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From "Absurd" to "Elegant" Universe

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Abstract

The "Absurd Universe" as described by Michael Turner [1] represents the consensus characterization of the predictions of the most widely accepted physics and cosmology theories marred by their unresolved contradictions, inconsistencies, and paradoxes. This paper provides a new fundamental understanding of the Cosmological Constant and relativistic universe expansion as an alternative to the widely accepted linear Hubble expansion. The current paradoxes and inconsistencies are shown to be artifacts of the missing (hidden) physics of the well-known phenomenon of spontaneous decay. A new Gravity Nullification Model for Universe Expansion (GNMUE) is proposed that integrates the missing physics of the spontaneous mass-energy conversion into a simplified form of general relativity. The model predicts the observed expansion of the universe and galaxies and other data. The model provides answers to key fundamental questions and resolves paradoxes among general relativity, quantum mechanics, and cosmology. It also bridges the gap between quantum mechanics and relativity theories via revealing relativistic understanding of the inner workings of quantum mechanics. The impact of the new understanding on widely-accepted fundamental assumptions is discussed and a new wholesome perspective on reality is provided.

1. INTRODUCTION

The "Elegant Universe" or an unknown and unverifiable "Multiverse"? The "Absurd Universe" as described by Michael Turner [1] represents the consensus characterization of the predictions of the most widely accepted physics and cosmology theories marred by their unresolved contradictions, inconsistencies, and paradoxes. Consistent answers to some key fundamental questions are yet to be found. Science today is at the crossroads searching for resolution to some serious paradoxes and puzzles paralyzing its leading theories. The mission of science to achieve a unified theory is founded on the basic premise that there exists a single universe and one set of universal laws that the theory would reveal to explain the observed universe. This mission is marred by the uncertainty and confusion of the multiverse that presumes parallel universes with their own varying sets of laws. In spite of their demonstrated successes against limited and focused experiments, the two leading theories - general relativity and quantum mechanics, have been unable to explain almost 96% of the universe presumably comprised of the unknown dark energy and dark matter. Hence, their universality (or "*Multiversality?*") remains only a dream at this time. While general relativity theory suffers from black hole singularities and locality limitations of the constant speed of light, quantum mechanics remains a puzzle due to a serious lack of understandings of its inner working and quantum gravity. In spite of several alternate (App. A) cosmological theories [2, 3, 4, 5, & 6], there remains a serious lack of a cohesive universe model that resolves the so-called cosmic conundrum entailing the outstanding paradoxes and inconsistencies. The science community needs to urgently look into questioning the foundations and current assumptions that may be wrong inhibiting the achievement of a unified universal theory.

The purpose of the work presented herein is to demonstrate that the current paradoxes of physics and cosmology are artifacts of the missing physics of the well-known phenomenon of the spontaneous mass-energy conversion such as observed in the spontaneous decay of quantum particles, wave-particle duality, and Hawking radiation [7] involving the evaporation of black holes mass. Black holes that radiate away more mass than the mass falling in via gravitational pull from outside are expected to shrink and vanish completely due to the spontaneous evaporation or conversion of mass to energy. Hawking forwarded quantum arguments to show that the radiation is similar to the black body radiation governed by thermal effects. However, without a theory of quantum gravity, it is impossible to analyze the detailed thermodynamic state of a black hole. A new Gravity Nullification model (GNM) is proposed to describe the missing (hidden variable) physics of the spontaneous conversion of mass to energy. This is integrated into a simplified form of general relativity to provide a GNM based Universe Expansion (GNMUE) model, which predicts both the observed linear Hubble expansion in the nearby universe and the accelerating expansion in the distant universe. The integrated model resolves many of the paradoxes haunting physics and cosmology today. The proposed model eliminates singularities from existing models and the need for the incredible and unverifiable assumptions. Predictions of the model show a close agreement with the recent observations of the universe. The

integrated model is also shown to resolve inconsistencies between quantum mechanics and general relativity. GNMUE provides consistent answers to key fundamental questions (Appendix A).

2. GRAVITY NULLIFICATION MODEL FOR UNIVERSE EXPANSION (GNMUE)

As part of the special theory of relativity, Einstein derived the famous law governing conversion of mass to energy - $E = m C^2$, wherein E and m represent equivalent changes in energy and mass respectively. Unstable particles are known to decay instantly [8]. It is hypothesized that the energy released during a spontaneous conversion of mass to energy via a spontaneous decay manifests as motion or kinetic energy of the remaining (unconverted) mass of the body or particle. This hypothesis is tested later in the paper to predict the observed stability of particles and ordinary objects in the universe. Let us now consider a spontaneously decaying mass M_o at rest (V=0) representing a total relativistic energy, $E_0 = M_0 C^2$. The transformation energy, TE, of a small portion of the mass, Δm, can be described according to the specific theory of relativity as follows:

$$TE = \Delta m \cdot C^2 = (M_0 - m)C^2 \qquad (1)$$

This energy is assumed to propel a radial expansion of the remaining mass m with a radial velocity V. The momentum is conserved via a spherically symmetric radial expansion of the remaining mass. The relativistic kinetic energy (KE) of the remaining unconverted mass m is given by the special theory of relativity as follows:

$$KE = m\,C^2\left(\frac{1}{\sqrt{1-(V^2/C^2)}}-1\right) \qquad (2)$$

In the absence of any gravitational force or energy, equating this kinetic energy to the energy from mass transformation given by eqn. (1), we obtain the following:

$$(M_0 - m)C^2 = m\,C^2\left(\frac{1}{\sqrt{1-(V^2/C^2)}}-1\right) \qquad (3)$$

Simplifying the above provides the following equation:

$$m = M_o\sqrt{1-(V/C)^2} \qquad (4)$$

Since the process of conversion of mass into energy is outwardly expansive and opposite to the process of gravitation that is pulling inwardly, we refer to equation (4) as the Gravity Nullification Model (GNM) representing anti-gravity. The corresponding space and time dilation are described by specific relativity equation: $S = S_o\sqrt{1-(V/C)^2}$, wherein S is the spatial dimension at V and S_0 is spatial dimension at V=0. Similarly, the time dilation is given by: $t = t_o\sqrt{1-(V/C)^2}$. GNM predicted mass, space, and time dilations versus V/C are shown in Figure 1.

