, the difference between a 3D space and a 4D ‘Time-Space’ have to be different and the same should be reflected in the dimension of measure of curvature of a distorted space. The very famous geometrical presentation time-space of general relativity in the form a spherical ball (mass) resting on a 3D space net is a hyperbolic type. So the measure of curvature should be different than that of a spherical/hyper spherical shape. The inverse area dimension of the cosmological constant also do not support it to be dispersive physical variable acting in opposition to the gravitational forces.

General relativity considered ρ as ‘mean density of matter of the universe’ but the same cannot account for the measure of curvature of space and vis-à-vis the cosmological constant. If in the equations (4.1) and (4.2), the TQG concept of dimensionless constant energy density of space ($E=3V$) is being utilized, one reaches a different horizon altogether and can understand what really is General relativity ‘4D space time’. The dimensions obtained for radius of curvature of space and cosmological constants are, $\Lambda_E = (1/R_E)^2 = (4\pi G\rho)/C^2 = 3 \times (4\pi) \{(16\pi^2 r^5/9)^2/4\pi\} / (4\pi^3/3)^2 = (16\pi^2 r^{4/3}) = 3 \times (\text{Force or temperature})^2$

So the measure of curvature of space is found to be inverse 2 dimensional and which should ideally be the Gaussian curvature of

space (a 3D-time/4D distorted space-time) of general relativity. As well, the significant and meaningful dimension of the ‘cosmological constant’ is obtained which is 4 dimensional and is in the form of (Push forward)² or (Temperature)² and which is simply the dimension of EM-wave of TQG. In fact the ‘cosmological constant’ represents the ‘Dark Energy flow of the Universe’. Although general relativity did not clearly spell out the same as ‘Dark Energy’ but while making the solutions of EFE of General relativity, Friedman labelled the cosmological constant as dark energy of the universe. In reality what is being said as ‘dark energy’ is indeed the flow of dark energy, not exactly the ‘dark energy’ itself. In TQG, energy is 3 dimensional and the flow of the same (energy and entropy hybrid) is EM-wave. Since entropy is 1 dimensional, the flow of energy becomes 4-dimensional ($r^3 \times r = r^4$) EM-wave.

In modern cosmology, however, the universe is being represented by a well split (open, flat or closed) Friedman equation¹⁰¹ in relation to Hubble’s constant, H:

$$H^2 = (8\pi G/3) \rho - (kC^2/R^2) + (\Lambda_E/3) \quad (4.3)$$

The first term of equation (4.3) describes the matter density of the universe, the second term is arising out of the distorted ‘space-time’ of the universe and the last term represents the dark energy physical variable and is the candidate responsible for the expansion of the universe as far as the thoughts of the subject of ‘modern cosmology’ is being considered. In equation (4.3), the symbols k and R stand for the curvature of the space and the scale factor (dimensionless) representing the size of the universe respectively.

In regard to TQG, the Hubble constant is not a constant at all, it is a variable of the universe and represents the push forward force (having a dimensionality 2) responsible for the expansion of the universe. In TQG, ‘time’ is the reciprocal of Hubble’s constant. So the LHS of equation (4.3) has a dimensionality of 4 and each and every term of the RHS of the said equation has to have the dimensionality be equal to 4 since otherwise, the said equation would no more remain to be a mathematically valid equation. However, here for the first term of equation (4.3) which represents the outburst contribution of matter density to the push forward force of the universe (Hubble’s constant), the ‘dimension of matter density’ of TQG should be applicable. For the second term and the 3rd/last term of the said equation the TQG derived ‘energy density of space’ should be logically applicable, since both the terms are related to space.

The TQG derived dimensions/expressions of the physical variables of equation (4.3) are,
 $G = (16\pi^2 r^5/9)^2/4\pi$, energy density of matter = $3/(4/3\pi r^3)^2$, energy density of space = 3, $C = (4/3\pi r^3)$, $k = (1/r^2)$ (the radius of curvature of space of the universe)

The following results are obtained by imposing the TQG on general relativity and the solutions of the EFE by Friedman,

1st term $\{8\pi (16\pi^2 r^5/9)^2/3\} \times 3 / (4/3\pi r^3)^2 = (\text{constant}) \times r^4$, (constant) = $(2)15/(3)7\pi$

2nd term $k (4\pi/3\pi r^3)^2/R^2 = (1/r^2) (16\pi^2 r^6)/9 = (4\pi/3)^2 \times r^4$ (4.4)

The dimensionless scale factor R is not being considered in equation (4.4)

3rd term $(4/3\pi r^3)^2 = (\Lambda_E/3)$

Now very much meaningful conclusions could be drawn once the above findings are being well scrutinized. First of all the ‘dark energy’ is a 4 dimensional physical variable of the universe and is the EM-wave or (Temperature)² of TQG.

So TQG driven dimensional analysis reveal the underlying truth of ‘curvature of space’, ‘cosmological constant’ and ‘dark energy’ of ‘General relativity and Friedman cosmic model of the universe’.

As a matter of fact once the true significances of Planck hypothesis and Stefan-Boltzmann laws are being understood (as already explained in this article) along with the theory of color physics [1] of TQG, no mathematical model is absolutely being required to understand the shape of the universe or whether it is being static or expanding. If a pedestrian is walking through the right path, the path itself takes him to the proper destination and he can very much feel on his own whether he is walking through a closed path or an open path or whether the path is curved or a flat one.

Friedman’s [101] applied the equation of state of a perfect fluid to fit into the geometry of the space-time or the cosmic universe and handled with so many parameters like, spatial curvature of space, dimensionless scale factor, a dimensionless parameter, $\omega = (p/\rho)$, where p is the pressure and ρ is the energy density and made so many assumptions and tried to establish the cosmic state of the universe by mathematical logic only. While solving of the general relativity EFE’s was the need of the day when it was proposed (for the understanding of the geophysical shape of the cosmic universe) but the said equations cannot be solved, however, either by i) fitting the EFE’s to the equation of state of a material like a fluid or mixture of fluids or by ii) well defined TQG dimensions or the geometrical shapes of time, mass, momentum, stress, energy,.. etc. At the said point of time no other option was being left to the scientists than to adhere the first one to solve the EFE’s and that led to make so many assumptions. TQG, however, has solved the EFE’s very straight forward fashion and has been already reported in the recent publication and the phenomenon of ‘gravitation’ has been established to be an entropic one.

General relativity (GTR) principally is resting on mathematical models (the EFE’s) with the following geophysics concepts,

- i. The space of the universe is a ‘4D time- space’ rather than apparently apprehended ‘3D –space’.
- ii. Effect of warp of the massive objects is the phenomenon of gravitation.
- iii. Cosmological constant being of inverse area dimension, is responsible to overcome the gravitational attraction

However, the TQG version of GTR is now being given below based on the above discussions made so far:

- i. Curvature of space-time is inverse 2-dimensional and is an inverse force, being linked to the ‘time’ variable of the universe and is entropic by its origin. The space of the universe are in two forms, i.e., ‘5D expanded space’ and ‘inverse 5D contracted space’

- ii. The so called ‘warp’ is the overlapping of the mutually interacting inverse acceleration/space inversion fields of the astronomical bodies of the universe and is indeed the phenomenon of ‘gravitation’ and is entropic one by its origin.
- iii. The cosmological constant is the flow of energy from matter to the space and does take place in the form of flow or EM-wave of ‘dark-energy’ and which is 4 dimensional and entropic by its origin.

As a matter of fact, however, general relativity and Friedman equations, are not the essential ones to understand the following phenomenon of the universe:

- a. ‘The universe is an expanding universe’ [80]
- b. ‘The universe is being made up of baryonic matter, dark matter and dark energy [5].
- c. ‘Dark energy is responsible for the expansion of the universe’ [5]
- d. ‘The universe has an acceleration and the same is increasing gradually’ [1]
- e. ‘The universe is a flat universe or is pushing up to a flat geometry’ [1]
- f. ‘The universe is a so called zero energy universe’ [99-100]

The analyses of ‘color’ phenomena of the universe as done in TQG along with the main essence of Planck Theory and Stefan-Boltzmann law being taken into consideration, very firmly establishes the above mentioned phenomena of the universe. The phenomena a, b and c among the above said phenomena have been already explained in a recent publication¹ and the rest three will be proved now to be true [1].

The Stefan- Boltzmann law/Planck theory of Black Body Radiation can be presented in regard to TQG as, Energy = (space inversion) $(1/r^5=\sigma)$ x (push forward force or temperature)⁴ $(r^8)=(T^4)=(1/r^5) \times (r^4)^2=(1/r^5) \times (r^5) \times (r^3)$

In TQG, dimensionally, (EM- wave) = (temperature or force)²= r^4 and power or space expansion = (EM-wave x entropy)= $(r^4 \times r)=r^5$ and ‘space inversion’ is ‘color of object’, ‘space expansion’ is ‘color of light reaching the eye’ hence it could be written firstly,

$$\begin{aligned} \text{Total energy of Black Body} &= (\text{space inversion}) \times (\text{EM-wave})^2 \times (r^5 \times r^8) \\ &= (\text{space inversion}) \times (\text{space expansion}) \times (\text{energy}) (r^5 \times r^5 \times r^3) \\ &= (\text{color of object}) \times (\text{color of light}) \times (\text{dark energy}) (r^5 \times r^5 \times r^3) \\ &= (\text{power inversion in mass in the form of pull back or squeezing EM-Wave}) \times (\text{power spread to the space in the form of push forward EM-Wave}) \times (\text{dark energy}) (r^5 \times r^5 \times r^3) \\ &= (\text{Grey universe}) \times (\text{dark energy}) (r^5 \times r^5 \times r^3) \end{aligned}$$

(since the hybrid of ‘black color of the object’ and the ‘white color of light’ makes the universe a ‘Grey’ one.)

$$\text{Total energy of Black Body} = (\text{space inversion}) \times (\text{EM-wave})^2 \quad (4.5)$$

