

## **FROM LAWS TO AIMS & INTENTIONS - A UNIVERSAL MODEL INTEGRATING MATTER, MIND, CONSCIOUSNESS, AND PURPOSE**

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### **ABSTRACT**

This paper presents a scientific approach to address the following questions: Are mathematical laws mindless? How do goal-oriented systems arise, and how do they exist and function in a world that we can describe in terms of (apparently) goal-free mathematical evolution? It demonstrates the power of a wholesome consciousness-integrated science to reveal the physical basis for purpose, aims, and intentions in the universe and life in it. The approach of the scientific research is three-fold. First is to complete the picture of reality via integrating consciousness into a physical model and explain the observed universe behavior resolving the current paradoxes, singularities, and inconsistencies of the mainstream scientific theories. Second is to develop a framework for an integrated model of matter, mind, and consciousness founded on the wholesome reality. And lastly, demonstrate how the so-called mindless physical laws lead to the ultimate purpose, aims, and intentions. A successful agreement between the predictions and empirical observations of the universe demonstrates the validity and credibility of the proposed approach. The predictions are further testable and falsifiable via future observations. The goal-oriented behavior is shown to be an orderly physical/cosmic trend governed by the laws and not an accident or an imperative.

### **INTRODUCTION**

What I can recall, it all started one evening about ten years ago while helping my son with his high school physics homework. As I was walking away after giving him some hints to solve a problem, my son asked me- "Dad, does physics have anything to do with the real life? Is there any purpose to the universe and life in it? My teacher says that there is none." My answer was a casual agreement with the teacher due to the common belief of mainstream scientists that physics deals with the measurable reality of the inanimate matter and not the subjective real life goals or consciousness. However, his questions triggered a deep anxiety and doubt within my subconscious that motivated me for this research work.

Great achievements of science over the last few centuries, specifically in the last few decades, have enriched the material life on this planet. However, the apparent overconfidence and optimism based on the material successes alone have been afflicted with some very serious and as yet unexplained singularities and absurdities [1] in the flagship theories of science that are unable to explain the vast majority (96%) of the universe. One of the most serious outcomes of this deficiency is the apparent purposelessness of the universe and life in it, thus making science and laws meaningless. Such a conclusion of modern science is in direct conflict with the common human experience of the extraordinary order and self-emergence underlying the evolution of the universe. The root cause is shown to be the fact that the mainstream science has ignored spontaneity or consciousness and its theories are founded on the fundamentality of inanimate matter and forces. The higher level purpose of the living (conscious) system is further lost during its lower level fragmentation into inanimate pieces.

To understand the true nature of the universe and basis for purpose, aims, and intentions, one must realize that the universe consists of conscious beings and hence is conscious. The widely known biological consciousness is only a limited manifestation of the universal consciousness since inanimate brain matter cannot spontaneously generate consciousness or spontaneous physical behavior of the universe. Hence, to develop a universal understanding of purpose and aims/intentions an integrated model

of matter, mind, and consciousness is necessary that explains both the inanimate and conscious universe. There is an abundance of scientific evidence pointing to the spontaneity or consciousness in the universe. The well-studied physical phenomena of the spontaneous birth/decay of particles, wave-particle duality, spontaneous or self induced motion of the universe expansion, and the non-causal universal existence of the eternal physical laws provide the scientific evidence of consciousness in the universe. Furthermore, the presence of conscious beings and the prevailing cosmic order are not possible in a universe that is not conscious.

## **INTEGRATION OF THE MISSING SCIENCE OF SPONTANEITY OR CONSCIOUSNESS**

My answer to the question put forward by my son continued to disturb me deep inside and I began searching desperately to find an answer. I did not hesitate to think outside of the box and venture beyond the well-established mainstream scientific theories. A turning point in my understanding was the book [2] by Roger Penrose. Since I wanted to keep my approach simple and comprehensible, I started to look deeper into the theory of relativity for possible headways to unravel the mysteries of both the small below the quantum and the large scale dark energy fueling the accelerating expansion of the universe.