Figure 1: GNM mass, space, and time dilations.

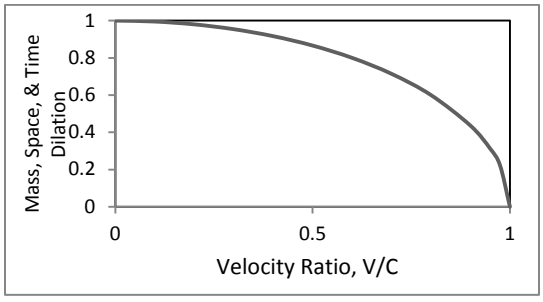
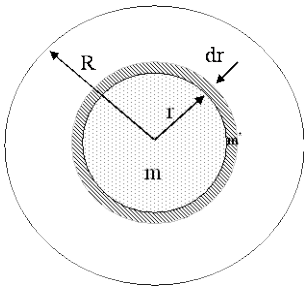


Figure 2: A simplified gravity model of the universe.



GNM Universe Expansion (GNMUE) Model

The gravitational effects were neglected in the formulation of GNM eqn. (4). However, for the whole universe the total mass M_o is very large and the gravitational effects are significant. Using a simplified spherical gravitational model of the universe depicted in Figure 2, the following is obtained for estimating the gravitational potential energy (GPE) of the universe:

$$GPE = \int_0^R \frac{Gmm^*}{r} = \frac{3Gm^2}{5R} \qquad (5)$$

Now, from the energy balance equating the transformation energy, TE, from eqn. (1) with the sum of the kinetic energy (2) and the gravitational potential energy (5),

$$(M_0 - m)C^2 = mC^2\left\{\frac{1}{\sqrt{1-(V/C)^2}} - 1\right\} + \frac{3Gm^2}{5R} \qquad (6)$$

Equation (6) represents GNM based universe expansion model (GNMUE) including the effects of gravity.

GNM based Relativistic Model of Cosmological Constant

In BBM, Einstein proposed a 'Cosmological Constant' denoted byΛ, that represents a contribution to the density of the universe from vacuum energy. In the GNM universe model eqn. (6), no such extraneous fudge factor exists. However, to represent eqn. (6) in terms of Λ and equating the vacuum energy equation proposed by Einstein to the kinetic energy one obtains the following relationship between Λ and R:

$$\frac{1}{6}\Lambda mC^2R^2 = mC^2\left\{\frac{1}{\sqrt{1-(V/C)^2}} - 1\right\} \qquad (7) \qquad or, \qquad \Lambda = \frac{6}{R^2}\left\{\frac{1}{\sqrt{1-(V/C)^2}} - 1\right\} \qquad (8)$$

Combining equations (6) and (8) leads to the following:

$$\Lambda = \frac{6}{R^2}\left\{\left(\frac{M_0}{m} - 1\right) - \frac{3Gm}{5RC^2}\right\} \qquad (9)$$

GNM based Relativistic Universe Expansion (RUE) Model

The following equation is obtained via substituting $\Lambda = \frac{3H^2}{C^2}$ in eqn. (8):

$$\frac{V}{C} = \sqrt{1 - \left\{1/\left(1 + \frac{H^2R^2}{2C^2}\right)\right\}^2} \qquad (10)$$

Equation (10) describes the Relativistic Universe Expansion (RUE) model as an alternative to the widely accepted Linear Hubble (LHM) model, V=HR in BBM. It should be noted that for the range of observed galactic distances (up to approximately 5 to 9 billion light-years) wherein the LHM is seen to hold, the RUE eqn. (10) exactly matches the predictions of the LHM, as shown in Figure 3. For values of R larger than approximately 14 billion light-years, the expansion velocity calculated by the Linear Hubble model (LHM) exceeds the velocity of light C and hence, violates the theory of relativity. The velocity predicted by RUE, on the other hand, approaches the speed of light C as R increases indefinitely. Since the RUE predicted V never exceeds C, it never violates Einstein's theory of specific relativity. It also avoids any singularities in the GNMUE universe model eqn. (6).

Figure 3: LHM and RUE predicted velocity ratios.

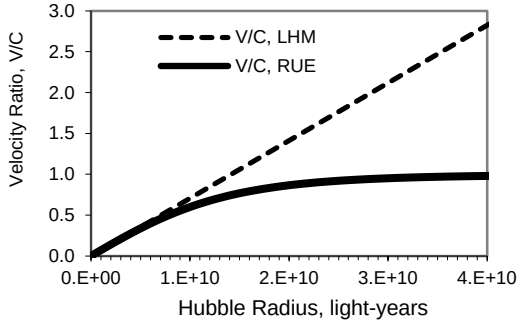
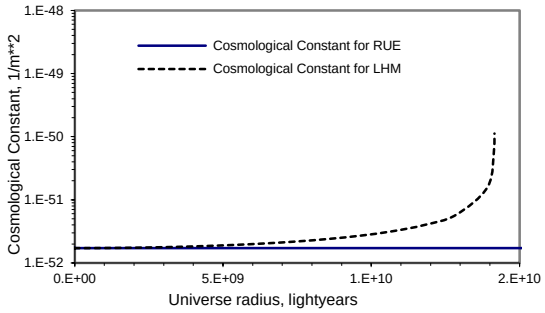


Figure 4: LHM and RUE predicted Cosmological Constants.