It is to note that in the above expression ‘EM-wave’ is appearing twice. One of the ‘EM-wave’ is the ‘EM-wave’ of white color of TQG [1] (section 16 of Color Physics and gravitons in reference no. 1) and the other one is the ‘EM-wave’ of ‘Dark energy’ as discussed above. So the above expression can be rewritten as,

$$\begin{aligned} \text{Total energy of Black Body } (E_T) &= \\ &(\text{Space inversion in the form of black object color}) \times (\text{EM wave of White Color}) (\text{EWC}) \\ &\times (\text{EM-wave of Dark Energy}) (\text{EDE}) \end{aligned} \quad (4.6)$$

Since energy is 3-dimensional and power/acceleration is 5 dimensional as per TQG, the LHS and the RHS of equation (4.6) is being multiplied by r^2 to take the said equation to the power form as,

$$E_T \times r^2 = (\text{space inversion in the form of black object color}) \times (\text{EWC} \times r) \times (\text{EDE} \times r) \quad (4.7)$$

So it can be written now (since EWC and EDE are both 4-dimensional), Total power flow or power output of the universe = (power in inverse integrated form in the black body or black object color) x (Power in integrated form in White Color of light in equilibrium with black body) x (power of dark energy flow of the universe) (4.8)

Now the hybrid or product of ‘power in inverse form in the black object color’ and the ‘power of white color of light’, the first 2 terms of equation (4.8), does represent the ‘grey universe’ and hence the above equation (4.8) can be rearranged as, (Grey Universe) x (Dark Energy power output) = (Total power flow or total power output of the universe) (4.9)

$$(\text{Grey Universe}) = (\text{Total power flow or total power output of the universe}) / (\text{Dark Energy power output}) \quad (4.10)$$

The LHS of the above equation (4.10) is in the ‘integrated form’ and the RHS of the same is in the ‘differential form’. In fact the ‘Grey universe’ being in the ‘integrated form’ is being thirsted by the ‘dark energy’ and as a result of the said thirst, the universe gets ‘de-hybridized’ or ‘disintegrated’ and goes to the differential form and the entropy gravitons do continually emerge out from baryonic matters and the entire/total power of the universe in the form numerous push forward gravitons like force, energy, EM-wave, space expansion/acceleration, photo-electric emission, nuclear fission, x-ray, plasma state gravitons are evolved and are spread over the entire universe and more and more dark energies are being evolved too.

The universe, as if, in the form of a multidimensional (9/10 dimensions) integrated form of a coil is being stretched by the ‘dark energy’ and this results in the ‘uncoiling’ of the universe and it does continually passing on to differential forms(for the very obvious logic there off) to flat to more and more flat geometry. This is being shown below diagrammatically in Figure 9,

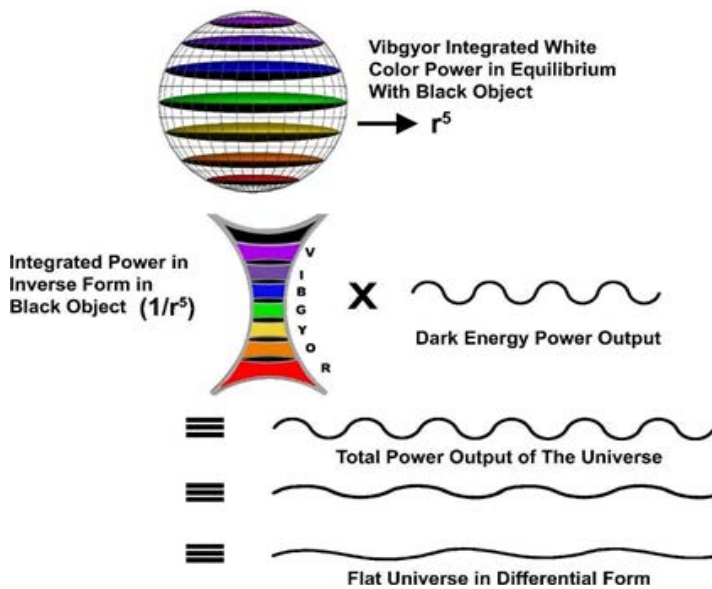


Figure 9: Presentation of the emergence of flat universe from Stefan-Boltzmann law

Now regarding the phenomenon of ‘acceleration of the universe’ it is being observed that the galaxies are just going apart from each other at more and more faster rate and it is also being followed from equations (4.9) and (4.10) too.

In TQG ‘acceleration’ is ‘space expansion’. If the geometrical shape of ‘acceleration/space expansion’ of TQG is being critically examined, it will be found that the force circle (r^2) around the energy sphere (r^3) is pushing forward the energy sphere and as a result of it, the said sphere is getting stretched/flattened (figure 10 below) and that is what is the so called ‘space expansion and the consequent flattening of space’ of TQG. This could also stand as an ideal model of ‘a physical variable remaining in the integrated form is passing on to differential form’ since upon stretching of the energy sphere, the hidden building blocks would be emerging out of it.

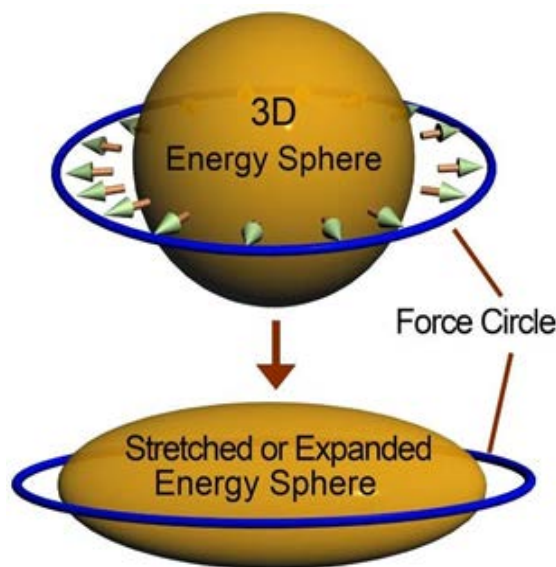


Figure 10: Quantum gravity theory driven geometrical presentation of dual cosmic phenomena of space expansion cum flattening

of space.

If the universe does pass on to more and more differential forms, it will be more flat in its geometrical shape, the more and more the space expands. So from a distance or from one end of the universe, it will look so that the other end is going away at a faster rate since at the said end there are space expansions in the form of more and more flatter geometries.

If the ‘grey universe’ [1] as discussed above is being considered, it is just in the multiplicative inverse form as,
 Grey Universe = {Space inversion of dimensionality ($1/r^5$) x Space expansion in the form (r^5)}

To note here is the fact, that since the ‘dimensionalities-inverse dimensionalities’ of the universe are just cancelling out each other, the net dimensionality of the so called ‘grey universe’ is zero indeed. In the equations (4.9) and (4.10) the net-dimensions of both the RHS and the LHS’s are zero.

The existing concept of ‘ZERO ENERGY UNIVERSE’ [99-100] is never required to be interpreted as “The total energy of the universe is zero”. The concept of zero energy universe tried to substantiate the fact that the positive energy of the universe is being neutralized by the negative energy of ‘gravitation’. TQG has shown that this concept of ‘negative energy’ simply does not stand and the ‘gravitation’ is a spatial geometrical phenomena in the inverse form and which is being originated principally from the inverse geometrical shapes of the physical variables like ‘time’ and ‘mass’. The said concept of ‘negative energy’ should be replaced by the ‘concept of inverse energy or inverse volume’ and the concept of ‘ZERO ENERGY UNIVERSE’ [99-100] should be amended as “The net dimensionality of the grey universe is zero”. This conclusion, as a matter of fact, one can make straight forward from the TQG derived equations (4.9) or (4.10) as shown above.

Cosmological Red Shift and Gravitational Red Shift

Two very much well known phenomena of the global science are ‘cosmological red shift’ [103] and ‘gravitational red shift’ [102]. The former one is related to the subject of cosmology and the latter one is a phenomenon of general relativity. In a very precise form, cosmological red shift is being a perception of the eye of an observer of the ‘dominancy of red color’ when a lighting object moves away from him but when a lighting object moves towards him, the eye sight experiences the ‘dominancy of blue color’. TQG color physics pictorial presentation of the above said phenomena is shown below in figure 11.

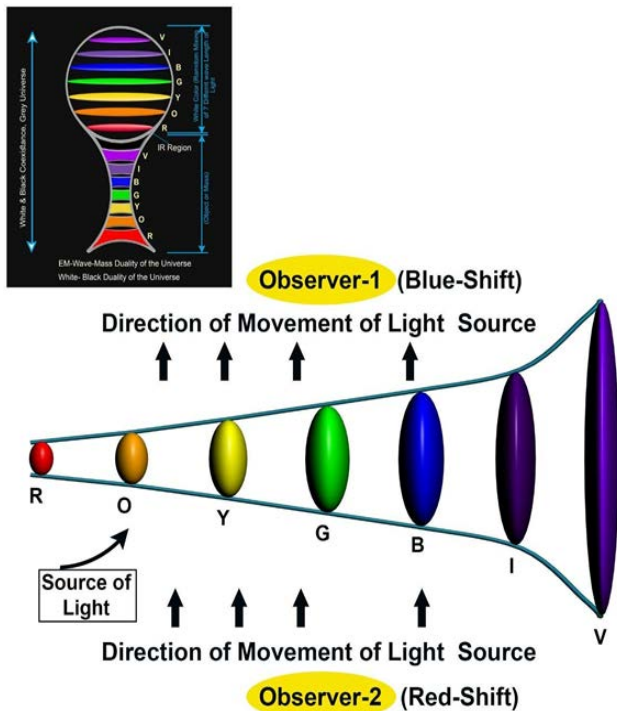


Figure 11: Quantum gravity theory driven geometrical presentation of cosmological red shift.