Since the existing scientific theories deal with the inanimate matter alone, they are incapable of addressing physical mechanism governing human thought, intentions, creativity, free will and hence the purpose in the universe. My biggest challenge was how to achieve such integration. Consciousness is often characterized by many a scientists as the ‘Ghost in the Atom’ [18] and considered to be outside the realms of physical sciences. I ventured beyond the presumed belief that consciousness is founded in the biological brain and free will/purpose/goals are outside the domain of science. The power of integrating consciousness into science comes from the wholesome view of reality in all its domains including the material (measurable) and non-material (immeasurable but predictable or experience-able). The non-material domain here does not mean the super natural, but well-known natural and observed spontaneous (non-causal) phenomena that are comprehensible to human mind. Spontaneous decay/birth of particles and the so-called dark energy causing the observed accelerating expansion of the universe are examples of such phenomenon.

The physics of the spontaneous decay phenomenon is integrated into a physical model of the universe that allows a system to induce a change to its own mass-energy state without an external agency. It is hypothesized that such consciousness defined as the self-induced motivation capability inherent in living systems allows them to efficiently organize their simplest components with the intricate aims of survival, reproduction, and other biological ends employing panoply of physical effects to accomplish many conscious or free-willed chosen goals. Such consciousness or spontaneous motion also governs the spontaneous expansion of the universe, spontaneous birth/decay of particles, and functioning of the biological mind that provides spontaneous self-motivation capabilities to biological life forms. This hypothesis is tested against the observed universe behavior and further testable via proposed future empirical observations.

## **RESULTS AND VALIDATION OF THE INTEGRATED SCIENTIFIC APPROACH**

A detailed scientific thesis including the proposed mathematical model and results is documented in the form of a book [3]. Specific details of the model are also included in references [4, 5, 6, & 7] and summarized in the Appendix. The proposed mathematical model integrates the physics of spontaneous decay of mass within a simplified form of general relativity. It provides quasi-static or time-invariant mass-energy field equations that predict the observed galaxy and universe expansions. It provides a fresh perspective on the misconceived birth and evolution of the universe, especially the creation and dilation of matter. It eliminates singularities in existing theories and the need for many incredible and unverifiable

assumptions including the superluminal inflation, dark energy, dark matter, multiple universes, multiple dimensions, and quantum gravity.

Using relativistic formulations of the universe as a spontaneously decaying/forming mass with rest mass  $M_o$ , the following Universal Relativity Model (URM) equation (1) is obtained for its relativistic mass  $m$  as a function of the universe radius  $R$  including the effects of gravity.  $\Lambda$  represents Cosmological constant,  $G$  is gravitation constant, and  $C$  is the speed of light.

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

Equation (2) below describes the time-invariant or quasi-static Relativistic Universe Expansion (RUE) model as an alternative to the Linear Hubble (LHM) model,  $V=HR$  in the standard Big Bang Model (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. (2) matches the predictions of the LHM, as shown in Figure 1. 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  $C$  asymptotically as  $R$  increases indefinitely. Since the RUE predicted  $V$  never exceeds  $C$ , it never violates relativity.

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

URM predicted mass, space, and time dilations versus  $V/C$  are shown in Figure 2.

Figure 1: LHM and RUE predicted velocity ratios.

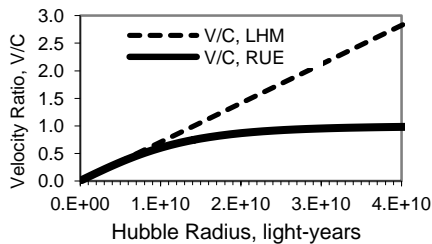
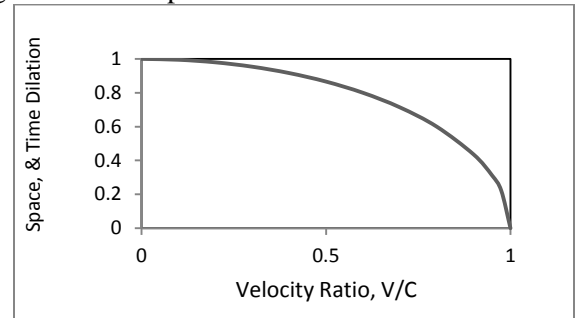


Figure 2: URM space and time dilations.



URM Solves the Dark Energy Puzzle as shown in Figure 3, which depicts the predicted fractional mass energy ( $mC^2$ ), gravitational potential energy (GPE), and relativistic kinetic energy (KE) for a range of universe sizes. The sum of the three energies remains constant at  $M_o C^2$ . 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 referred to 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. URM thus resolves the puzzle of the elusive dark energy or vacuum energy paralyzing modern physics and cosmology. There is no singularity (Big Bang) as  $R$  approaches zero since mass also tends to zero.

