QUANTIVITY

The Unified Theory of Everything
Part 1:
Cosmological Constants as Quantized Spacetime Parameters, Vacuum Mass/Energy, and Partial Spacetime Anatomy

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Abstract:

Quantivity covers the fundamental concepts due to high-energy being explored in Special *Relativity(SR), General Relativity(GR) Quantum Mechanics (QM)* as well as *String Theory (ST)*, and eventually reconciles them. Through our unique reverse engineering approach, we have got the big picture, we have *conceptually* unraveled the *glorious grand design of the Universe*. Our theory strongly supports the *Holographic* model of the universe. We claim that all the objects measurements might be turned into dimensionless frequencies, referred by us as *q* (or *q factor*), by using relevant *cosmological* units. It is further postulated that nature uses the same approach for objects measurements, so these *q factors* are compatible with each other and are capable of seamlessly being mixed with each other in any desired equation. Additionally, we strongly confirm the existence of the *hidden world* as mentioned in the literature, which simultaneously communicates with our *visible world*. While *SR* and *GR* address our *visible world*, and *QM* addresses the *hidden world*, *QUANTIVITY* addresses both. We have a comprehensive set of findings that will be published in multiple articles. In this article, as the first article of series of our articles, we concentrate on showing that the *Spacetime* is quantized, by deriving its grain size, rigorously, employing the previously known constants, which then consequently reveals its inverse as the number of Spacetime grains. Going into deeper discussions, we will show that, this *fixed expansion* of Spacetime is due to a *special built-in mechanism* that *inflated* its size *vertically*, due to high builtin velocity (i.e., *c*) and small rest mass (i.e., *vacuum pos/neg masses*), causing the Spacetime excitation with high frequency (coined by us as *qmax, see Fig. 1*). Additionally, said *Spacetime inflation* has caused a series of resource shortages, making objects to obey a *resource sharing scheme* for resources including *energy, mass, space,* and *time*. This concept might be considered as the propagation of resources, in the (*vertical*) *Time*, additional to their propagation in the (*horizontal*) *Space*. The value of this intrinsic *qmax* with the value of its inverse partner (qmin, as a pair of *dimensionless constants)* is the glorious set of numbers: $10^{\pm 38.6308177}$. This pair behaves similar to the parameters of a balloon, wherein the size of its *inflated space* competes with its *thickness*. Further, we show that this pair of constants are being used everywhere as ultimate sizes, as well as addressing the following issues: (1) the *long being sought for Cosmological Constant*, (2) the ratio between the *Strong Force* and the *Gravitational Force*, (3), and the reason behind the so-called *Gravity leak* and/or possibly the presence of *Dark Matter/Energy*. Additionally, in this and our future articles we make interesting conclusions, including a postulate stating that *length* and space (after redefinition of space) are inverses of each other, and the *time dilation*, as well as the space dilation (i.e., the length contraction), lead to extreme light motion traversing the whole Spacetime almost instantly, without violating the SR's 2nd postulate.

I. INTRODUCTION

The title of our theory, *Quantivity* is a combination of Quantum Mechanics (QM) and Relativity, since it is a bridge between the two theories.

It might also be considered as a set of fancy new made-up terminologies out of *Quantum* to make them grammatically look like the Relativity's terminologies as follows.

The Quantive vs Relative, Quantivity vs Relativity, and Quantivistic vs Relativistic.

A. Our Research Justifications and Inspirations

In Special Relativity, there are some flaws and/or weaknesses.

However, before going further, we want to mention that all of our criticism of Relativity, is not meant to deny the fact that Einstein's contributions in this area and his inspirations in opening our eyes towards the phenomena such as *time dilation* and *length contraction*, due to high velocities, besides his other contributions, are indeed invaluable.

We strongly support his approach in Special Relativity, and we think that the same approach should have been taken to develop his General Relativity, with more promising results in elegance and simplicity.

1. Special Relativity's flaws

(a) The concept of Space. This concept is taken in the wrong way, as 3d spatial (Physical) space.

The correct definition in Relativity sense is as follows.

For any object, the *outward* space is the accumulation of all those *kinetic micro-motions* of said object, independent of the object's change of directions (similar to the concept of time).

Then, the *inward space* (i.e., length) is the inverse of said outward space.

Therefore, the outward space is the *pro-space*, while the inward space is the *anti-space*.