The above figure is very much self-explanatory. First thing to note here from the shapes of the 7 components of VIBGYOR, as one passes from red to orange to yellow to green to blue to indigo to violet, they all are being of 5 dimensional (with apparent looks of 3 dimensional) ellipsoid geometries, with varying aperture of the base circles. TQG driven 'Color Physics' has shown that the said apertures are the 'Spectral Power Distribution (SPD)' of Planck theory of Black Body radiation and as a result if the said apertures are being plotted against wavelength of visible light, taking the aperture of Red as 1, a typical 'Black Body Radiation curve' is being evolved and which does also match the typical sun's spectrum too peaking at green and near green region. As one passes from V to I to G to Y to O to R, both the energy (E) and volume (V) increases such that the ratio of E to V remains constant and that is one of the very important conclusion of TQG. To the 'observer 1' the lighting object is approaching him and since among the seven number of colors of V I B G Y O R (as per TQG, the color is space expansion and is of dimensionality, 5) of the light emitting object, the sequence of space expansion is in the order $V > I > B > G > Y > O > R$, it is the blue region light (V, I & B) which will hit the eye most profoundly first of the observer 1. As a result, the guard-feel of the said observer will be as if the light wave is shifting towards the wave length of blue light. The guard-feel of the 'observer 2' would just be the diametrically opposite one to that of the observer 1. Since the light source is moving away from him, the red light being the least space expanded one by its geometry will be retained with dominance in the region of his eye sight.

A very much discussed subject of physics and cosmology is 'UV CATASTROPH'. If one examines the typical 'Black Body radiation' curves, one would find that at lower wavelengths of light, the intensity of radiations are decreasing. At higher wave lengths of light the intensities are lower and the intensities increases with decrease in wavelength, exhibits a peak maxima and then again decreases. The classical physics could not explain this pattern of variation of the intensities. As per classical physics, the intensity would go on increasing at lower wavelengths too such that it would reach to a stage of dominance of very high energies like UV rays and their intensities would have become very strong and just would have destroyed everything of the nature. This is being referred to as the phenomena of 'UV CATASTROPH'. But in reality this is not happening so. It is Sir Max Planck who proposed his abstract 'mathematical quantum theory model' to simply account for the decrease in intensity at lower wavelengths of 'Black Body radiation'. The TQG 'color physics' has very clearly explained the typical 'Black Body radiation curves' and explained the typical SPD (spectral power distribution) of 'Black Body' and the Sun's energy emission spectrum simply by dimensional analysis of CHFL, the 'COLOR HYBRID FUNCTION OF LIGHT' [1] without recourse to any sort of mathematical model. In fact no mathematical model as that of 'Max Planck' is in fact being required in practice.

The principal concept of a high energy field as per TQG (see Figure 11) is, a high energy field is lower in aperture but its spread is more. If the geometrical shapes of the higher energies like Violet (V), Indigo (I) or Blue (B) of Figure 11 are being looked into, one would find that geometrically, V, I or B are laterally/transversely smaller but longitudinally much higher. This is the effect of the geometry of 'space expansion' as shown in Figure 10. So the main essence of TQG is 'High energy fields are more and more dispersed in space up to long to long distances in the form of differential or flat shape space expansions unlike the relatively lower energy fields which are much more confined ones and are much less space expanded versions'. The geometries of 'high energy fields', in fact, protect the nature from the devastating phenomena like 'UV CATASTROPH' since the energy being very much uniformly distributed over space in flat geometrical shape over longer distances.

The GTR gravitational red shift depicts that a clock in a deeper gravitational well will tick slower. While in GTR, time is an 'abstract' physical variable of the universe, it is TQG indeed, which only for the first time, gave the said physical variable 'time' a full proof realistic shape and defined it by the merging or bridging concept of physics, mathematics and geometry. The gravitational red shift is also a phenomena being related to space. While in case of 'cosmological red shift', the space expansion is the responsible physical variable, it is the phenomenon of 'space inversion' or 'color of object' which is responsible for 'gravitational red shift' or the happenings of the 'slower' or 'faster' ticking of a clock. Gravitational red shift is being diagrammatically shown below.

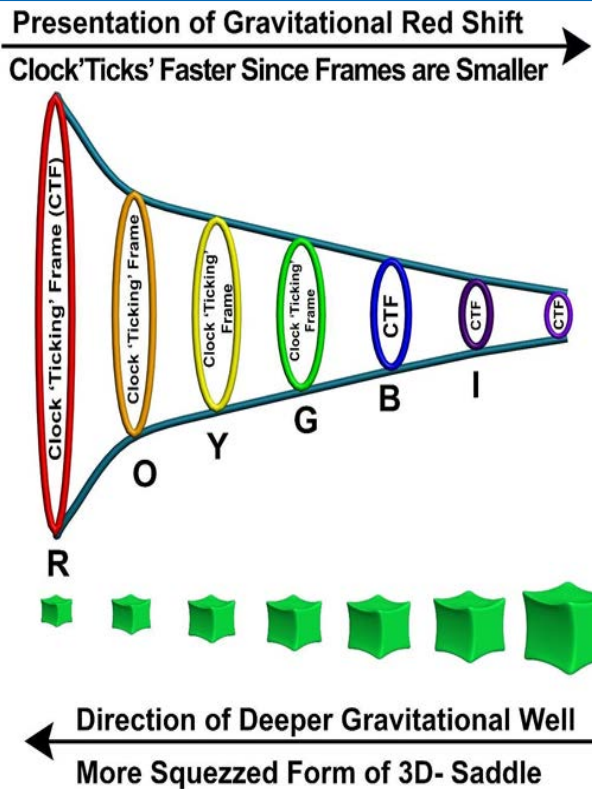


Figure 12: Quantum gravity theory driven geometrical presentation of gravitational red shift of general relativity.

As a matter of fact the frequency of periodic back and forth movements of the pendulum of a clock in 2 dimension and 3 dimensions are being related to force circle and 3D energy sphere respectively. Since in each periodic motion of the pendulum, if being viewed in 2 dimension, an area is travelled by the pendulum, and be viewed in 3 dimension, it encompasses a volume too. In TQG, under the condition of equilibrium, 'area' is force and the 'volume' is energy. From Figure 12 above, it will be found that the red color in the space inverted form is the most cohesive one and as one passes from R to O to Y to G to B to I to V, the cohesiveness falls off monotonically since the shape of the space inversion graviton becomes more elongated one. The curvature of the '2D time saddle' goes towards more and more linear one.

One needs to understand like anything the fact, that it is being the physical variable 'force or area', which is linked to the 'ticking' of a clock. When it is being told that 'ticking of the clock is slower' visà- vis, 'the time frame is bigger', it simply means that the inverse of time, which is force or area, is bigger. On the contrary when 'the ticking of a clock is faster' or 'the time frame is smaller', the inverse of time (which is force or area) would be smaller. In fact Figure 12 is the presentation of the equilibrium phenomena between the 'Inverted Time Frame and frame of the ticking of a clock' of the universe in the form of force' (the 2D circles) and the 'inverted VIBGYOR or space inversion or a Black color ob-

ject' (inverted 3D – geometry of space-time). From Figure 12, one can develop the proper concept of 'gravitational red shift' since it is geometrically shown there that in an object, the phenomena of 'gravitation' takes it 'maximum attractive form' when it is fully red shifted, the associated 'frame of ticking of a clock' is the largest since the area of the 2D circle/elongated elliptical circle is the largest one and the sequence of 'time frame' of the universe would follow the order $V < I < B < G < Y < O < R$ and 'the frame of ticking of a clock' would follow the order $V < I < B < G < Y < O < R$.

The 'EQUIVALENCE PRINCIPLE' of GTR is the result of very to very much consequences of 'Space expansion-Space inversion' or 'acceleration-inverse acceleration' or 'grey-universe' model of TQG and is not required to be discussed any further as is being presumed now.

TQG Proof of the Conservation of 'Momentum' and 'Energy Density of Space'

Among many derivations of TQG, the two very much significant ones are:

- Momentum being the hybrid of a unit of mass (m) and a unit of volume (V) is conserved and is equal to 3 or $mV = 3$. Here newton's velocity v is being replaced by Volume, V . The question is what does this numerical '3' stands for?
- Energy density of space is constant. E represents a unit of energy and V stands for a unit of volume and $(E/V) = 3$. Again the question does arise what does this numerical '3' stands for?

While TQG has put the logic that when the dimension of time is being taken into consideration in the dimension of velocity of conventional physics, on its own 'velocity' does transform to 'volume'. Apart from mathematics, the TQG also has demonstrated by the logic of physics and geometry how this is happening.

Here it is very much being required to understand the concept of development of empty space dimensions. When the length of a straight line (as for example the length be 10 cm) is being divided by the length of another straight line (whose length if be for example is 5 cm), the result is 2 and which is dimensionless for the very obvious reason of the 'centimeter' in the numerator and denominator of the division cancels out each other. It is being concluded that the former straight line is 2 times longer than the later one. The question is what is this '2 times' stands for. These are in fact 2 units of 'empty space entropy graviton'. Similarly if a square of area X is being divided by a square of area Y , the result is (X/Y) and which is dimensionless too. In Figure 13, it has been shown how empty lengths space, areas are being evolved. In Figure 13, the straight line 'CD' has been taken as a 'unit length'. When another straight line AB is being divided by the said 'unit length' straight line, the division leads to the generation of two empty space length units 'ab' and 'bc'. In the said figure the formation of 'empty space areas' in the form of either 'unit empty space squares' or 'unit empty space circles' have been shown diagrammatically and all those are being self-explanatory.