Figure 3: URM predicted fractional mass energy, gravitational potential energy, and kinetic energy.

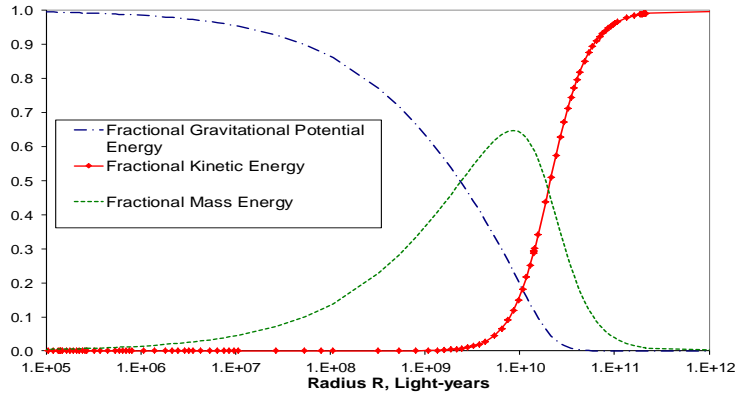


Figure 4 shows comparison of the supernova [8 & 9] and other near-field [10] data against the predicted relative brightness for LHM versus RUE. A good agreement is seen between the predictions of the RUE and the measured values. The LHM under-predicts the trend of the observed data beyond  $Z=0.4$ , 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 imposed by over extrapolation of LHM at large radii. Hence, the supernova data vindicate the RUE model predictions.

Figure 4: Comparison of LHM and RUE predictions of Supernova and near field data.

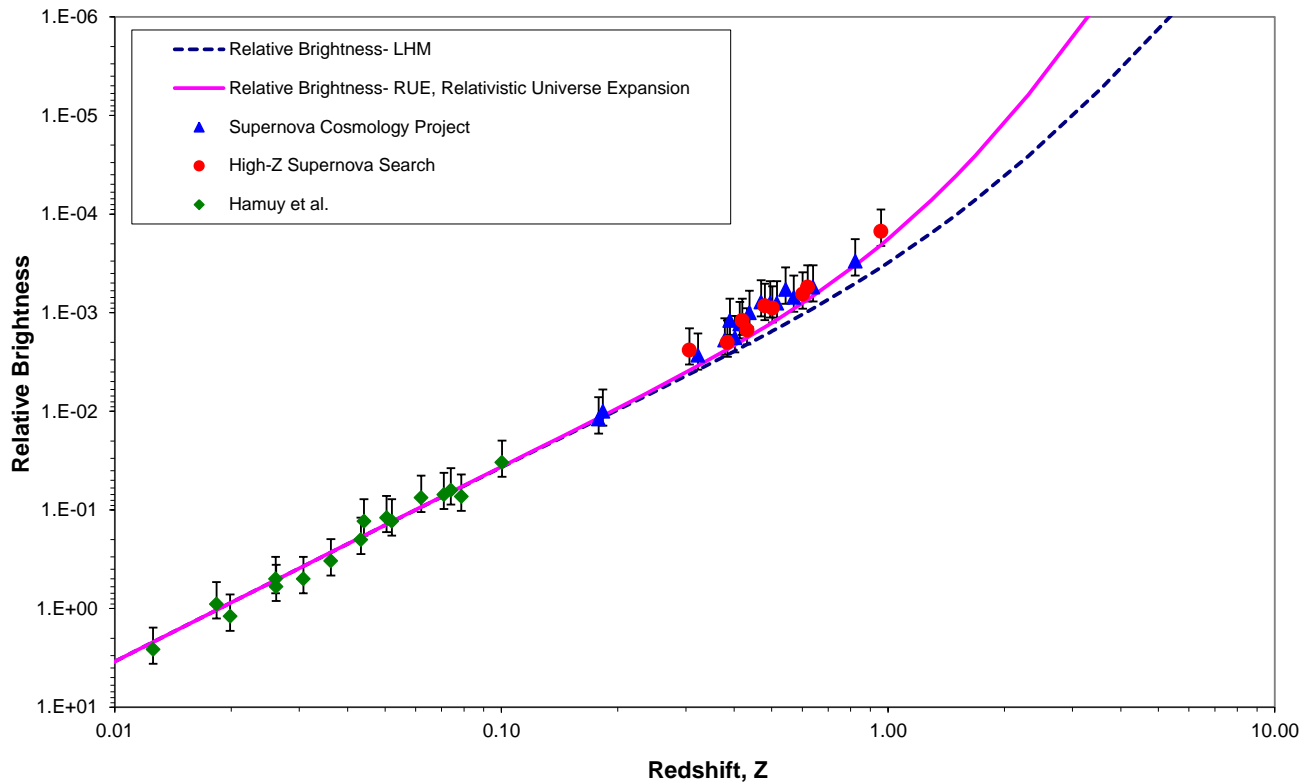
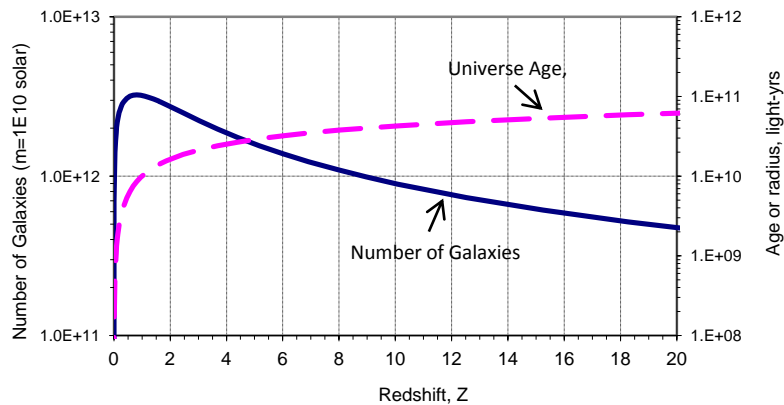