(b) the Twin-Travelers in Thought Experiment. The application of the minus sign to the velocity is wrong and causes the so-called *Twin-Paradox* issue.

In order to avoid this, the minus sign should be applied to the square of distances traveled, since the visible world works on the square of distances.

(c) The frame of reference. We will show that there is a global coordinate system, which should have been employed by the SR, instead of the local coordinate systems which are changing all the time and yet unreliable.

(d) Time Dilation derivation. During verifying the Time Dilation derivation we realized that handling the velocity case is much more complex than just the simplified version used in the Special Relativity.

Without going into details, we came to some conclusions that traveler's speed also might be added to c, rather than being subtracted from c. To be more precise, we saw a combination of both to be possible.

(e) The anomaly between Relativity and Quantum Mechanics. The existing anomaly between the Special Relativity's 2nd postulate, limiting the light speed to c, and the evidence in Quantum Mechanics experiments, as well as the observed Universe Expansion, that suggest much higher velocities might be possible.

(f) General Relativity (GR). In GR, using a hybrid formula has not been such a good idea, since the consistency is lost.

As we know for effects from gravity, Newton's equations are used, while for effects of stress or pressure, the equations from *Hydraulic Engineering* or similar discipline being used, and yet, *Relativistic* effects are borrowed from the Special Relativity concept, for high-velocity cases.

We needed a more consistent theory for all the different sources governing the phenomenon of gravity and its related issues, including the *Space Warping*.

Some other reasons for our motivations and inspirations comprise of the following for which we continue numbering them as follows:

(g) Multiplication Math Scheme. As the last and most important factor, we refer to the need to use a multiplicative math scheme instead of an additive math scheme, when dealing with high velocities.

As we know GR only works for big objects and fails to work for small objects such as particles.

One of the reasons is, we believe, that it fails to be applied to particles is because of their high hidden speeds (which are much bigger than c, as will be discussed in-depth in our future articles)

Our studies have proven that the concept of

relativity, for extreme gravity and/or speed, only works correctly based on the multiplicative math (e.g., using division for comparison) rather than additive (i.e., subtraction for comparison, as done in Special Relativity).

Generally, it is easy to understand, when dealing with big changes, the additive math scheme stops working, and we need to apply the multiplicative math scheme.

An example of such cases in our day-to-day life is the use of logarithmic scale charts in *stock market analysis* when big price movements are involved.

The need to use the multiplicative scheme becomes apparent when in extreme cases nature wants to use more than it has, (i.e., the resource in hand).

So the question is what is the right equation for the remainder.

let's assume we have a resource for an item with the amount *a*, and we have already used the amount *b* of it, so the reminder is *a/b*, or *[log(a)-log(b)]*, but not *a-b*.

2. The evidence behind Gravity's weakness.

While we were trying to derive our new *frequency-based Quantum gravity* equation, which will be presented in a separate article, we found something intriguing.

There was a huge difference in the two values when comparing our results to Newton's equation.

Further investigation revealed that this huge difference was due to a missing term, which was resembling the *Planck Time*, or similar values.

We realized that Planck length and Planck time are not just the smallest units of length and time, but they are revealing much deeper knowledge to us.

We, then concluded that a sharing scheme is being employed by nature to share the resources, including the object's masses.

Therefore, among the other knowledge, these constants are conveying to us, they are carrying this sharing factor.

Later we will show that additionally to the propagation of energy/mass horizontally in the Space, they are vertically propagated in Time, as well.

This is part of a broader discovery we made, wherein the motion is performed similarly. (i.e. through Space and Time dimensions) resulting in information being traveled by light and waves to longer distances without violating the speed of light) as will be expensively discussed in our upcoming articles).

B. Source of Negative Mass/Energy and other issues

Before going further to derive the cosmological constants, we need to briefly explain the nature of the parameters used.

These are parts of the discoveries we have made which will be discussed in more detail in our upcoming articles.

As we know, the constant *G* plays an important role in Newton's Gravitational equations, but it has another important role which, up to now, has not been mentioned anywhere.

We postulate that the constant *G* is the counterpart of the constant h, in the sense that it is the smallest unit of negative energy.

Later, we will show that when cosmological units are used, the values of *h* and *G* will become identical.