Geometrical Presentation of Development Empty Space Dimensions

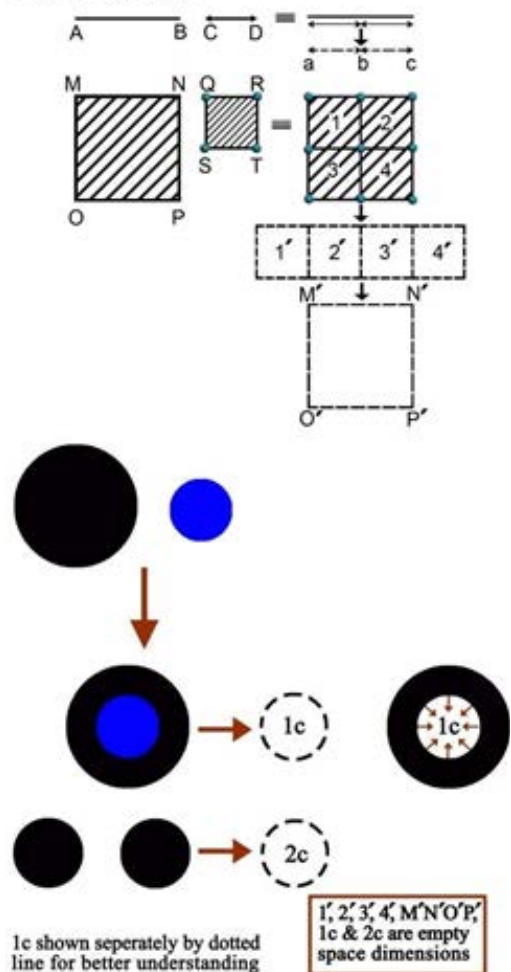


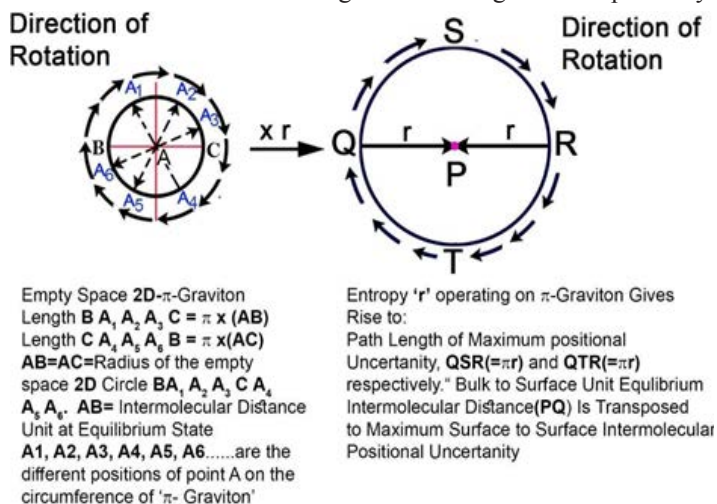
Figure 13: Geometrical presentation of formation of empty spaces of the universe.

TQG has defined π as [1], $\pi = (\text{Average intermolecular distance at the state of highest positional uncertainty at random state}) / (\text{Average intermolecular distance at the equilibrium state})$

The random state is the state of maximum possible curvature and the equilibrium state is a linear straight line. The central force is being originated from the midpoint of the said linear straight line and the maximum possible curvature as being referred above is directly proportional to the length of the said equilibrium straight line. All these have already been discussed and described in detail in the first article of TQG.

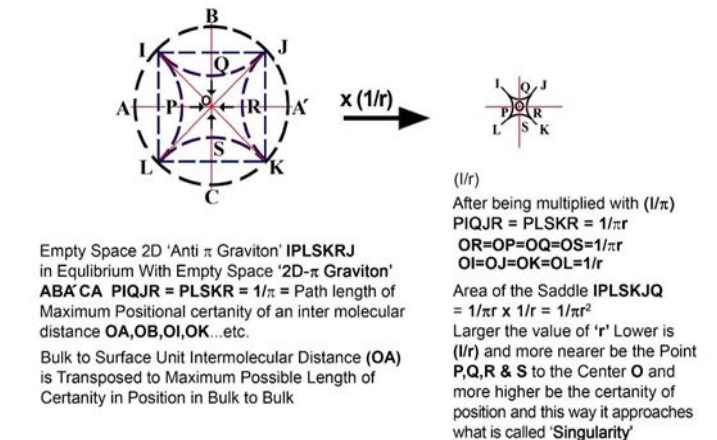
For the very logical reasons, vis-a-vis the concept of 'units of empty space lengths/dimensions' as have been provided above (Figure 13), it can be concluded " π is a rotating and curved empty space length of non-converging value of 3.145... and if two molecules (at the two ends of a smallest possible unit intermolecular distance) are being hybridized with π , their positional uncertainty will be multiplied by the π factor and it will attain its maximum value. In fact π signifies the 'factor of maximum positional uncer-

tainty' which when is being imposed on a 'bulk to surface intermolecular distance' (r), is indeed being transposed to maximum positional uncertainty (πr) but that too, in the form of 'surface to surface intermolecular distance' on the surface of a 2D circle or a 3D sphere or any of their curved sections. The significance of $(1/\pi)$ is 'It is a factor of maximum positional certainty and which when is being imposed on an a 'surface to bulk inverse intermolecular distance or an inverse length ($1/r$)' it is being transposed to maximum positional certainty ($1/\pi r$) and that too in the form of 'bulk to bulk inverse intermolecular distance' on the bulk of a 2D saddle or a 3D saddle. The geometries and mathematics of π , πr , $1/\pi$ and $1/\pi r$ have all been shown in Figure 14 and Figure 15 respectively.



π - Gravitons Are the Carries of Uncertainties Like Volume, Energy, EM-Wave, Space Expansion, --- Plasma State --- Etc

Figure 14: Geometrical presentation of ' π - Graviton' of the Theory of Quantum Gravity.



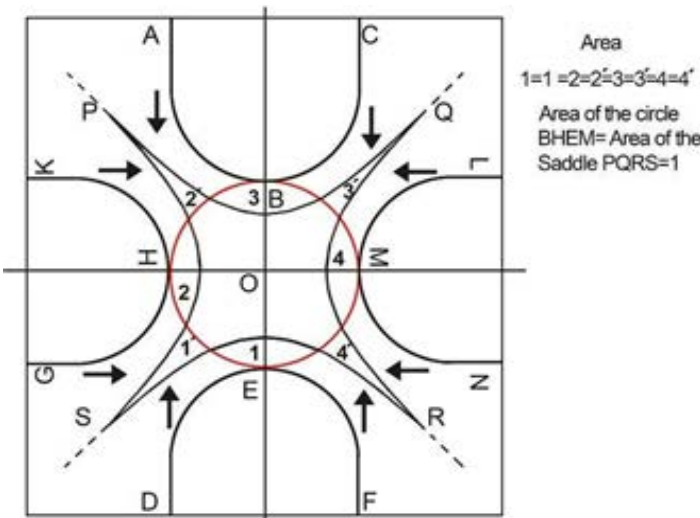
Anti π -Gravitons are the Careers of Certainty Like Order Graviton, Time, Mass, Anti-EM-Wave, Space Inversion Black Hole Etc.

Figure 15: Geometrical presentation of 'anti π ' graviton of the theory of Quantum Gravity

The others very to very much important concepts of TQG to understand are the 'phenomenon of inversions' of the circles and the spheres. The following Table 1 summarizes the different possible modes of inversion of circles.

Table 2: Inversion of Circles

SI No.	Type of Inversion	Mathematics and Geometries of Inversion	Physics of the results of Inversion
1	Self-equilibrium Inversion of a Circle	Inversion of the mathematical equation of the circle in the form of $y = f(x) = \{(k^2 - x^2)\}^{1/2}$, k constant, to the inverse form $y' = \{1/f(x)\} = [1/\{(k^2 - x^2)\}^{1/2}]$ and consequent balancing of the areas or the attractive and dispersive forces.(see Figure 16)	This gives rise to the equilibrium phenomena of the universe in the form of: Pressure = $P = Tt = 1$ (Temperature T and Time t) and both the temperature and time gravitons do exist in equilibrium with each other.
2	Induced or Combination Inversion of Circles	The interference of 4 nos. of force circles in space leads to the inversion of the area of a circle from πr^2 to $(1/\pi r^2)$. (see figure 17)	This gives rise to phenomena like $mV = 2$ (conservation of momentum in 2-dimension where m stands for mass and V stands for volume) and generates empty space 2 units of linear 2D squares.
3	Induced or Combination Inversion of 3d Spheres	Provided in Appendix It is very similar to 'induced or combination inversion of circles' as described above	This gives rise to phenomena like Conservation of momentum ($mv=3$) in 3D and leads to the generation of 3 nos. of empty space linear homogeneous unit length volume/energy cubes This also leads to the phenomena of mutual space expansion space contraction or inversion.



The inversion of a circle BHEM to form a Saddle PQRS (same area as that of the circle). The equation of a circle is $y^2 = 1 - x^2$ and the inverse function of circle $y'^2 = 1/1 - x^2$ ABC is the inverse HBM portion of the circle. The inverse portions ABC, GHK, DEF and NML attract each other and the saddle PQRS is formed.

Figure 16: Self equilibrium inversion of a circle shown geometrically where the 'push forward graviton' and the 'pull back graviton' co-exist in equilibrium to each other.

When it is being said that (E/V) or energy density of space is 3, the said 3 stands for 3 numbers of 2D circular space holes and 3 numbers of unit directions (x, y and z respectively) and rotations and hybridization of the same gives rise to an unit empty space hole 3D π -graviton. This is what is being called as the 'conservation of

energy density of space'.

The above concept of generations of 'empty space' in the forms of length, area or volume are very important concepts of TQG. The following two TQG derived facts of the space of the universe are being geometrically being shown in Figure 17 and Figure 18 respectively and those are self-explanatory too.

- Energy density (E/V) of space is constant and is equal to 3 and that does stand for an empty space 3D π -graviton. If a unit of energy is being de-hybridized or divided by a unit of volume, the result is the formation of the said empty space 3D π -graviton. (Figure 18)
- Momentum is the hybrid of mass (m) and Volume (V) such that the product of the two is also 3 but which does represents the generation of 3 nos. of units of homogeneous linear cubes. The said 3D linear homogeneous cubes then capture 3D π -gravitons and attain the shapes of 3D spheres (Figure 17)

Presentation of Conservation of Momentum in Two Dimensions
 $mV=2(m = \text{mass } V = \text{Volume})$

In TGQ In 2 - Dimension
 $m=2/\pi r^2$ and $V=\pi r^2$
 So $m \times v=(1/\pi r^2 \times 2\pi r^2)=2$

In TGQ One Circle is Actually
 2 Nos. of Circles so $2\pi r^2$ Present
 4 Nos. of Circles A, B, C, D
 $OP=OV=OR=OT= r$ (1 Unit)

Area PVY(Lined) = Area PXV(Non Lined)
 Area YPV(Lined) + Area VNT(Lined) +
 Area RZT(Lined) + Area PMR(Lined) = (Area of Circle MPVTZR) -
 (Area of Square PRVT) = $\pi(1)^2 - (\sqrt{2})^2 = 1.146$

So Area of Saddle $PQRSTUVX = 2 - 1.145 = 0.873$

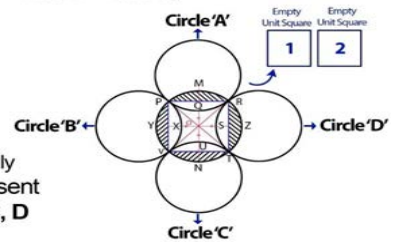


Figure 17: Geometrical presentation of induced or combination

inversion of circle and conservation of momentum of the theory of Quantum Gravity in the form $mV = 2.00$ in 2D and $mV = 3$ in 3D.

above said 1D-entropy and inverse 1D-entropy gravitons and 2D & 3D π - gravitons and anti π -gravitons.