Fig. 5: Evolution of number of galaxies and size vs. Redshift Z



The model is also vindicated by recent observations of mature galaxies in the far-field or very early universe. As of 2012, there were about 50 possible objects or mature galaxies  $z = 8$  or farther, and another 100  $z = 7$  candidates, ranging up to 13.39 billion light year away, based on photometric redshift estimates released by the Hubble eXtreme Deep Field (XDF) project from observations made between mid-2002 and December 2012 [11]. The model also predicts the results of a recent study [12] that shows the total number of galaxies in the universe up to  $z=8$  is about two trillion, almost a factor of ten higher than would be seen in an all sky survey at Hubble Ultra-Deep Field depth. The model predictions extend much beyond the 14 billions years, the current age of the universe predicted by the standard model limited by the linear Hubble model. Based on an average galaxy size of  $10^{10}$  solar mass, the UR predicted total number of galaxies up to  $z = 8$  falls between the maximum of  $3.2 \times 10^{12}$  and minimum of  $1.1 \times 10^{12}$  which is in close agreement with the published results, maximum of  $2.7 \times 10^{12}$  and minimum of  $1.4 \times 10^{12}$ , in reference [12]. The predicted results also support other conclusions of the study that the number of galaxies decreases with time after the initial birthing at  $z < 1$  and the possibility of large number of undetected galaxies existing at higher redshifts  $z > 12$  as shown in Figure 5. **These UR predictions are further testable via future observations of mature galaxies in the still unexplored far-field universe beyond 14 billion light-years as the cosmological observational capabilities improve.**

## A NEW PERSPECTIVE ON UNIVERSAL REALITY

URM represents the universal reality as a time-invariant or quasi-static continuum field of various mass/energy/space/time states as a function of size  $R$  or velocity potential expressed by ratio  $V/C$ . Since the universe, on a large scale, is known to be homogeneous and isotropic, the Relativistic Expansion represented by eqn. (2) holds true for any observer anywhere in the universe, and hence there is no center or edge of the universe nor there is any direction of time such as the beginning or time evolution as of the universe. The redshifts and Hubble velocities can be predicted quasi-statically without any time-variant expansion of space and without any explicit consideration of time in the model. No mass-energy is ever lost; it simply gets redistributed in the form of mass, gravitational, or kinetic energy during various relativistic states. URM also predicts an asymptotic Zero-point state at  $V=C$ , wherein mass, distance or form (not space), and time are fully dilated and pure relativistic kinetic energy, commonly known as dark energy, fills the entire universe. URM depicts the universe as a wholesome and congruent continuum of all matter/energy/space/time states extending from near-field ( $V=0$ ,  $R=0$ ) to far-field ( $V=C$ ,  $R \sim \infty$ ). Each of these multiple parallel states (commonly known as parallel sub-universes) has its own specific space-time and clock; there is no one unique universal clock that denotes unique universal beginning, current or ending times. The above predictions of the universe behavior are alternative to the widely known Big

Bang standard model that describes the universe beginning at the absolute zero time moment and expanding in real finite time with a time variant evolution leading to a finite age of 14 billion light years. Big Bang is a singularity at time zero, but URM predicted universe has no singularity. As described in ref. [3] and appendix, URM also explains the inner workings of quantum mechanics.