Another important issue we want to briefly mention here is to emphasize the difference between energy and *action* (also referred to as *work*).

As we know the constant *h* is not energy but it is a product of energy and time.

In the literature, this is called action, and its use is limited to the *Hamilton principle*.

We want to mention here that the role of this product is extremely important and broader to the extent that we think is greatly neglected.

We will refer to this item as *extracted-energy* since this is the *real juice*, the *fuel* which is being extracted from the *vacuum*, as opposed to the energy which analogously might be considered as the *container* being used to extract said juice.

We will also make use of *extracted-mass* as the companion to the above item, as opposed to mass.

For the *extracted negative energy*, due to *G*, the right value is the product of energy and *meter*, instead of *second*.

In another article, we extensively discuss the vacuum's positive and negative mass, produced by said energies which are the main ingredients nature used to create the stuff comprising of the

Spacetime, the light, the particles, etc.

Additionally, here for the first time, we postulate that production of free energy (cheap energy) by applying concepts such as *over-unity*, does not violate the conservation of energy principle, due to our previous discussion (stating that the extracted-energy is not energy) so it is possible that by taking different paths, we obtain different values for extracted-energy from the same energy. a separate article might be devoted to this concept.

II. DERIVATION OF *QMIN*/*QMAX* (COSMOLOGICAL CONSTANTS)

Based on our previous discussions, to start with, we get the common part of Planck length and Planck time, by calculating their logarithmic mean as follows.

$$u_{lt} = \sqrt{P_t P_l} = \sqrt{(hG)/c^4} \qquad (1)$$

wherein the constant u_{lt} is the logarithmic mean of P_l and P_t, Planck length and Planck time, respectively.

The constant u_{lt} is also the smallest measure of *length-time*, as well as being the small unit of length-time, as will be explained later. As we implied before, the length is anti-space.

In our next article, we will discuss the concept of space/time in more depth.

The *G*, *h*, and *c* constants are Gravitational Constant, Planck Constant (energy), and Light Speed, respectively.

However, after the above derivation, we want to go further and postulate that this number is a dimensionless number.

In order to prove this, we need to show that the numerical part of u_{lt} is constant as a number, and remains constant independent of the system of measurement units we choose.

In other words, we will show that length and time unit size in the measurement system chosen, have no effect on the numerical part of u_{lt}.

Before going further, we want to emphasize that this additional requirement is very crucial to the validity of our postulate which claims the Spacetime is comprised of a fixed number of grains.

This requirement also needed to support our claim that the measurements employed by nature are frequencies, which have no dimension.

As we know, the conventional definition of frequency is the number of cycles per unit of time.

Here, we extend the definition of frequency to dimensionless measurements in which measurement for an object is simply an integer showing how many times the relevant unit of measurement needs to be repeated to measure the entire property of the said object.

That is why the cosmological units being used in nature are small enough to maintain accuracy, by ignoring the fractions.

The numerical part of u_{lt}, referred to as *qmin*, is as follows:

$$qmin = u_{lt} / \sqrt{ms} = \sqrt{(\bar{h}\bar{G})/\bar{c}^4} \qquad (2)$$

The $\sqrt{ms}$ is the unit part of u_{lt}, wherein m, and s are meters and seconds, the length and time units in the SI system of measurements.

The symbols with horizontal bars represent numerical parts of their corresponding parameters.

The *qmax*, the inverse of *qmin*, represents the number of Spacetime grains governed by the following equation:

$$1 = (qmin)\,(qmax) \qquad (3)$$

To make *qmin* and *qmax* values more consistent, we modify the (2) as follows:

$$qmin = \sqrt{(hG)/c^4} \,/\, \sqrt{(time\_unit)(length\_unit)} \qquad (4)$$

Now, after putting the relevant values in (2) the value of *qmin* is as follows:

$$qmin = 2.33981925 \times 10^{-39} \qquad (5)$$

In order to bring out the symmetry between the *qmin* and *qmax*, they are rewritten, by replacing the *qmin* value with the following value, using a log of *qmin* to the base 10 as follows:

$$qmin = 10^{-38.6308177} \qquad (6)$$

and consequently, the *qmax* value is as follows:

$$qmax = 1/qmin = 10^{+38.6308177} \qquad (7)$$

In order to understand that the *qmax* value

in (4) is not affected by change of system of measurement, it is easy to see that if we change, e.g., from SI system to any other system, both upper side and lower side terms, inside the square root symbol might change, but the changes are proportional to each other, leaving the final result (i.e., *qmin*) unchanged.