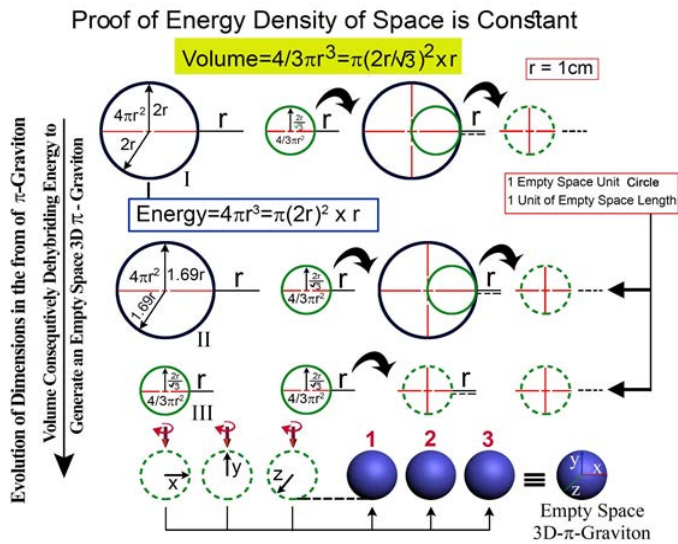


Figure 18: Quantum gravity theory driven geometrical presentation of energy density of space is constant

[In case of Figure 17, it is to note here that when the 4 nos. of lined portions of the circles (total area = 1.146) hybridizes or get multiplied with the area (=0.873) of the 2D saddle PQRSTUVX, the result is unity (since the said lined portions and the said saddle are being multiplicative inverse to each other). The lined portion and the entire saddle area/ space then become empty space. However, the ‘entropy’ gravitons of the 4 nos. of unlined portions of the circles then move to the 4 nos. of lined portion vacuum space (area = 1.146) and a square (PVTR) of total empty space area 2, is being left since the length of each side of the said square is square root of 2. This area 2 can be thought of as 2 nos. of unit square empty space and which is being shown in Figure 18. In the similar fashion in 3 dimension the hybrid of mass and volume as per TQG would be,

$$m \times V = \left\{ \frac{9}{4} \pi r^3 \right\} \times \left(\frac{4\pi r^2}{3} \right) = \left\{ \frac{1}{r} \right\} \times \left(\frac{9}{4} \pi r^2 \right) \times (r) \times \left(\frac{4\pi r^2}{3} \right) \\ = \left\{ \frac{1}{\pi} \left(\frac{2r}{3} \right)^2 \times 3 \times \pi \times \left(\frac{2r}{3} \right)^2 \right\} \\ = \frac{1}{\pi R^2} \times 3 \times \pi R^2 = 3, R = \left(\frac{2r}{3} \right)$$

In case of 3 dimension, it can be shown geometrically in an exactly identical fashion as that of shown for 2 dimension the hybrid of mass and volume gives rise to an empty space square area 3 and the same stands for 3 units of empty space square units and hence the momentum, mV remains constant offering a value of 3]

The geometrical presentations of formation of ‘empty space π -gravitons’ from ‘empty space anti π -gravitons’ and the vice versa have already been given in the first article of TQG and are not being time again repeated here.

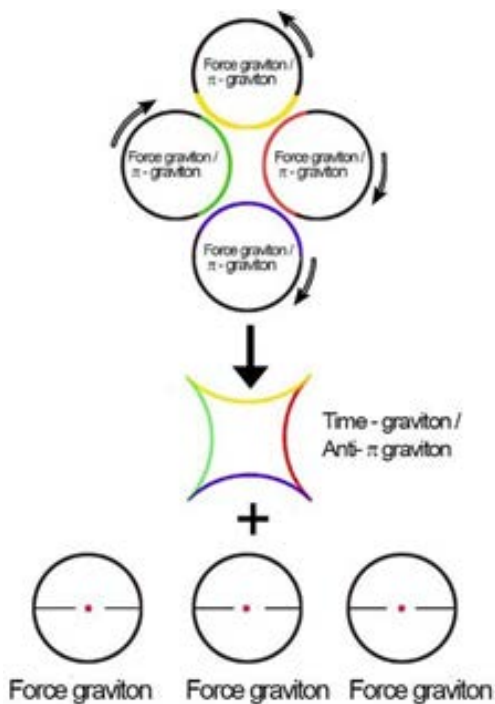
As a matter of fact all the physical variables of the universe are persisting in the quantized form or in the form of packets in the

3 nos. of linear unit of empty space squares thus formed (under equilibrium conditions from the hybridization of an unit mass with an unit volume) then captures empty space ‘3D π -gravitons’ and be merged with them.

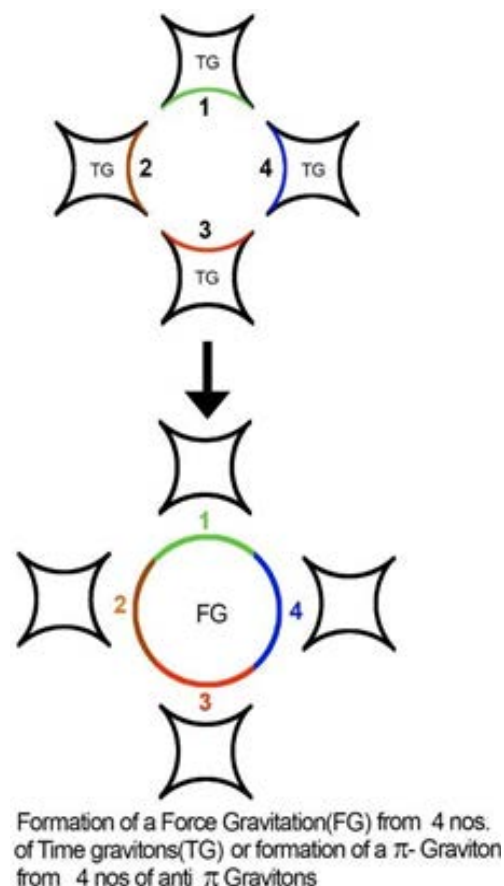
Both the phenomena leads to the formation of empty space 2D/3D π gravitons. The said π gravitons in turn interact among themselves to form 2D/3D ‘anti- π gravitons’ and those are the ‘quantum’ or ‘packet’ or ‘carriers’ of the physical variables of the universe. All the ‘push-forward gravitons’ of the universe are grown in 2D/3D π gravitons and the said push forward gravitons are the carriers of the ‘uncertainties of the universe’ like force/temperature, volume, energy, EM-wave, acceleration/space expansion, photoelectric emission, nuclear fission, X-ray, gamma rays, plasma state and antigravity. On the contrary, all the pullback gravitons of the universe are being grown in 2D/3D anti π gravitons and the said pull back gravitons are the carriers of ‘certainties of the universe’ like order, time/inverse force, mass, anti-magnetic field, space contraction/inverse acceleration, permeability, cold nuclear fusion, black hole and singularity.

One very important point to be noted (to remove any confusion in the mind of the readers), that TQG is never emphasizing a phenomena like, a ‘push forward’ graviton can be fully converted to its ‘conjugate pair’ as for example a ‘volume graviton’ inverses to its conjugate pair ‘mass graviton’ fully. Such type of full transformations are not possible in reality and the facts the TQG is substantiating are i) a ‘push –forward graviton’ can co-exist with its equal and opposite ‘pull-back graviton’ and ii) whenever a ‘push-forward graviton’ hybridizes with a ‘pull back graviton’ that leads to the formation of a new dimensions either in the form of ‘certainty’ or ‘uncertainty’, as for example ‘mass’ and ‘volume’ hybridizes to form 3 numbers of 3D π - gravitons and that is what is the so called phenomena of ‘conservation of momentum’. If a unit of mass is being fully converted to a unit of volume that would be considered to be the full conversion of ‘certainty’ (mass) to ‘uncertainty’ (volume) and that is forbidden in the universe.

The question which is very relevant to the word ‘forbidden’ in this context is, why is this full conversion mass to volume or the vice versa is being forbidden? The answer to this question does lie in the fact that it is geometrically not possible. In this context the following figures 19 and figure 20 to be noted. In case of figure 19, only a part of the push forward gravitons are being transformed to pull back gravitons and the rests are being retained in the push forward graviton form. In case of figure 20 also it would be very easy to follow that only some parts of the pullback gravitons are being transformed to push forward gravitons and the rests are being retained in the form of pull back gravitons only. Certainty and uncertainty may change their shapes (linear to non-linear, from length to area to volume or vice versa) but can never absolutely disappear. TQG derived ‘conservation of momentum’ or ‘mass energy equivalence equation, $mv=3$ ’ is fully adhering to the above facts of the universe.



Formation of 'Time' graviton from the closely interacting of 4 nos. of 'Force gravitons'. The direction of rotation of the force gravitons are shown by arrow on the figure. The similar fashion an anti π graviton is formed from 4 nos. of rotating π gravitons.



Formation of a Force Gravitation(FG) from 4 nos. of Time gravitons(TG) or formation of a π -Graviton from 4 nos of anti π Gravitons

Figure 19: Quantum Gravity theory driven geometrical presentation of the formation of 'pull back gravitons' from the interaction of 'push forward gravitons'. This diagram also shows how from 'empty space π graviton' (circles), 'empty space anti π graviton' (saddles) are being formed.

The famous equation of Albert Einstein ($E=mc^2$) suffers from the major drawback that as per the said equation, mass (being a certainty) can be fully converted to energy and which is an uncertainty or energy being an uncertainty can be fully converted to mass and which is a certainty. The universe, however, can never be represented by such an equation which is only mathematically valid and are forbidden by physics and geometry. If this would be true then in one fine morning, the universe could have either converted solely to a 'mass' or solely to 'energy'.