### URM OFFERS A FOUNDATION FOR A THEORY OF CONSCIOUSNESS & PURPOSE

Since the human mind is an intermediary between the observations (recorded by the brain) and conscious experiences of the physical world, it is imperative to understand the physical basis of the mind for a complete understanding of the nature of consciousness beyond the biological consciousness. The well-known physicist Freeman Dyson during an interview with [meaningoflife.tv](http://meaningoflife.tv) alluded to the evidence of three levels of mind - the human mind, the mind residing at the micro level the atomic subatomic level, and then at the very macro levels the mind of the universe. Dyson states: “..... So the atom seems to have a freedom to choose, that's something, which characterizes quantum processes that they seem to just occur spontaneously. We call that spontaneous decay. So it is spontaneous; .....this freedom that the individual atom has to have.... seems to be an indication of some rudimentary form of mind.” Thoughts (brain waves) in a contemplative human mind can be compared to the quantum particles that can decay or be born at the free will of the person. This provides a common basis for the human mind and the micro-mind suggested by Dyson. Further, since the empty space in the universe is filled with particles that get born and decay instantly at their free will (non-causal), the argument of similarity between the human mind and the micro-mind can be extended to the macro- or the universal mind. In a New York Times article [13], Brian Greene enumerates this fact elegantly by describing how our conscious moment-by-moment activities are governed by the physics of mass-energy equivalence described by Einstein's special relativity theory: “... When you drive your car,  $E = mc^2$  is at work....When you use your MP3 player,  $E = mc^2$  is at work..... As you read this text,  $E = mc^2$  is at work. The processes in the eye and brain, underlying perception and thought, rely on chemical reactions that interchange mass and energy, once again in accord with Einstein's formula.” **The physical process governing goals involves intentional self-induced change of state by a living system again using relativistic mass-energy conversion processes within its mind-body.**

Using the above arguments, it is apparent that URM formulations represent an integrated model of the spontaneous relativistic mass-energy-space-time conversion or equivalence that also governs the physical mechanism of consciousness, aims, and intentions unifying the three kinds of minds stated by Dyson – human observer's mind, micro-mind at the quantum scale, and the macro-mind at the universal scale. It closely complements as well as enhances understanding of the wholesome continuum of the matter, mind, and consciousness beyond the mechanism underlying conscious quantum systems developed by Keppler [14]. Based on the hypothesis that the full range of phenomenal qualities is built into the frequency spectrum of a ubiquitous zero-point field (ZPF), Keppler forwarded a quantum model as a promising candidate that is qualified for playing the dual role as both the carrier of energy and consciousness. It proceeds on the assumption that conscious systems employ a universal mechanism by means of which they are able to extract phenomenal nuances selectively from this field. This dynamic coupling mechanism is presumed to be a unique feature of quantum systems, suggesting that the dividing line between conscious and non-conscious systems is defined by the differentiation between quantum systems and classical systems. It is further posited that a natural measure for the level of consciousness of a state is the degree of coupling or order in the local ZPF compared to the completely disordered field.

The Zero Point State (ZPS) depicted by URM is the wholesome un-manifested (fully-dilated mass, space, and time) kinetic energy (commonly known as Dark Energy) state at  $V=C$  that is all-inclusive of all the possible manifested mass/energy/space/time states. This is in contrast to the ZPF of the quantum model [14] that consists of the full range of phenomenal qualities built into its frequency spectrum. Since the vacuum energy of the quantum ZPF (vacuum) is roughly 120 orders of bigger than the relativistic

cosmological constant predicted dark energy, the ZPS of URM represents the fundamental reference state of the universal consciousness. Just like the level of consciousness of a quantum system is determined by the degree of coupling or order in the local ZPF compared to the completely disordered field, the degree or level of consciousness of a given observer is represented by the coupling or overlap between the range of the velocity  $V$  of the observer's frame of reference and ZPS, which also correlates to the corresponding range of the radius  $R$  given by eqn. (2) representing the human observer's domain of awareness. The ZPS state thus represents absolute (no relativity) or full consciousness at  $V=C$  and  $R$  tending to  $\infty$ . It also represents the unmanifested zero-entropy and expansive domain of the eternal (living) universal laws depicting the fundamental universal consciousness or awareness.