The above claim holds, whether we convert previously measured values of *h* and/or *G* from one system of measurement to another, or measure these values directly by units in the new system.

III. VACUUM MASS

To express the *qmin* in terms of vacuum mass directly, the following expresses the *qmin* value employing these masses:

$$qmin = \sqrt{m_h . m_G} \qquad (8)$$

Wherein, the m_h and m_G are vacuum positive and negative masses as follows:

$$m_h = e_h / c^2 \qquad (9)$$

$$m_G = e_G / c^2 \qquad (10)$$

$$e_h = h / (time\_unit) \qquad (11)$$

$$e_G = G / (length\_unit) \qquad (12)$$

.

As we mentioned, while any system of units will yield the same values for the qmin and qmax, let's consider cosmological units as a special case.

The reason to pick these units is that since these units are really what the set of units being employed by nature, the equations we obtain for *h* and *G* reveal the real components of these items (i.e., *h* and *G*).

we have discovered that *cosmological units* of mass, time, and length are as follows:

$$U_M = P_m = \sqrt{(\bar{h}\bar{c})/\bar{G}}\ Kg \qquad (13)$$

$$U_l = U_s^{-1} = (u_l = P_l) / qmin = \sqrt{\bar{c}}\ m \qquad (14)$$

$$U_t = (u_t = P_t) / qmin = (1/\sqrt{\bar{c}})\ s \qquad (15)$$

Here, we want to explain that units as uppercase *U* represent the unit to be shared the (large unit), while the units as lowercase *u* represent the unit equal to the share each member receives (the small unit).

Now, let's we replace Kg, second, and meter by their corresponding cosmological units from the above equations in the following equations:

$$h = \bar{h}\ . Kg. m^2. s^{-1} \qquad (16)$$

$$G = \bar{G}\ . Kg^{-1} . m^3 . s^{-2} \qquad (17)$$

By doing so, and using (2) as well, we will get the new values for *h* and *G* as follows:

$$h = (qmin . U_t) (P_m . c^2) \qquad (18)$$

$$G = (qmin . U_l) (P_m^{-1}. c^2) \qquad (19)$$

As we can see, the values of *h* and *G* are symmetrical.

Let'ss find the values of m_h and m_G based on the new values of h and G:

$$u_{m+} = m_h = (h / U_t) / c^2 = qmin . P_m \qquad (20)$$

$$u_{m-} = m_G = (h / U_t) / c^2 = qmin . P_m^{-1} \qquad (21)$$

With these values, the Pm is simplified as follows:

$$U_M = P_m = \sqrt{m_h/m_g} \qquad (22)$$

Therefore, in a sense, the negative and positive vacuum masses m_h and m_G are fundamental constants.

Additionally, please note that, excluding c^2, *h* and *G* are expressed in 5 values, namely *qmin*, U_t, U_l, P_m, P_m^{-1}, addressing five different dimensions.

While the Spacetime partially is given in Fig. 1, a separate article will be devoted to *Spacetime Modelling*.

IV. CONCLUSIONS

During developing and refining our theory of Quantivity, we have come up with wild conclusions.

It seems, based on our conclusions, in many cases, the concepts are not straight forward, and in many cases, the deeply hidden facts are

radically different from what they seem to be on the surface.

We think that we should wait until all the postulates regarding the whole *Quantivity* theory are revealed, after which, we then can discuss all the conclusions.

However, here, only we mention a couple of our conclusions.

A. New Interpretation of qmax

The value of *qmax* might be interpreted also as follows:

$$qmax = 2^{128} \qquad (23)$$

wherein the difference in the two values might be attributed to inaccuracies in the measurement of the parameters involved.

We postulate that the number *128* in (1) is the value of the *fine structure constant* in fast energy conditions (i.e., for light/photon).

We are in the process of further investigation in this matter, including justifying the value of this constant for electron and other particles.

We will report the outcome when we are convinced of the results of our investigation.

B. Particle Inflation Frequencies

As we know, in *Quantum Field Theory*, particles are said to be created by certain excitations of the vacuum.