The theory of special relativity claims that the velocity of light is constant and no matter in this universe can attain the velocity of light. These indeed are very much confusing statements since he claimed that light is made of 'photons' and those are dual, sometimes they are particles and sometimes they are waves. What is the definition of a 'particle'? How the photons look alike then? What could be their geometrical shapes? He did not put forward any proof of the constancy of the velocity of such photons too or provided either the definitions of what a particle is or what 'time' is?

If for the sake of argument, it is being accepted that the velocity of light is constant, one would land up to a very much absurd state of

Figure 20: Quantum Gravity theory driven geometrical presentation of the formation of 'push Forward gravitons' from the interaction of 'pull back gravitons'. This diagram also shows how from 'empty space anti- π gravitons' (saddles) the 'empty space π gravitons' (circles) are being formed.

situation. If energy (E) along y-axis is being plotted against mass (m) along x-axis of the equation $E=mc^2$, one would be getting a straight line passing through the origin with a slope of C^2 since C is a constant. At the origin then, both the certainty (mass) and the uncertainty (volume) are zero and as the certainty increases, the uncertainty also does increase and the both simultaneously goes to infinity. Is this our universe? Is it in conformity with the 'theory of conservation of mass of the universe? Then, (if the origin is considered to be the 'absolute zero of temperature') at the absolute zero of temperature end of the universe, the entire mass of the universe would be zero and the same would be going to limitless at the other extreme end.

The very common sense of a human mind would be in the view that when we heat up a liquid (at constant pressure), the certainty of the travel of the molecules to reach to the surface from bulk increases but at the same time, the certainty of the molecules to remain in equilibrium state in the bulk of the liquid decreases. If this be considered in the form of the captive of a couple of 'certainty uncertainty', then it can be concluded that as the temperature of a liquid is being increased, the certainty of travel of the molecules from surface to bulk decreases (i.e., the uncertainty in position of the molecules increases) and the volume being the function of tem-

perature (or higher kinetic movements or higher so called velocity), has no other option than to increase.

So if a liquid is being considered as spherical in shape (the very fact that droplets of liquids are spherical), the above said higher uncertainty in position of the molecules and the higher volume would be enforcing the radius of the sphere to increase to some extent. The radius of a sphere is the measure or the scale of randomness or does express the entropy so for each unit of hybrid of 'uncertainty in position and volume' there exist an unit of 'entropy'

So one can write,

(Uncertainty in volume) x (uncertainty in position) = entropy (TQG)

(Uncertainty in volume) x (uncertainty in position) = Planck's constant = h (Heisenberg)

The language of 'uncertainty principle' of Heisenberg and the language of TQG just merge here.

Einstein's equation $E = mc^2$, just stand in opposition to Heisenberg's uncertainty principle and the conservation of momentum principle of the universe of TQG too.

As a matter of fact, what Albert Einstein expressed by his universal famous equation $E = mc^2$, gets a newer and tangible shape by replacing 'velocity, C ' of his equation by 'volume V ' and adding the main foot-holds of TQG to that. The main foot hold of TQG based on the logics and philosophies of physics, mathematics and geometry are,

- i. The inverse dimensionality of 'time' transforms the physical variable 'velocity' to 'volume' since the conventional definition of velocity in the form of (distance/time), is not a full proof or appropriate one on the ground of 'abstractness' of the physical variable time, there in.
- ii. Mass is inverse form of energy/volume. The momentum and energy density of space are constant and are being equated to 3 in the form '3D dimension or volume and '3D π graviton' respectively.

$E = mc^2$, based on the above discussions and in the light of TQG can then be written as $E = mV^2$ and since $mV = 3$, Einstein's equation becomes, $E = 3V$ and which then converges to TQG concept of 'Energy density of space is constant and is equal to 3'.

It does very much play in the mind of many people that the enormous high amount of energies which are being liberated when a hydrogen bomb explodes can only be explained through $E = mc^2$ since C (velocity of light) is enormously large by magnitude and hence even a very small magnitude of mass (mass defect) will give rise to a very high value of E . It is very much important to note, that such calculations of energy are very much empirical type since the energy (E) is related to force and which is in turn is related to mass (force = mass x acceleration). The physical variable 'velocity' of RHS of the equation is related to 'time' but both the said variables (time and mass) have not been defined by Albert Einstein. In contrast to that, TQG has explained the 'mass-defect' which is based on conservation of momentum of ($mv = 3$) such that the 'mass defect' (or the masses which do disappear during a nuclear fusion reaction) is a phenomena related to the of the phase inversion of the units of 'mass gravitons' to the unit of 'volume/energy

gravitons' maintaining the conservation of momentum, $mV = 3$. In a nuclear fusion reaction millions and trillions of the units of 'mass gravitons' are being transformed to 'volume/energy gravitons' instantaneously and this is the true underlying cause of generation of enormous high amount of energy in a nuclear fusion reactions.

Now to the end, the three laws of motion of Newton needs to be conferred newer shapes based on the all above discussions. The limitations of the said laws have already been reported [1].

1st Law of Newton / Philosophy of 'Multi- Building Blocks Universe'

This universe on its own (being in form of a coil in the multidimensional, or multi building blocks integrated form) is continually passing on to differential state arising out of the thirst of dark energy and is pushing up to more and more flat geometries in the form of smaller to smaller curvature 'directional entropy gravitons' (in the form of almost a linear straight line), while the 'energy density of space' remaining constant.

2nd Law of Newton / Philosophy of the Cosmic Phenomena of the Universe

Momentum is the hybrid of mass and volume and is conserved one. The phenomenon of 'acceleration' is 'space expansion' and the 'inverse acceleration' is 'space inversion'. When the 'Force' overcomes the 'mass', an 'acceleration' takes place but when the 'mass' overcomes the 'force' it is being called the 'inverse acceleration'. The 'space expansion' leads to the phenomena of 'white color of the universe', 'photo-electric emission', 'nuclear fission', 'evolution of X ray', 'gamma rays', 'plasma state' and antigravity'. The 'space-inversion' leads to 'black color of object', 'permeability, 'cold nuclear fusion', and the 'gravitational lensing' and 'formation of black holes'.

3rd law of newton/ philosophy of zero dimensional universe

The universe is made up of numerous different types 'push-forward' and 'pull-back' gravitons. To every 'push forward graviton' there does exist an opposite (multiplicative inverse) and inverse dimensional 'pull back graviton' and those are 'conjugate pairs'. However the said gravitons though opposite to each other in their dimensions but their magnitudes are not always equal since they are being interrelated to each other under equilibrium condition through ' π gravitons', 'anti π gravitons', 'conservation of momentum ($mV = 3$)', 'push forward force graviton x pull back force graviton = $Tt = 1$ ' and 'conservation of energy density of space ($E/V = 3$)'. The net dimensionality of the universe is zero since the dimensionalities of the said 'conjugate pair gravitons' cancel out each other.

Conclusion

Globally, from the very beginning of the era of 'research activities and new discoveries in science', there does persist principally three different types of scientific concepts 'abstract', 'quasi-visible' and 'fully visible or touch to feel' concepts. This third type of concepts are much rarer than the other two. As a matter of fact, the third one should be the target or the 'mile stone' of the scientists while offering their research findings or concepts to the innumerable readers. However, this research article (being driven by the theory of quantum gravity) has presumably touched the said mile-

stone on the ground of being explained or described through physics, mathematics and geometry. Groping in the dark is no more being required in physics and cosmology. The basics of physics has reached the door step in a 'newer shape' altogether. Every one need to welcome.

The term 'law of' something like 'laws of ideal gas' or 'laws of motion' whatever be it ,as we are being practiced to from the beginning of the era of scientific discoveries, in fact, we need to afresh such terminologies since science is based on 'logic', 'philosophy' and 'understanding of the concepts'. In this context it is to be noted very much that whenever a person talks about a 'LAW', it may bring a sensation in the mind of the others, that it is something 'sacrosanct', the person is talking about. But the ideas of science does change very much from age to age from one decade to the other and science is a subject which is inherently more 'conceptual and transformational' than being something 'abstract and sacrosanct'. For this logical reasoning there off, the 3 laws of motion of Newton has been redefined in this article in the shape of 'philosophy' of TQG and not as 'laws'. At the same time, the existing 'quasi-true' geo physics concepts of the universe (of the conventional and modern physics and cosmology) have been made 'visible and a touch to feel ' and the level of understanding of the physics of the 'COSMOS' have been promoted to the next higher level at this proposition, as well. This is to take to the knowledge of the readers that further research is on, and in the very next article, to appear , the origin of evolution of the subatomic particles of the universe would be explained through the 'newly discovered theory of quantum gravity'.

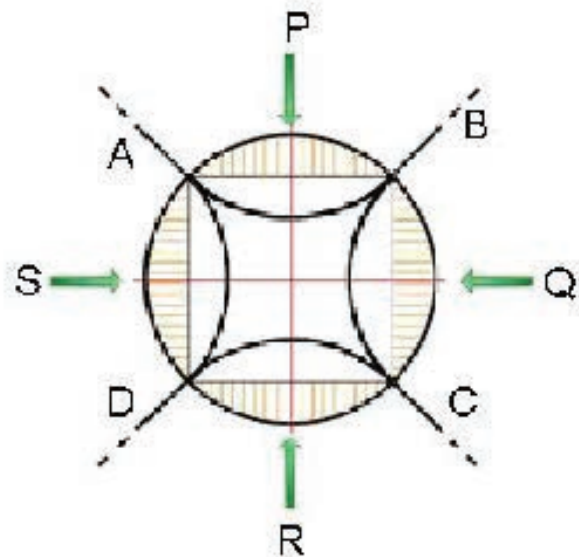
Appendix – 1:

Table A-1: Growth pattern of positive numbers

Base positive numBERS	Increased Positive number	Magnitude Increase	Percentage Increase over base Positive number
1	2	1	$(1/1) \times 100 = 100\%$
2	3	1	$(1/1) \times 100 = 100\%$
3	4	1	$(1/3) \times 100 = 33.3\%$
4	5	1	$(1/4) \times 100 = 25.0\%$
5	6	1	$(1/5) \times 100 = 20.00\%$
6	7	1	$(1/6) \times 100 = 16.66\%$
7	8	1	$(1/7) \times 100 = 14.44\%$
8	9	1	$(1/8) \times 100 = 12.5\%$
9	10	1	$(1/9) \times 100 = 11.1\%$

Table A-2: De-growth pattern of inverse positive numbers

Base Positive Inverse numbers	Increase Positive Inverse Numbers	Magnitude Decrease	Percentage Decrease over base Positive number
1	0.5	0.5	50%
0.5	0.33	0.17	34%
0.33	0.25	0.08	24.2%
0.25	0.20	0.05	20.0%
0.20	0.167	0.034	16.5%
0.167	0.143	0.023	14.37%
0.143	0.125	0.018	12.5%
0.125	0.111	0.015	11.2%
0.100	0.10	0.011	9.9%



Appendix – 3: Geometry, Mathematics and Physics of Circle to 2-Dimensional Saddle Formation

In the above figure, how a circle inverts to a 2-dimensional saddle, has been shown J geometrically. A circumscribed circle (C) of the square ABCD, inverse the curvatures at point A, B, C & D respectively, and as a result, a 2-dimensional saddle (IC) is formed. In the figure please note that, The area of the lined portion = AREA P + AREA Q + AREA R + AREA S (A.3.1)

So, if the area of the lined portion can be obtained mathematically, the area of the saddle IC, would be obtained upon subtracting the sum of (AREA P + AREA Q + AREA R + AREA S) from the area of the square ABCD since the area of the unlined portion around the saddle is same as the area of the lined portion.