It is important to point out that GNM based RUE provides a relativistic expansion model of the universe, while the LHM represents an empirical fit to the observed Hubble expansion data from the near field galaxies. When compared to the recent far-field Supernova data, LHM leads to the apparent conclusion that the universe expansion is accelerating. However, such a conclusion is merely an artifact of the over-extrapolation (V>C) of the linear expansion assumed by the LHM in the distant universe. It is shown later in the paper that the observed non-linear expansion from the far-field data is naturally predicted by the RUE vindicating the fact that the universe expansion in the far field is relativistic and not linear as predicted by LHM.

Comparison of Cosmological Constants predicted by RUE versus Linear Hubble Model (LHM)

Figure 4 shows the predicted Cosmological Constant Λ, eqn. (8), using V/C from LHM and RUE models. It should be noted that the Cosmological Constant predicted by RUE remains invariable for all universe sizes, thus representing a universal constant. However, the Cosmological Constant predicted using the LHM increases exponentially to very large values as the universe size increases beyond 2 billion light-years. This explains the reason for why the non-varying universal Cosmological Constant used in widely accepted cosmology theories would underestimate the universe expansion when used in conjunction with the LHM that requires a very large (several orders of magnitude) value of dark energy to match the observed accelerated expansion in the distant universe. The universal Cosmological Constant provided by RUE in conjunction with eqn. (8) is given by:

$$\Lambda = \frac{3H^2}{C^2} \qquad (11)$$

GNMUE, eqn. (6), represents a quadratic equation that can also be simplified to obtain actual mass m of the universe as a function of its size R and Cosmological Constant Λ as follows,

$$m = \frac{5RC^2}{6G}\left[\sqrt{\left\{\left(1+\frac{\Lambda R^2}{6}\right)^2 + \frac{12GM_o}{5RC^2}\right\}} - \left(1+\frac{\Lambda R^2}{6}\right)\right] \qquad (12)$$

3. COMPARISON OF GNMUE PREDICTIONS AGAINST SUPERNOVA DATA

By observing distant, ancient exploding stars, physicists and astronomers [9, 10, and 11] have determined that the universe is expanding at an accelerating rate. By comparing the observed distance of type Ia supernovae with the redshifts of their home galaxies, researchers have calculated the rate of expansion of the universe during its historical evolution. The observations of distant type Ia supernovae place them significantly farther away than would be expected from their redshifts, suggesting that the unknown dark energy is pushing the stars and galaxies in the universe farther apart faster than it did in the early universe. In early January 1998 the Supernova Cosmology Project [9] presented the first compelling evidence that the expansion is accelerating and that this acceleration is caused by the unknown dark energy represented by the Cosmological Constant, Λ. The Einstein's theory of specific relativity provides the following relationship between the redshift z and velocity V:

$$z = \sqrt{\frac{1+(V/C)}{1-(V/C)}} - 1 \qquad (13) \quad \text{or,} \quad \frac{V}{C} = \left[\frac{(z+1)^2 - 1}{(z+1)^2 + 1}\right] \qquad (14)$$

Combining eqn. (14) with the LHM and RUE leads the following for the respective radii of the universe,

$$R_{LHM} = \left(\frac{C}{H}\right)\left[\frac{(z+1)^2 - 1}{(z+1)^2 + 1}\right] \qquad (15), \text{ and } \quad R_{RUE} = \left(\frac{C}{H}\right)\left[\frac{z}{\sqrt{z+1}}\right] \qquad (16)$$

The relative brightness B of the supernova can be estimated [16] as follows for LHM and RUE respectively,

$$B_{LHM} = 1.92x10^{50}\left(\frac{H}{C}\right)^2 \frac{(z+1)^5}{\left[(z+1)^2 - 1\right]^2\left[(z+1)^2 + 1\right]^3} \qquad (17)$$

$$B_{RUE} = 3.84x10^{50}\left(\frac{H}{C}\right)^2 \frac{(z+1)^7}{z^2\left[(z+1)^2 + 1\right]^6} \qquad (18)$$

Figure 5 shows comparison of the supernova [9, 10] and other near-field [11] data against the predicted relative brightness for LHM versus RUE by equations (17) and (18) respectively. A good agreement is seen between the

predictions of the RUE and the measured values. The LHM under-predicts the trend of the observed data beyond Z=0.4, indicating that it does not accurately account for the relativistic effects that are dominant at large R or redshift values. The relativistic universe expansion eludes us as an accelerated expansion, which in reality is only an artifact of the erroneous linearity induced by over extrapolation of LHM at large radii. Figure 6 shows the LHM versus RUE predicted distances versus redshift of supernovas. The RUE predictions are consistent with the supernova observations that, at large redshifts (Z>0.4), the supernovas appear to be farther than LHM predictions. Hence, the supernova data vindicates the RUE model predictions.

Figure 5: Comparison of LHM and RUE predictions of Supernova and near field data.