We postulate that each object inherits the vacuum excitations, therefore any additional personal excitation will be combined (multiplicatively) by said (excitation) frequency.

It is further postulated that all the excitations are deflationary, wherein outward space decreases, while inward space increases proportionally.

The light/photon has the highest excitation (inflationary frequency), equal to that of Spacetime.

Other particles have lower excitations with each known particle having its own inflationary frequency, like a signature.

The inflation frequencies for various particles, considered in order of their frequencies, are exponentially reduced.

We postulate that while objects spread in (horizontal) Space due to the increase in their rest mass, they move in the (vertical) Time due to an increase in their extracted-mass (resulting from their motions, i.e., excitations, see Fig. 1).

The above postulate conforms with the reports stating that massive *black holes* look flat.

We postulate that Spacetime and object's motions follow the well-known *Torus* model (see Fig. 2).

Some research efforts are done in regard to finding this pattern and related rules governing a gradual increase in the mass of particles as well as atoms.

The readers might Google for "Spiral periodic table" and/or "Spiral structure for elementary particles". The main keyword here to be used in the search is *Spiral*

While all particles have equal rest masses equal to only one unit of vacuum mass (i.e. m_h and m_G), their extracted-masses are different, which depend on their motion in space and time, which dictated by their built-in deflation frequency (the said excitation).

We postulate that at all time, the final two frequencies for each particle are inverse of each other, as follows:

$$(outward\ frequency)\ .\ (inward\ frequency) = 1 \qquad (24)$$

C. Light Traverse in Spacetime

The Spacetime special mechanism makes objects move vertically in Time additional to their horizontal motion in Space (see Fig. 1).

As can be seen, on the axis s^+ and t^-, the traverse of light (which is the same as the Spacetime radius) are huge, but their ratio is equal to c.

In a separate article, we discuss this mechanism which reveals a correct Relativistic (i.e., Quantivistic) factor, stating velocity ratios (i.e., $\beta=v/c$) are proportional to the *log* of their excitation frequencies (i.e., inflation q).

We postulate that this phenomenon makes the light/information to travel the whole Spacetime in one unit of time (i.e., U_t).

D. The relationship between space and time

Definition of the and *U* units, and setting c to 1, give us the following equations:

$$U_l / U_t = c = 1 \qquad (25)$$

$$Us \,.\, Ut = c^{-1} = 1 \qquad (26)$$

E. Center of Gravity

The center of gravity (i.e., actually a circle) is at the origin center (see Fig. 1) where log=0 or *Normalized distance* of $\underline{1}$ (i.e., one unit) from the *singularity point*.

This is equal to velocity *c* or the following actual distance from the singularity point:

$$Gravity\ Center\ Distance = u_l = P_l \qquad (27)$$

The distance between the singularity point and this center of gravity is what is shown in Fig. 1 as the *inward space/time,* in which the gravity decreases as we move to singularity point from said center of gravity.

V. SUMMARY

In this article, we started to prove that the Spacetime is quantized and to find the size number of its grains, as dimensionless numbers which we postulate represent the *Cosmological Constants*.

By doing so, as well as by our extensive research following the above discovery, we have been able to answer several burning related questions, taking the first step into unrevealing the Universe's grand design and the grand theory known as the *theory of everything*, which governs the matter's behavior, especially when subject to high energies.

We started tackling the problem, by postulating that we live in a resource sharing environment,

We further saw the Planck Length and Planck Time as values that are revealing deeper knowledge than just simply telling us the smallest length size or smallest time tick.

We saw them as share factors of the shares each point in the Spacetime is receiving from larger sources, based on an elaborate resource sharing scheme.

Therefore, the first important piece of information we needed to know was the value of the share factor involved in the above-mentioned scheme.

The result we have obtained here is really what is referred to as the *Cosmic Constant*, as the most wanted constant, and whose value has been associated with wild guesses.

This is the parameter that confused Einstein while he was putting finishing touches in his *EFE*'s.

Additionally, we already postulated that the hidden part of the world works based on the multiplicative math scheme, parallel to the additive math scheme which is employed in our visible world.

So, to find said constant as a common factor in Planck Length and Planck Time, as was discussed in our previous discussions, we guessed the logarithmic mean of these parameters would give us our constant.

We found this value in (1), which is revealing to us some facts and suggesting some postulates.