While the quantum model entails a discrete boundary between the classical (unconscious) and quantum (conscious) system, URM depicts a wholesome and congruent continuum of all matter/mind/consciousness states extending from unconsciousness ( $V=0$ ,  $R=0$ ) to full consciousness ( $V=C$ ,  $R \sim \infty$ ). Lower level consciousness states at small  $V$  ( $V/C \ll 1$ ) and  $R$  are primarily matter/gravity dominated while the higher level ( $V/C \sim 1$  or large  $R$ ) states are anti-gravity or cosmological constant (kinetic energy) dominated as shown in Figure 2. Further various levels of consciousness states are complimentary or equivalent transcendent states and not evolutionary states evolving in space/time. Human mind thus represents a small subset or replica of the universal mind or consciousness. Nature offers choice to a human observer to choose reality from the whole ensemble of relativistic states. And, this choice leads to the freedom of human intentions or goals.

URM approach of integrating brain (matter) and mind is vindicated by the published scientific research [15, 16] demonstrating that intentional long-term meditators can self-induce high-amplitude gamma synchrony during mental practice and structural changes in the brain. Further, subjective but repeatable experiences [17] of intentional meditators experiencing space-time dilation also vindicate predictions of URM. An intelligent living system or human observer is capable of intentionally transcending from one level of consciousness to another just as a self-decaying mass transcends its mass-energy levels. An inanimate system does not have this capability. Transcendence or phase change from one level of consciousness to another ( $V_1$  to  $V_2$ ) is intentional or self-motivated by the observer via spontaneous mass-energy conversion within its mind/qualia states. However, within a given state of low consciousness there exists corresponding finite mass/energy/space/time that governs its evolution in time. The transcendence from a lower to higher level of consciousness leads to lower entropy state while evolution within a fixed consciousness level leads to increasing entropy, complexity, uncertainty, and chaos with the arrow of increasing time.

## **URM PROVIDES A FRAMEWORK FOR AIMS, INTENTIONS, & PURPOSE**

Now coming to the theme –“Wandering towards a Goal – How can mindless mathematical laws give rise to aims and intentions?” As demonstrated by URM above, the mathematical laws are not mindless but the fundamental foundation of mind as well as the cosmic consciousness represented by the ZPS. Einstein was right when he said –“I want to know God's thoughts” in developing theory of relativity. The level of self-driven purpose, aims, and intentions is associated with the level of consciousness or awareness of the mind. Nature and its laws offer choices to the living beings to choose reality and goals. Qualia, aims, purpose, and intentions represent various mass/energy/space/time states of the mind that are limited manifestations of the universal consciousness subject to the limits of the awareness of the mind and its aims/intentions. Mind represents a bridge between body (matter) and consciousness. Thus URM provides a potential explanation to the so-called “Hard Problem of Consciousness” via depicting the physical mechanism governing mind or qualia. URM demonstrates the ultimate highest level purpose in the universe in its eternity, non-locality, wholeness, certainty and implicate order at the most fundamental level of reality of absolute consciousness or ZPS state. The realizations that the universe is not born out of nothing and it is not merely going to disappear into the oblivion, and that the universe is an eternal

cosmos with order and not chaos enforce its very purpose and meaningfulness. Eternity means the ultimate survival transcending time and evolutionary struggles. Human mind is demonstrated by some enlightened beings to be capable of realizing this meditative state due to the scientifically established plasticity of the brain.

The manifested universe at lower levels of consciousness in various forms of biological and primate life are motivated by the same universal consciousness and laws but limited via their classical bodily forms (in fixed space-time) to the process of biological evolution resulting in its inherent purpose of minimizing energy and maximizing entropy. Mortality and not eternity is the ultimate destiny of the biological life in spite of its intentions for prolonging survival. Primates have selfish goals because their awareness is confined to body and immediate environment. At still further lower material level of consciousness, inanimate classical objects, planets, stars and galaxies do not seem to have goals of their own other than providing objective measurable evidence to enable human beings to realize the higher level purpose.