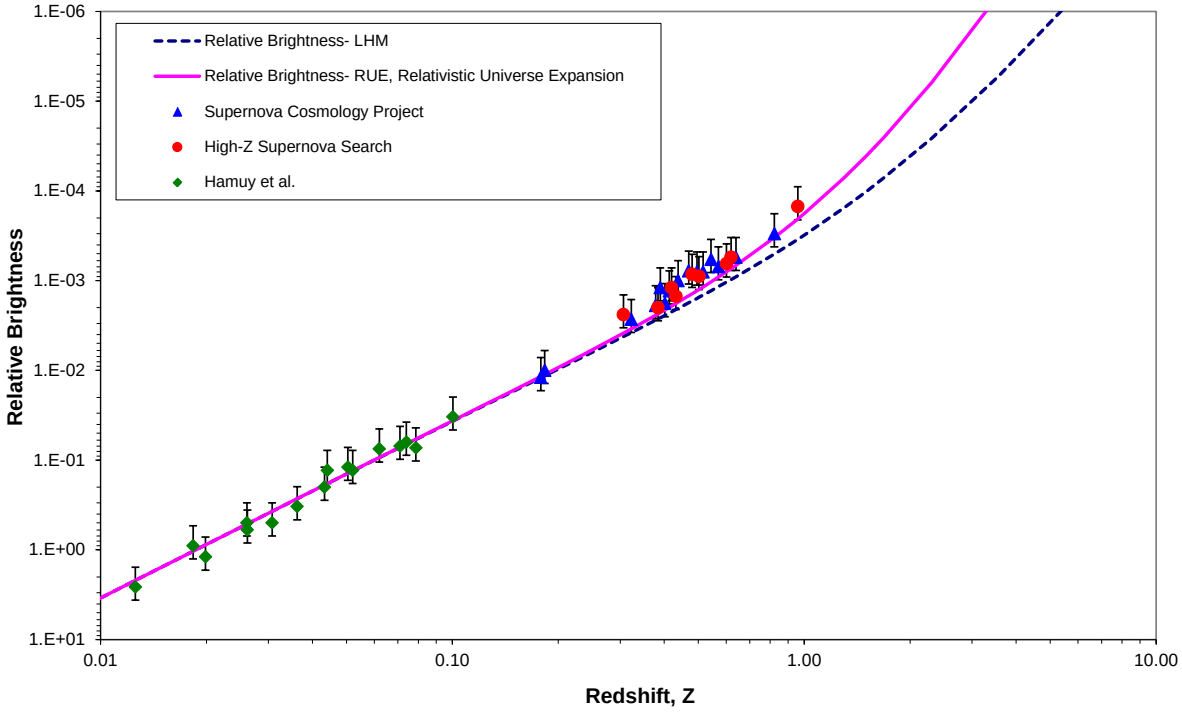
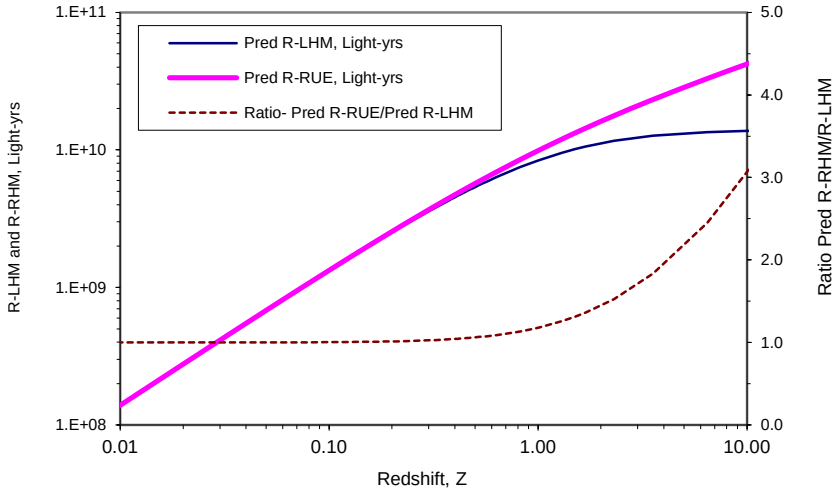


Figure 6: LHM and RUE predicted supernova distances and their ratios.



4. GNM RESOLVES PARADOXES AND MYSTERIES OF COSMOLOGY

Predictions of GNMUE, eqn. (12), using input constants (described in App. A) measured from experiments are presented in this section.

4.1 GNMUE Solves the Dark Energy Puzzle

Figure 7 shows the predicted fractional mass energy (mC^2), gravitational potential energy (GPE), and kinetic energy (KE) for a range of universe sizes. The sum of the three energies remains constant at M_0C^2. During the early universe up to about 2 billion light-years, GPE dominates. At about 9 billion light-years, the GPE and KE even out. Following this period, the increasing KE, commonly known as dark energy or vacuum energy, dominates fueling the non-linear relativistic universe expansion, which eludes us as the apparent accelerated expansion as opposed to the linear Hubble expansion. GNMUE thus dissolves the puzzle of the elusive dark energy or vacuum energy paralyzing modern physics and cosmology.

Figure 7: GNMUE predicted fractional mass energy, gravitational potential energy, and kinetic energy.