It was obvious that the numerical part of u_{lt} in (1) is the size of Spacetime grain, as a dimensionless number, while its inverse gives us the number of Spacetime grains.

Next, the vacuum positive/negative masses were calculated from their corresponding extracted energies, namely *h* and *G*.

It was shown that if the cosmological units used, the values of *h* and *G* were identical (i.e., symmetrical) and the related masses seem to be fundamental, wherein their logarithmic average and difference yield *qmin*, and P_m, respectively.

We also have presented partial modeling of the Spacetime (see Fig. 1).

As can be seen, similar to what said regarding the P_t and P_l, their inverse also has a deeper meaning than just revealing the number of space and time grains per their corresponding units; they additionally represent the outward space/time dimensions.

Finally we have made some conclusions which were mentioned in the previous section.

As we have mentioned. we will publish more conclusions after the major postulates of *Quantivity* are published.

VI. APPENDIX

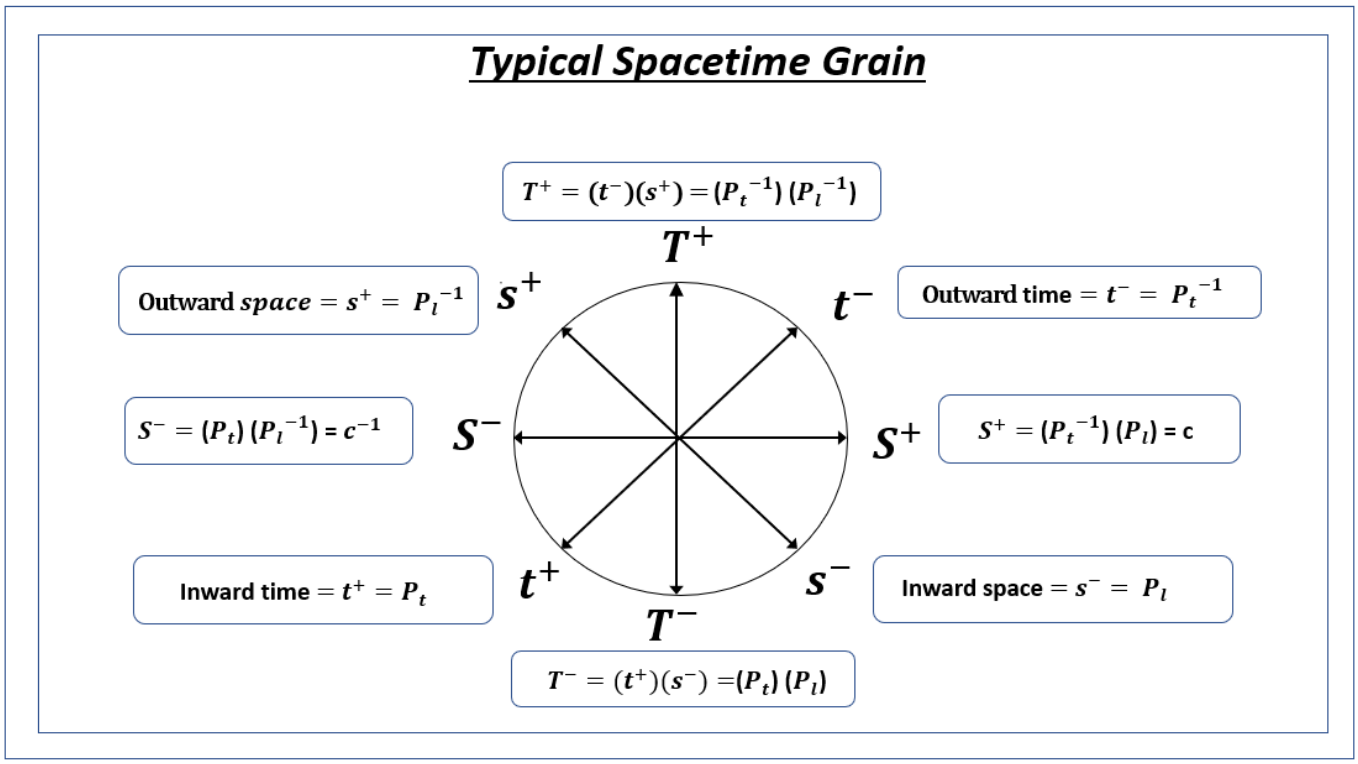

Fig. 1: Partial modeling of the Spacetime. A separate Fig. might be considered in which the t^+ and s^- are replaced by m_h and m_G, respectively, and the other dimension values are modified accordingly.