Evolution and transcendence are two orthogonal manifestations of and powered by the underlying fundamental universal consciousness. The arrow of evolution or time is towards increasing entropy, disorder, and complexity, while the arrow of transcendence is towards elevating to higher level of consciousness or awareness, cosmic order, and zero entropy. The transcendence to higher order is sometimes interpreted by a classic observer as emergence from a lower order inanimate state. The ultimate purpose of any living system is to achieve full consciousness, but its bodily, brain, material, and sensory limitations constrain and mold the actual goals to be confined within the boundaries of limited awareness (R). Primate goals of reproduction are also powered by their limited level of consciousness to achieve continuity and longevity of species. Reproduction and death are inherent properties of the universe as depicted by the spontaneous birth and decay of quantum particles leading to mass creation/dilation. Similarly, the evolutionary features of information processing, computation, learning, complexity thresholds, and/or departures from equilibrium arise from the fundamental motivating power of consciousness. Rarely a living being is aware and utilizes its full potential capability to transcend to the cosmic consciousness. URM thus reveals that the goal-oriented behavior is a physical or cosmic phenomenon and not an accident or an imperative.

The level of intelligence is directly related to the level of consciousness. Intelligence represents capability of a living system to collect, process, and gainfully utilize information to achieve its intentions and goals according to their consciousness level. Causality or cause-effect phenomena apply to classical systems that have well-defined boundaries of form in space-time. Causality is dominant in matter/gravity or near-field universe at very low levels of consciousness. Conscious or living systems may impact the outcome or effect of an external cause utilizing their conscious intentions to redistribute the flow of energy. In this sense, conscious or living systems propelled by consciousness may behave teleologically (purpose driven) rather than causally.

The URM model also unfolds the following universal realities and their apparent purposes:

- Consciousness or spontaneity in nature provides transcendence and phase-transition mechanism to allow equivalence or complementarity in physical phenomena.
- Relativity, and not uncertainty, rules the manifested universe wherein all things and phenomena are connected in spite of their apparently different form, location and time.
- Simplicity and beauty, and not complexity and uncertainty, are the dominant characteristics of the universe for human beings to enjoy and cherish their aims and intentions.
- Time and evolution represent relative realities of matter and primates respectively, with an apparent purpose to propel them towards the ultimate survival.



- There is only one single whole universe, which encompasses multiple states of the one wholesome Zero-point state representing “Everything-ness” that is often interpreted by a classic observer as Nothingness.

## SUMMARY

I am indebted to my son asking the question of science’s capability to address life and purpose. The fifteen year’s journey that followed has been an enlightening and wondrous experience of my life. This has reinforced my belief in the power of a wholesome consciousness-integrated science to reveal the physical basis behind purpose, aims, and intentions in the universe and life in it. URM demonstrates that a common set of physical laws govern the functioning and behavior of matter, mind, consciousness, intentions, aims, and purpose at all scales in the universe. It reveals that laws are not mindless but the very mind of the universe and goal-oriented behavior is not an accident or an imperative. URM predictions are not only vindicated by the empirical observations of the universe but also testable and falsifiable against future observations. I have also realized that there are no boundaries between genuine science and genuine spirituality; it is all One Wholesome continuum of the fundamental reality of consciousness beneath the manifested material and biological world. Now, I understand the scientific meaning of God without resorting to the dogmatic belief. And last, but not the least, I have now realized that God is not a particle and what may possibly be his/her intentions.

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## APPENDIX

The “Absurd Universe” as described by Michael Turner [1] represents the consensus characterization of the controversial Big Bang and Standard Model cosmology. 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 govern the observed universe. This mission is marred by the uncertainty and confusion of the multi-verse predicted by quantum theory that presumes parallel universes with their own varying sets of laws. In spite of their demonstrated successes, the two leading theories - general relativity and quantum mechanics, have been unable to explain 96% of the universe presumably comprised of the unknown dark energy and dark matter. Hence, their one wholesome universality 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 its well-known weirdness and a serious lack of understandings of its inner working including the quantum gravity. In spite of several alternate cosmological theories, there remains a serious lack of a cohesive theory that resolves the so-called cosmic conundrum entailing many unexplained paradoxes and inconsistencies.