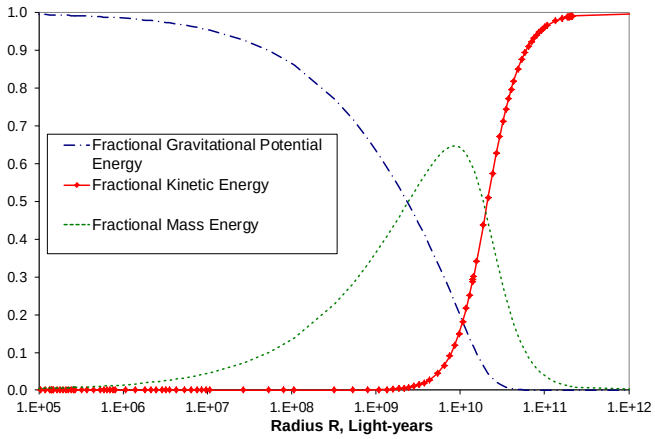
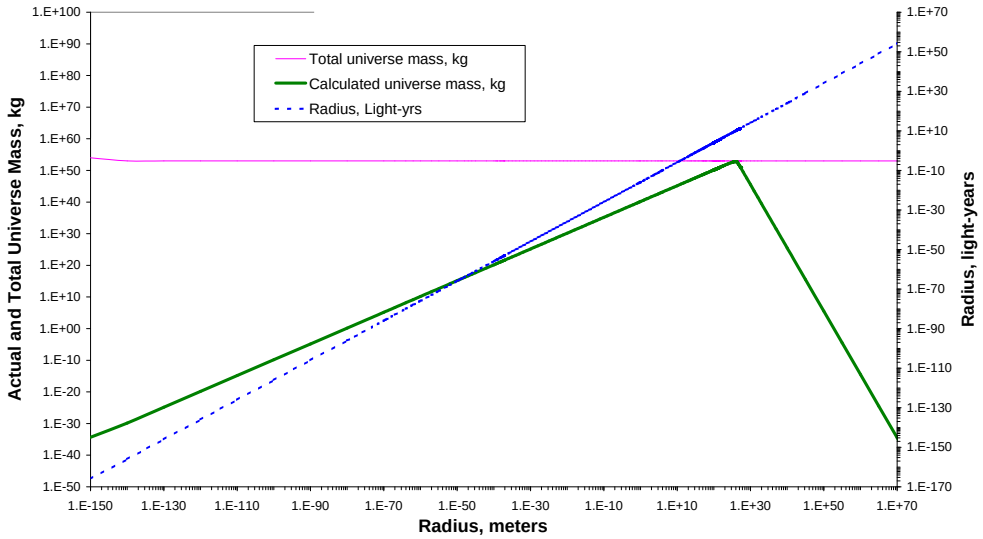


Figure 8: Universe mass versus radius predicted by GNMUE, demonstrating no black hole singularity



4.2 GNMUE Eliminates Black Hole or Big Bang Singularity

The quantum theory predicts that at densities greater than those supported by any quantum degeneracy, gravity overwhelms all other forces leading to the collapse of the body forming a black hole. All the matter ends up in an infinitely dense singularity at the center of the event horizon. The GNMUE does not experience any singularities as shown by the predicted results of actual mass versus size shown in Figure 8. The calculated mass is less than the Planck's mass when the radius is of the order of 10^{-100} meters. At still smaller radii, the predicted mass of the universe decreases to even smaller values without causing any singularity.

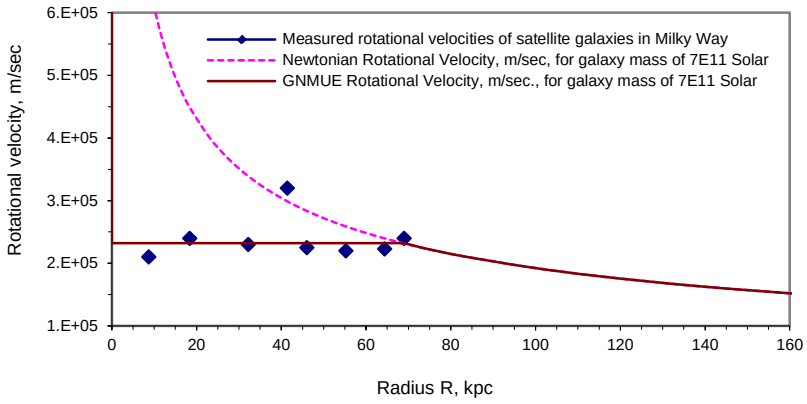
4.3 GNMUE Predicts Creation and Dilation of Matter in the Universe

GNMUE, eqn. (12), predicts the creation and dilation of mass m of the universe as a function of its size, as shown in Figure 8. The actual mass increases with increasing size of the universe until a maximum mass is reached at about 10 billion light-years, beyond which, mass decreases again with size. GNMUE thus represents the universe's mass, energy, space, and time as one continuum, without any limits or singularities, governed by the relativistic laws.

4.4 GNMUE Dissolves the Dark Matter Myth

The astronomers have, until now, explained the observed extra-ordinary large rotation velocities of stars in galaxies by claiming existence of large amounts of invisible dark matter predicted by the Newton's theory. Figure 9 shows a close agreement between the GNMUE predicted versus observed rotational velocities in the Milky Way spiral galaxy without any considerations of the dark matter (A detailed treatise is provided in reference [15]). GNMUE also predicts the observed radiant energy and visible size limits of galaxies and the universe. GNMUE predictions indicate that the elusive dark matter may be a mere artifact of the incorrect application of the Newtonian laws that neglect the relativistic effects prevalent at galactic scale.

Figure 9: GNMUE predicted versus observed rotational velocities in the Milky Way spiral galaxy.