Let us consider that the radius of circle C is, equal to 1 Planck length. So the area of the circle, $C = \pi(1)^2 = \pi$. (A.3.2)
If the length of each side of the square, ABCD is k, then from geo-

metrical point of view

$$l^2 = (k/2)^2 + (k/2)^2$$

$$\text{So } k = \sqrt{2}$$

So the area of the lined portion = $\pi - (\sqrt{2})^2 = (\pi - 2) = 1.14$ = unlined portion surrounding the saddle.

So the area of the saddle = $(2 - 1.14) =$ reciprocal or inverse of the sum total area $(1/1.14)$ of lined sections = 0.86

Now, if the area of the saddle, it is expressed in inversion dimension as $(1/\pi R^2)$ (where R is the Planck length in inverse 2-dimension), then one can write, $(1/\pi R^2) = 0.86$

$$\text{So } R = 0.60 \quad (\text{A.3.3})$$

So a unit Planck length in 2-dimensional inverse world is 60% of the Planck length in normal 1-dimension.

Appendix – 4: Geometry, Mathematics and Physics of 3 Dimensional Saddle Formation:

Progressing with the same arguments and logic put forward for 2-dimensional Planck length in Appendix III, one can write

$$\text{Volume of sphere (with radius of 1 Planck length)} = \frac{4}{3}\pi (1)^3 = \frac{4}{3}\pi = 4.18 \quad (\text{A.4.1})$$

The length of the each side of the cube, k' (in 3-dimension, the square ABCD as shown in Figure A.3.1 of Appendix III, would turn into a homogeneous cube), would be $(2/\sqrt{3})$ since the geometrical relation between the radius of a sphere (r) and the length of each side of its inscribed cube (k'), is, $k' = 2r/\sqrt{3}$ and the radius, $r = 1$

$$\text{So the volume of the lined portion would be in 3-dimension} = \frac{4}{3}\pi - (2/\sqrt{3})^3 = 4.18 - 1.52 = 2.66 \quad (\text{A.4.2})$$

So, volume of the 3-dimensional saddle will be $= (1/2.66) = 0.37$
The total volume of the sphere (4.18) would have to be the sum of the following three variables Volume of the sphere = (volume of the lined portion + volume of the non-lined portion around the saddle + volume of the saddle) = 4.18
or $4.18 =$ Volume of the non-lined portion + 2.64 + 0.37
So the volume of the non-lined portion = 1.15

In fact, in this case, there are space contractions along the each 4 sides of the inscribed sphere of the cube and that is the total volume of the unlined portion outside the volume of the 3 dimensional saddle. The figure A.3.2 is being referred in this context, along the line AB in this said figure the coexistence of expanded and contracted spaces have been shown.

While inverting, the expanded space in Figure A.3.2, contracts and is passing on to the opposite side. On the other hand, it might also be stated that the contracted space when is inverting and passing on to the opposite side is being expanded. This is the phenomenon of “MUTUAL SPACE EXPANSION– SPACE CONTRACTION”.

The time graviton in its attractive form of $(1/\pi r^2)$, in fact acts on the volume in the form of, $\pi (r)^3$ and the volume contracts. From

the consideration from the other side, the force graviton being the push forward graviton acts on the contracted space and the volume expands.

If the volume of the 3-dimensional saddle is being considered in the inverse field as $3/4\pi R'^3$, then, $3/4\pi R'^3 = 0.37$

$$R'^3 = 0.64$$

$$\text{or } R' = 0.87$$

$$(\text{A.4.3})$$

So, a Planck length in normal 1-, 2-, or 3-dimension reduces to 0.87 in inverse 3-dimension, or the Planck length in inverse 3-dimension is 87% of the normal Planck length.

Acknowledgements

Thanks are very much due especially to Mr B Sarkar, the CEO of Austin Paints & Chemicals Pvt Ltd for giving high level inspiration and support all through the research work on the theory of quantum gravity. Thanks are also due to Dr S Dutta of Austin Paints for his valuable discussions on the subject and as well the author expresses his high level gratitude to all the members of staff of Austin Paints. Finally, the author expresses his thanks to Mr G Manna, IACS, Jadavpur, for the critical drawing of the diagrams of this article and Mr Tapan Moulik for carefully typing the manuscript.

Dedication

This article is being dedicated to the beloved ones of my family, late father Mr K P Bhattacharya, mother Mrs. Aruna Bhattacharya, mother in law Mrs. Jayanti Sengupta, wife Mrs. Chandana Bhattacharya and the only daughter Ms. Sulagna Bhattacharya.

References

1. Bhattacharya C (2020) Cosmology and the Unified Quantum Gravity Theory of the Universe, Advances in Theoretical and Computational Physics 3: 114-211.
2. Nakano Tadao, Nishijima Kazuhiko (1953) Charge Independence for V-particles, Progress of Theoretical Physics 10: 581-582.
3. Bhattacharya C (2020) Novel Quantum Gravity Approach to Evaluate the Dimensionalities and The Geometrical Profiles of the Chemical Reactions (2020) International Journal of Scientific & Engineering Research Vol 11.
4. C Amsler, M Doser, M Antonelli, D. Asner, K S Babu et al. (2008) Pentaquarks.
5. C Bhattacharya, (2020) Novel Quantum Gravity Interpretation of Chemical Equilibrium Free Energy, Dark Energy and Dark Matter of the Universe, Adv Theo Comp Phy. 3: 86-95.
6. Lenard-Jones, J E (1924) On the determination of molecular fields, Proc R Soc Lond A 106: 463-477.
7. Naturforsch, Morse Potential (2013) “The relationship between Lenard Jones (12-6)” 58a: 615-617.
8. Lei Zhang, (2013) The Van der Waals force and gravitation force in matter. arXiv:1303.3579, arXiv:1303, 3599VI
9. Richard Bonneville (2016) An alternative model of particle physics in a 10-dimension (pseudo) Euclidian space time. arXiv.0912.5354.
10. Keelhy K Menon, Talish Quarashi, Phys Rev A (2018) Wave particle Duality in asymmetric Beam interference. arXiv:1711.10219.
11. O B Zslavski, Gen Rel Grav (2006) Ultimate gravitational