The root cause of widely known controversies is the missing physics of consciousness from the widely accepted physics and cosmology theories. Consistent answers to some key fundamental questions are yet to be found. It is conceivable that the universe extends far beyond the visible and measurable limits of the modern science. This may require facing up to the challenge of opening the theoretical frontiers of science to what is beyond the existing measurement capabilities of the current instruments and what is “beyond-the-cause-effect” in order to fully reveal the ultimate universal reality. It is hard to deny the humanly experienced free-willed or spontaneous physical existence of the universe and its eternal laws. If that is true, how could the physical description of the universe be complete without a mathematical treatise of spontaneity or consciousness into any universal theories? The spontaneous decay of particles, their spontaneous (wave-particle) behavior both as matter or energy waves, and spontaneous acceleration of photons emanating from a stationary surface to the near speed of light without any external stimuli are further examples of the existence of the spontaneity as a universal physical phenomenon. The observed flow of time signifies spontaneous changes occurring in the universe without any known external stimuli driving it. There are no known fundamental physical mechanisms for spontaneous creation or dilation of matter, which governs the fundamental birth and existence of the universe. In fact, there is no physics to explain the

origination of first motion in the universe. The so called Big Bang is only an implied “Origin of Motion” based on the so-called expanding universe implied by Hubble observations. What (physical mechanism?) governs the conditions that allowed the birth of the universe and its spontaneous expansion is an unknown. Similarly, the root cause mechanism that allows the observed spontaneous physical phenomena as well as weirdness of quantum mechanics remains so far unknown and unaddressed.

The work published [3, 4, 5, 6, and 7] by the author shows that the root cause of the black hole singularity experienced by General Relativity (GR) is the missing physics of spontaneous conversion of mass to energy and vice versa representing the equivalence of mass and energy. When large amount of mass is pulled in by gravity attraction force into a small volume it results into a very high density. As the volume becomes smaller and smaller, the density tends to increase to infinity leading to the singularity. Including the missing physics of the spontaneous transformation of matter to radiative energy into a simplified universal general relativity model eliminates this singularity. The integrated model also explains the observed rotational velocities of stars in galaxies without the need for the mysterious and illusory dark matter. The Cosmological Constant is known as “Einstein’s Biggest Blunder” because he introduced this into his relativity theory as an extraneous anti-gravity constant to counter gravity to allow a static (time-invariant or non-expanding) universe. The integrated model also explains dark energy via a new fundamental mechanistic understanding of the Cosmological Constant and time-invariant relativistic universe expansion as an alternative to the widely known linear Hubble expansion as well as apparent accelerating expansion derived from Supernova observations. A new testable Universal Relativity Model (URM) is proposed that predicts the observed behavior of the universe and galaxies and other observations.

Spontaneous mass-energy conversion representing the equivalence of mass and energy is shown to be the most fundamental universal mechanism explaining the observed far-field or 96% of the universe. The proposed model provides a relativistic physical basis for the inner workings of quantum mechanics eliminating the need for its many incredible and unverifiable predictions including the superluminous inflation, multiple universes, multiple dimensions, and quantum gravity. It also predicts the limits of the observed quantum and classical behaviors. URM provides some consistent answers to many key fundamental questions such as the following:

- What governs the stability of classical masses and quantum particles?
- What governs the quantum versus classic behavior and the inner workings of quantum mechanics?
- Is Heisenberg Uncertainty a fundamental property of the universe or a measurement induced feature?
- What leads to Non-locality or Spooky Action-at-distance?
- How to explain wave-particle duality – a new understanding based on spontaneous decay of mass?
- What is photon mass and speed – a new photon model?
- What governs the creation and dilation of matter? Is there anti-matter? Can something (Big Bang) be created out of “Nothing”?
- How to explain Quantum Gravity and Time Paradox?
- What is Quantum Vacuum; what it entails?

- What is the true nature of time and space? Is there a continuum of mass-energy-space-time? How it comes about?
- Could the speed of light be exceeded? What is  $C$ ? Do the universal constants vary with time?
- Did the universe have a beginning – the Big Bang? Does it have an ending?
- Are there parallel universes?
- Why the cosmological constant is so small as compared to that calculated by quantum mechanics?
- Is there dark matter? Do black holes exist?
- What role the consciousnesses of the observer play in observing and interpreting the physical reality?
- Could a mathematical framework for consciousness be integrated into physics and cosmology theories?
- Could science reveal the ultimate reality and purpose of the universe and life in it? How to bridge the gap between physics and philosophy?

In summary, modern physics and cosmology have not reached a dead end, but merely suffering from missing fundamental physics of consciousness from the well-known mainstream theories. Inclusion of the missing physics of the well-observed physical reality of the spontaneity of mass-energy equivalence is shown to potentially cure their shortcomings/inconsistencies and enhance their predictability of the observed universe. Such inclusion restores simplicity, purpose, and meaning to science and the universe.