4.5 GNMUE Eliminates the Need for Unverifiable Assumptions:

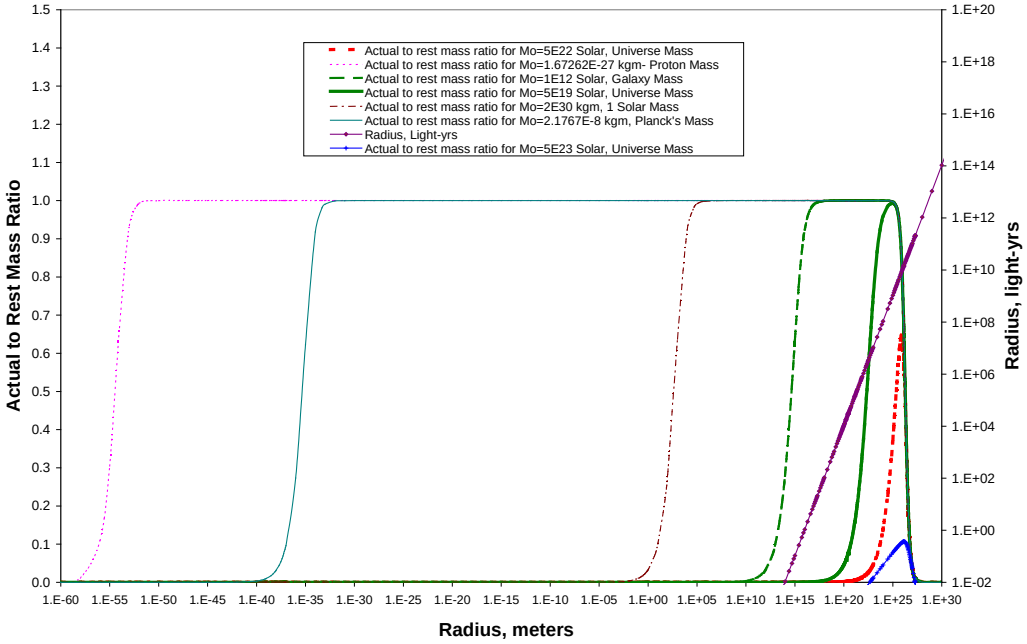
GNMUE eliminates (App. A) the need for other widely accepted but unfounded and unverifiable assumptions [15, 16, 17, and 18] in modern cosmology, which cannot be supported by theoretical arguments, experimental observations, or common human experience.

5. GNMUE PREDICTS STABILITY LIMITS OF MASSES

As described earlier, GNM is based on the hypothesis of the spontaneous mass-energy conversion during the spontaneous decay of an unstable particle. The following calculations show that GNMUE also predicts the observed stability of stable particles such as a proton and other ordinary objects from very small (quantum) to universe scales.

The ratio of the actual mass predicted by GNMUE, eqn. (12), to the rest mass M_o is shown in Figure 10 for rest mass M_o of a proton, Planck's mass, galaxy mass ($1x10^{12}$ solar), and parametrically varying Universe scale masses $5x10^{19}$ solar, $5x10^{22}$ solar, and $5x10^{23}$ solar. A proton mass is shown to be stable between the lower gravitational stability limit of $1x10^{-52}$ meters and an upper kinetic stability limit of $1x10^{25}$ meters. The predicted gravitational stability limit for Planck's mass is equal to the Planck's length ($1x10^{-35}$ meters) and $1x10^{15}$ meters for a galaxy mass ($1x10^{12}$ solar). Larger masses have significantly larger gravitational stability limits due to the increasing gravitational potential energy. For masses up to approx. $5x10^{19}$ solar, the upper kinetic stability limit is constant at $1x10^{25}$ meters and governed by the Cosmological Constant Λ. Masses greater than $5x10^{19}$ solar are shown not to be stable since their gravitational and kinetic energies approach similar order of magnitudes.

Figure 10: The ratio of the actual mass predicted by GNMUE to the rest mass M_o.



6. GNMUE EXPLAINS INNER WORKINGS OF QUANTUM MECHANICS BASED ON RELATIVITY

GNMUE dissolves the existing puzzles and bridges the gap between quantum mechanics and relativity theories via providing a new relativistic understanding of the inner workings of quantum mechanics as described below (Detailed mathematical treatise is published in references [15,16,17, & 18]):

- **Heisenberg Uncertainty:** GNM based explicit formulations for Heisenberg Uncertainty, presented in reference [15], show that this uncertainty is not inherent in nature but an artifact of the limitations of the classical measurements in the fixed space and time that fail to account for the relativistic effects governing the quantum phenomena being observed. The errors inherent in this method for measuring the behavior of slow moving (V<<C) particles and classical objects, wherein the relativistic effects are negligible, are small and hence free from any paradoxical measurement uncertainty. However, the errors get amplified tremendously when applied to the high energy (V ~ C) quantum particles or distant galaxies, wherein the relativistic effects become extremely important. GNM shows that via proper inclusion of the relativistic effects involving spontaneous mass-energy conversion, the quantum measurement uncertainty and its artifact paradoxes can be dissolved.
- **Non-locality Or Spooky Action-at-distance:** Non-locality is a key feature of quantum mechanics that seems to contradict the locality predicted by relativity theory due to the speed of light (C) limitation. GNM provides a relativistic formulation [18] to predict non-locality based on space-time dilation at high velocities (V~C). Action-at-distance, described as "spooky" by Einstein, is experienced only by an observer, who is observing a photon moving at V=C, situated in a Newtonian frame wherein the space and time are not dilated. However, the space-time are fully dilated in photon's own moving frame of reference causing all photon attributes appear to be synchronous or non-local to the stationary observer.