- mass defect 38: 945-951.
12. YU L Bolotin, V V Yanoksky (2017) Modified Planck units arXiv:1701, 01022.
 13. HUAY PAUL G, (2011) Maxwell's equation Wiley ISBN: 978-0-470-54990-2.
 14. Jackson J D (1999) Classical Electrodynamics (3rd ed) New York Wiley ISBN 978- 0471-30932-1 OCLC 318576085.
 15. Fundamental Physical Constant from NIST Physics.nist.gov.
 16. Halliday and Resnick (1974) "6 Power" Fundamental of Physics, Chapter 13 3, pp 13-2,3.
 17. Loudon R (2000) (1973). The quantum theory of light (3rd ed.) Cambridge University press ISBN 0-19-850 177-3.
 18. Duffin WJ (1990) Electricity and Magnetism, 4th ed., McGraw Hill 19. Ser Way, A. Raymond; Jewelt, John.W.Wilson, Jani Wilson, Anna, Rowlands, Wayne "32".
 19. Physics for Global Scientists and Engineers (2nd ed.) p.901.
 20. "The NIST reference on fundamental physical constants". Physics. nist. Gov, Retrieved 2011.
 21. Rybicki G B; Lightman AP (1979) Radiative Processes in Astrophysics. John Wiley & Sons. ISBN 0-471-82759-2.
 22. McQuarrie Donald A, Simon John D (1979) Physical Chemistry: a molecular approach (rev/ed.) Sausalito, Califo: Univ. Science Books.
 23. Browne, Michael (2013) Physics for Engineering and Science. p.427 (2nd ed.) McGraw Hill/Schaun, New York ISBN-978- 0-07-161399-6.
 24. Radiative Processes in Astrophysics, Rylicki and Lightman, pp.20-28.
 25. Purcell, Edward. M, David J (2013) Electricity and Magnetism (3rd ed.) New York, Cambridge University Press 14-20.
 26. J Maxwell "Treatise on Electricity and Magnetism" 2: 236-237.
 27. "The Nobel Prize in Physics 1921" Nobel Foundation Retrieved 2013.
 28. M G Arore & M Singh (1994) Nuclear Chemistry Anmol Publications 202.
 29. Goldston RJ, Rutherford PH (1995) Introduction to Plasma Physics. Taylor & Francis 1-2.
 30. Sharma (2017) 'Atomic and Nuclear Physics'. Pearson Education India. 478.
 31. X-rays NASA Archived from the original on November 22, 2012, retrieved November 7, 2012; Gamma rays NASA, Archived from original on 2012-05-02; Verdenne G.Attetia, J-L (2009) Gamma-ray Bursts. The brightest explosions in the Universe, Springer ISBN-978-3-540-39085-5.
 32. Schrodinger E (1926) "An undulatory theory of the mechanics of atoms and molecules" Phys. Rev 28: 1049-1070.
 33. Griffiths, David J (2004) Introduction to Quantum Mechanics (2nd ed.) Prentice Hall, ISBN 978-0-13-111892-B.
 34. PW Atkins (1977) Molecular Quantum Mechanics Parts I and II: An Introduction to Quantum Chemistry. Oxford University Press. ISBN-0-19-855129-0.
 35. 'Quanta' (1974) A Hand book of concepts, P.W.Atkins. Oxford University Press. ISBN-0- 19-855493-1.
 36. Einstein Albert (1916) "The foundation of the General Theory of Relativity Annalen der Physik 354 97: 769.
 37. Gron Oybind, Hernik Sigbojorn (2007) Einstein General-Theory of Relativity: with modern application is cosmology; Springer Science and Business Media.180.
 38. General Relativity as a Hybrid Theory. Dennis Lemkhl, The Genesis of Einstein's work on the problem of motion arXiv: 1803.09872.
 39. The Black Hole merger event GW150914 within a modified Theory of General Relativity.
 40. Chandra and Hubble Space Telescope Observation of dark Gamma-ray bursts and their host galaxies, A.A.Chirmas; A.J.Levan, E.R.Stanway Kwierseme arXiv: 1904.10549.
 41. Van der Bergh S (2011) "The curious case of Lemaitre's equation no.24", J. RoyalAstronomical Soc. of Canada 105: 151.
 42. Nussbaumer H; Bieri L (2011) "Who discovered the expanding universe?" The observatory 131: 394-398.
 43. Way MJ (2013) "Dimantling Hubble's Legacy?" APS Conference Proceedings 471: 97-132.
 44. World, Robert, M (1984) General Relativity University of Chicago, Press, ISBN-970-0-226-87033-5.
 45. World, R.M (1997) "Gravitational Collapse and Cosmic Censorship". In Iyer, B.R.Bhawal. B (eds.), Black Holes, Gravitational Radiation and the Universe, Springer 69-86.
 46. Overbye, Dennis (2015) "Black Hole Hunters" NASA Archived from the original.
 47. Montogomey, Collin; Orchiston, Wayne, Whittinghan, Ian (2009) "Michell Laplace and the origin of the Black-Hole Concept" J. Astronomical History and Heritage 12: 90-96.
 48. Abbot, B.P. et al (2016) "Observation of Gravitational waves from a binary Black Hole merger", Phys. Rev. Lett 116: 061102.
 49. Event Horizon Telescope, The (2019) "First M87 Event Horizon Telescope Results. I. The Shadow of the supermassive BlackHoll" The Astrophysical J. 87: L1.
 50. Shapiro SL, Teukolsky SA (1983) Black Holes, White dwarfs and neutron star: the physics of compact objects. John Wiley and Sons 357.
 51. Introduction to Black Holes Retrieved 26 September 2017
 52. SPACETIMEWALTZ – Jagjit Singh, Publication an Information Directorate, Wiley Eastern Ltd., 1st ed. ISBN:81-7236-105-x.
 53. Penrose R (2002) "Gravitational Collapse: The Role of General Relativity, General Relativity and Gravitation" 34: 1141.
 54. Rose, Charlie (2013) "A conversation with Dr. Stephen Hawking and Lucy Hawking. Archived from the original.
 55. Srikanta, Patnaik (2017) Recent Development in intelligent Nature – inspired Computing IGI Global ISBN 9781522523239.
 56. Giddings S, Thomas S (2002) "High energy colliders as black hole factories"; "The end of short distance physics". Physical Review D 65: 056010.
 57. Belgiorno F, Cacciatori SL, Clerice M, Gorini V, Ortengi, et al. (2010) "Hawking radiation from ultrashort lesser pulse filaments". Phys. Rev. Lett 105: 203901.
 58. Grossman, Lisa (2010) "Ultrafast laser pulse makes Desktop Black-Hole glow" Wired.
 59. Kumar KNP, Kiranagi BS, Bagewadi CS (2012) "Hawking Radiation – An augmentation attriton Model" Adv. Nat. Sci 5: 14-33.
 60. See de Wilt, Bryce (1980) For an alternative derivation and more detailed discussion of Hawking radiation as a form of unruh radiation. "Quantum gravity: the new synthesis" in Hawking S; Isreal.W (eds). General relativity; An Einstein centenary p.696.
 61. Jacob D Bekenstein (2008) "Bekenstein Bound" Scholrapedia

- 3: 7374.
62. Hawking SW, Ellis GFR (1975) "The large scale structure of space time", Cambridge Univ. Press.
 63. Misner Charles, Jhorne, Kip S, Wheeler John (1973) Gravitation WH Freeman and Co., ISBN 978- 0-7167-0344.
 64. Peacock JA (1999) Cosmological Physics, Cambridge Univ Press. doi:10.1017/CBO9780511804533.
 65. Brill, Dieter (2012) "Black-Hole Horizons and How they begin". The Astronomical Review 7: 25-35.
 66. Y Chen, J Shu, X Xue, Q Yuan, Y Zhao (2019) Probing Axions with event Horizon Telescope Polarimetric measurements arXiv:1905.02213.
 67. Searching for quantum Black-Hole structure with event Horizon Telescope. S.B.Giddings arXiv:1904.05287.
 68. Kunter, Marc (2003) Astronomy; A Physical perspective Cambridge Univ. Press, p.148.
 69. K Schwarzschild (1916) "Über das Gravitationsfeld eines Massenpunktes nach der Einstein Theory" Mathematik Physik, and Technik pp189.
 70. Wald Robert (1984) General Relativity. The University of Chicago Press 152-153.
 71. Scheffer Simon (1979) "John Mitchell and Black Holes" J. of the History of Astronomy 10: 42-43.
 72. Valev, Dimitar (2008) "Consequence from conservation of total density of the universe during the expansion" arXiv:1008.0533.
 73. McCornell, Nicholas J (2011) "Two ten billion solar mass black holes at the center of giant elliptical galaxies" Nature 480: 215-218.
 74. Robert H Sandesses (2013) Revealing the heart of the Galaxy; The Milky Way and its Black-Hole Cambridge University press p.36.
 75. Carol, Seam M (2004) Space-time and Geometry Addison Wesley ISBN 978-0-8053-8732-2.
 76. R Penrose (1965) "Gravitational collapse and space-time singularities". Phys. Rev. Lett. 14: 57.
 77. Kerr, Roy P (1963) "Gravitational Field of a spinning mass as an example of Algebraically Special Metrics", Phys. Rev. Letts 11: 237-238.
 78. Newman, Ezra, Janis, Allen (1965) "Note on the Kerr-spinning Particle Metric", J. of Math. Phys.
 79. Black Holes/Science Mission Directorate NASA retrieved 2018
 80. "IAU members vote to recommend renaming Hubble law as Hubble-Lemaître law Int. astronomical Union. Retrieved 2018.
 81. Joann's Haranas and Joannis Gkigkitzis. Int (2014) Scholarly Research Notices, Article ID 718251 "The Mass Graviton and its relation to the number of information according to Holographic principle".
 82. "From the Flat Space S-matrix to the wave function of the universe" Paolo Benninese arXiv: 1811.08864.
 83. "Explanation of the Special Theory of Relativity by Analytical Geometry and Reformulation of the inverse square law G-Modestino arXiv 1609.06208.
 84. Acorichi, J. Diag-Polo, E.F. Borza (2007) "Loop quantum gravity and Planck-size Black Hole entropy". J. Phys. Conf. Ser 68: 012031.
 85. "Singularities and quantum Gravity" (2007) Matrin Bozowald AIP Conf. Proc 910: 294-733.
 86. "An introduction to Loop Quantum Gravity through cosmology" (2007) Abhay Ashtekar Nuovo Cim. B122: 135-155.
 87. "Gamma-ray Burst UV/optical afterglow polarimetry as a probe of quantum gravity".
 88. Martin Bojowald (2007) "Quantum gravity and cosmological observations". AIP Conf. Proc. 917: 130-137.
 89. "Newtonian Quantum Gravity" (2010) John Hansson Phys. Essays 23: 53.
 90. "Resummed Quantum Gravity" (2008) BFL Ward J. Mod. Phys. D17: 627-633.
 91. Charles H-T. Wang (2006) "New 'Phase' of quantum gravity", Phil. Trans. Roy. Soc. Lond A364: 3375-3388.
 92. D.A. Demir (2006) "Higher curvature Quantum gravity and Large extra Dimensions" D.A. Demir, S.H. Tanyildizi Phys. Lett. B633L 368-374.
 93. "Quantum: General Introduction and Recent Developments" Claus Kiefer Annalen Phys 15: 129-148.
 94. "Pigment Handbook, Color Theory; Characterization and Physical Relationships edited by Temple C. Patton 3: 229-288.
 95. ZW Wick, FN Zones, S Peter pappas, DA Wicks Wiley (2007) "Organic Coatings: Science and Technology" 3rd ed. Wiley Interscience pp 383-416.
 96. Young T (1802) "Bakerian lecture on the Theory of Light and Colours". Phil. Trans R. Soc. Lond 92: 12-48.
 97. Wright, William David (1928) "Are-determination of trichromatic coefficients of the spectral colors" Transaction of the Optical Society 33: 73-134.
 98. Smith Thomas, Guild, John (1931-32) "CIE Free Documents for Download" Archived from the original on 2017. "The CIE Colorimetric standards and their use" Transactions of the Optical Society 33: 73-104: 141-164.
 99. Alexei V Filippenko, Jay M Pasachoff (2010) "A universe from Nothing". Astronomical Society of the Pacific.
 100. "A universe from Nothing lecture by Lawrence Krauss at AAI" (2009).
 101. Friedman A (1922) "Über die Krümmung des Raumes". Z. Phys. (in German) 10: 377-386.
 102. Chant C A (1930) "Notes and Queries (Telescopes and Observatory Equipment – The Einstein Shift of Solar Lines)". Journal of the Royal Astronomical Society of Canada. 24: 390.
 103. Steven Weinberg (2008) Cosmology. Oxford University Press. 11.

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