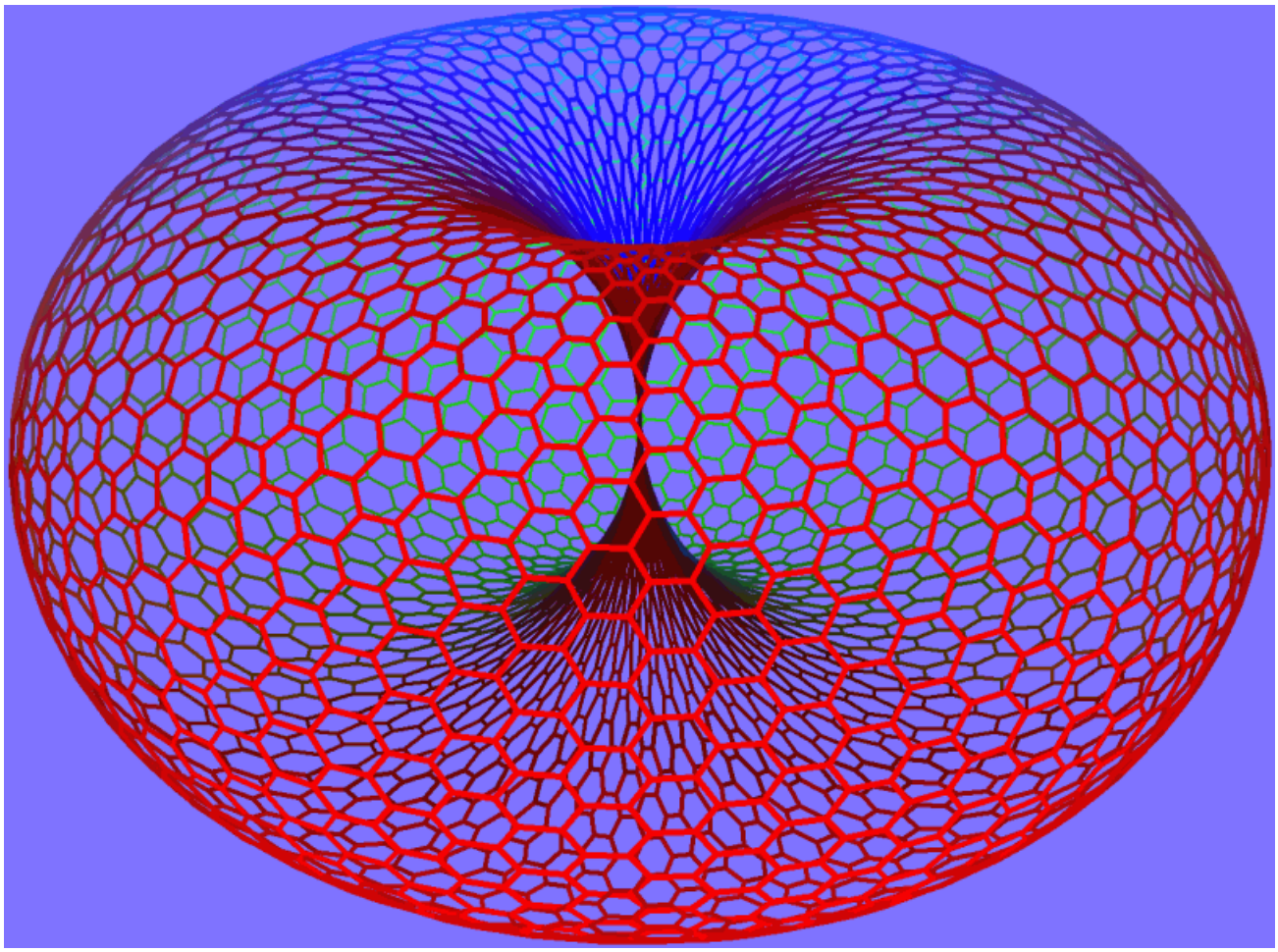

Fig. 2: The Spacetime Torus model, Courtesy of:
https://www.horntorus.com/illustration/coloured_horntorus_2.html