- **Wave-particle Duality:** Extending the widely known de Broglie model, a new wave-particle model [15] is developed integrating GNM, which explains the observed quantum and classical behaviors based on the relativistic spontaneous decay process. The model provides a physical understanding of the well-known paradoxes such as the quantum measurement problem, quantum tunneling, Bose-Einstein condensate, and quantum entanglement via properly accounting for the relativistic dilation of mass, space, and time.
- **Anti-particles:** One of the fundamental assumptions made by quantum mechanics and quantum cosmology is that the net mass-energy of the universe is zero. The artifact of this assumption leads to the presumed existence of anti-matter to cancel out the net positive matter energy in the universe. The existence of still allusive anti-particles in the same amount as the real matter is yet to be observed to prove the correctness of quantum predictions of anti-matter. GNMUE predicts spontaneous annihilation (as well as creation) of matter (mass-energy conversion) without invoking the unverifiable assumption of anti-matter.
- **Photon Model**: The conventional hypothesis is that the photon mass (rest mass) is always zero and it moves at the speed of light (V=C). However, these hypotheses are in direct conflict with relativity theory ($E=mC^2$) and laws of conservation of mass, energy, and momentum. GNM photon mass is determined by equation (4), wherein its rest mass M_0 (at emission or absorption) is non-zero and equal to its total energy divided by C^2. Only at V=C, the photon's relativistic mass dilates to zero.
- **Quantum Gravity and Time Paradox:** While a quantum theory of gravity is yet to be developed, GNMUE provides mechanistic descriptions [15] of the observed quantum gravity governed phenomena such as the radiant energy of galaxies (black hole evaporation), collapse of wavefunction, and gravitational stability [Figure 10] of quantum particles and classical masses. Gravity effects at quantum scales are explicitly described by GNMUE in terms of spontaneous relativistic mass-energy conversion and Newtonian gravity without the need for the paradoxical absolute quantum time.
- **Quantum Vacuum:** Also misunderstood as "Nothingness", quantum vacuum is explained by GNM as the Zero-point relativistic non-discrete state of fully-dilated mass-energy-space-time continuum occurring at V=C, which in reality entails totality of all contents of the universe in the form of kinetic energy M_0C^2.

7. SUMMARY AND CONCLUSIONS

The proposed Gravity Nullification Model for Universe Expansion (GNMUE) describes this missing physics and integrates it into a simplified form of general relativity that resolves many of the current well-known paradoxes and inconsistencies among general relativity, quantum mechanics, and cosmology. GNMUE predicts the observed galaxy and universe expansions. It provides a fresh perspective on the misconceived birth and evolution of the universe, especially the creation and dissolution of matter. It eliminates singularities in existing theories and the need for many incredible and unverifiable assumptions including the superluminous inflation, dark energy, dark matter, multiple universes, multiple dimensions, and quantum gravity. It also explains quantum weirdness and bridges the gap between quantum mechanics and relativity via revealing relativistic understanding of the inner workings of quantum mechanics. It also predicts the observed quantum and classical behaviors. GNMUE provides consistent answers to many key fundamental questions (App. A).

Finally, a new perspective on the wholesome universal reality (App. A) is provided encompassing the partial Newtonian, quantum, discrete, and non-discrete realities. GNMUE restores simplicity and beauty to physics and cosmology. It also rejuvenates the once lost "Elegance" to the so-called "Absurd Universe" [1]. Last, but not the least, the new wholesome understanding of reality is shown to have an immense potential for benefiting humanity via unifying physics, cosmology, and philosophy with purpose [19] and free will or consciousness (App. A).

Appendix A

GNMUE PROVIDES CONSISTENT ANSWERS TO THE FOLLOWING FUNDAMENTAL QUESTIONS

- Did the universe have a beginning – the Big Bang? Does it have an ending?
- What is the true nature of time and space? Is the universe expansion accelerating?
- Could the speed of light be exceeded? What is C? Do the universal constants vary with time?
- Are there parallel universes and multi-dimensions beyond ordinary three space and one time dimension?
- Is uncertainty or randomness the fundamental property of the universe?
- Is photon mass zero?
- Why the cosmological constant is so small as compared to that calculated by quantum mechanics?
- Is there non-locality in the universe?
- What is quantum gravity? Does quantum gravity have an absolute time?
- Is there dark matter or anti-matter? Do black holes exist? Do black holes evaporate –Hawking's Radiation?
- What governs the creation and dilation of matter?
- What governs the quantum versus classic behavior and the inner workings of quantum mechanics?
- What is the ultimate universal reality? Is it digital or analog or else?

GNMUE PROVIDES A NEW WHOLESOME PERSPECTIVE ON REALITY

GNMUE shows that the universe is a cosmos with a relativistic order and not chaos founded on uncertainty. The model also unfolds the following universal realities:

- The universe is not born out of nothingness (which is shown not to exist) nor will it disappear into oblivion. It represents an eternal and omnipresent continuum of mass-energy-space-time following the conservation laws.
- Relativity, and not uncertainty, rules the universe's connectivity and non-locality via space-time dilation.
- Space and time are relative entities. There is no absolute time or synchronicity in the universe, which has no absolute beginning, evolution, or ending. The apparent flow of time is a relative reality (an illusion) of the fixed ($V<<C$) space-time, which is only a small subset of the overall continuum ($0<V<C$) of space-time. GNMUE shows that the observed universe can be explained as a quasi-static universe without any explicit absolute (Newtonian) time or space or evolution. GNMUE provides a bridge between the Newtonian/Quantum fixed time ($V=0$) and universal timelessness ($V=C$).
- Quantum reality represents only partial reality and must be augmented with relativistic considerations to represent the universal wholesome reality. The relativistic universal reality exists irrespective of the observer. Paradoxes of quantum measurements and quantum reality (entanglement, tunneling, multiverses, multi-dimensions and anti-matter etc.) are artifacts of the observational limitations imposed by the fixed space-time. A measuring instrument interprets the quantum phenomena ($V\sim C$) from a Newtonian ($V\sim 0$) frame of reference, hence the quantum realty represents a truncated (collapsed wavefunction) partial reality resulting in the observed weirdness. In order to describe the true universal reality, proper inclusion of the relativistic effects is essential in interpreting the quantum observations performed in and limited by the fixed space-time.
- There is no multiverse. There is only one single quasi-static universe entailing various relativistic states of the one whole continuum of mass-energy-space-time (uncollapsed quantum wavefunction). The various relativistic states (at various V/C) of one mass-energy-space-time continuum may appear (allude) to a quantum observer (situated in fixed space-time) as parallel universes (multiple sets of mass-energy-space-time at various V/C).
- Quantum non-locality is a relativistic phenomenon caused by space-time dilation at velocities close to the speed of light ($V\sim C$).
- GNMUE provides a bridge between the discrete ($V<<C$) and non-discrete ($V\sim C$) realities via properly accounting for the relativistic effects.
- Simplicity (not complexity) and beauty (not absurdity of multiple universes, multi-dimensions, illusive particles, dark matter/energy etc.) are the dominant characteristics of the universe, which represents a "Cosmos" with relativistic order and not a chaos built upon uncertainty and disorder.

GNMUE ELIMINATES THE NEED FOR UNVERIFIABLE ASSUMPTIONS

GNMUE eliminates [15, 16, 17, and 18] the need for invoking the following unfounded assumptions, which cannot be supported by theoretical arguments, experimental observations, or common human experience:

- Anthropic principle
- Time variation of the following universal constants to explain paradoxes of the universe evolution:
  - Universal Gravitational constant, Speed of light, and Hubble constant
- Mysterious and still illusive quantum particles
- Multiple dimensions beyond the humanly experienced three dimensional space and time
- Parallel universes

GNMUE ELIMINATES THE NEED FOR SUPER-LUMINOUS INFLATION

BBM relies on the super-luminous inflation in the early universe to explain the observed uniformity in the microwave background radiation. The key argument against the super-luminous inflation scenario is that the extraordinarily dense matter at the beginning of the universe could not possibly move at a super luminal speed without violating laws of relativity and conservation of mass-energy. GNMUE explains [15 & 16] the observed uniformity via a relativistic space-time dilation predicted by the specific relativity equation as shown in Figure 1**.**

CONSCIOUSNESS – THE NEXT FRONTIER IN PHYSICS AND COSMOLOGY

The study of consciousness has primarily remained a focus of philosophy and biological sciences. However, the observed spontaneity (without any externally known cause) of the physical laws, wave-particle behavior, and spontaneous birth and decay of particles point to the existent free will or consciousness dimension of the universe that has so far been ignored in physics and cosmology. While questioning the foundations of physics, this dimension cannot be ignored or allowed to be shrugged under the so-called quantum randomness. GNMUE shows that inclusion of this significant characteristic of the physical universe may be a panacea to the current cosmic conundrum. The awareness or consciousness of the observer is essential to look/perceive beyond what is being measured in fixed space-time, which represents only a partial reality. If the majority of the universe is immeasurable due to the mass-space-time dilation, the physics of the immeasurable must be included in a universal theory.

FROM ABSURDITY TO ELEGANCE TO PURPOSE & FREE WILL

In summary, the apparent "Absurdity" of the universe is merely an artifact of the missing physics of spontaneous decay and incomplete interpretations of observations limited by the Newtonian fixed space-time. Integration of the missing physics into current theories reveals the true "Elegance" of the one wholesome universe via revealing its mysterious simplicity and beauty. GNMUE exonerates Einstein's "Biggest Blunder" – Cosmological Constant, explains his "Spooky Action-at-distance", and unravels his "Hidden Factor" behind the observed quantum mysteries via providing a bridge between quantum mechanics and relativity theories. The universe is not dark (dark matter & dark energy); we just need to open our eyes to the relativistic mass-energy-space-time. The universe is not multiverse; we fragment it via looking thru the peepholes of particles and strings. The universe is not a mere conglomerate of mindless particles floating around the universe. The uncertainty and randomness are not in the universe but in our chosen method of looking at it. Existence of time, entropy, beginning, and ending are all artifacts of our biased vision of classical Newtonian mass-space-time. The scientific understanding of the wholesome reality forwarded by GNMUE provides a bridge between science and spirituality [19]. The insight that the universe and life in it, including the human life, are not born out of nothing and will not disappear into oblivion provides purpose and meaning to their existence. The self-existence (without an external cause), eternity, and omnipresence of the universal relativistic laws and order point to the existent free will or self-awareness of the universe. The fabric of the cosmos is woven with the certainty of the universal laws and spontaneity of the relativistic continuum of mass-energy-space-time signifying order and free will respectively that make a genuine common pursuit of reality by science and spirituality possible.

INPUT CONSTANTS USED IN GNMUE PREDICTIONS

Based on the observational results from two balloon-borne telescopes, Boomerang and MAXIMA [12] the total mass M_o of the universe is estimated to be 100 trillion trillion trillion trillion tonnes or 10^{53} kilograms or $5x10^{22}$ solar masses. The 2dF Galaxy Redshift Survey [13] designed to measure the redshifts of 250,000 galaxies and the High-Z Supernova Search Team [14] reported the existence of a low-density universe with the Hubble constant H equal to approximately 70 km sec^{-1} Mpc^{-1} or $2.27x10^{-18}$ sec^{-1}. Using the above value of H, the Cosmological Constant is calculated to be $1.72x10^{-52}$ m^{-2} from equation (11).

Appendix B

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