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A Universal Model Integrating Matter, Mind, & Consciousness Resolves the Hard Problem & Cosmic Conundrum

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ABSTRACT

A multi-disciplinary and universal approach to consciousness addresses consciousness issues within the context of both neuroscience and contemporary physics. This paper proposes an integrated model that provides a direct relationship between the physics concepts of space, time, mass, and energy, and the consciousness concepts of spontaneity and free will. The observed spontaneity or free will in natural phenomena, which include human mind, is represented as a lower order manifestation of the higher order universal consciousness. The approach of the scientific research is two-fold. First is to complete the picture of universal reality via integrating consciousness into a physical model and explain the observed empirical 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 including consciousness. 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 empirical observations. Universal consciousness is shown to be the eternal fundamental state of existence depicted as the Zero Point State. The neurobiological or brain-mind processes and qualia (emotions, thoughts, intentions etc.) are shown to be a subset of the relativistic states of consciousness or the universal mind represented as one wholesome continuum of space-time-mass-energy - an orderly physical phenomenon governed by the universal laws and not a brain generated imperative.

INTRODUCTION

Great achievements of science have enriched the material life on this planet. These successes have led some scientists to proclaim that the 'End of Science' is near or the final victory – 'Theory of Everything' is within reach in the near future. 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 paradoxes [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 predicted purposelessness of the universe and life in it, thus making science and scientific 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 scientific approach has ignored spontaneity or consciousness and its theories are founded on the fundamentality of inanimate matter and forces.

The problem of consciousness is generally considered to be a problem only within the domain of neuroscience. That is because of the inherent and premature materialistic assumption that consciousness is an epiphenomenon of the brain. The sequential firing of neurons in the brain is assumed to create what are called the correlates of consciousness. The overall problem of consciousness is historically divided in two parts. The easy problem is to experimentally correlate the measured mental states in terms of electromagnetic signals to various well-defined brain and bodily activities. The hard problem, on the other hand, is how the mental states or firing patterns of neurons in the brain create subjective experiences such as anger, love, fear, or hate etc. How it creates the feeling of "I" or the personhood that relates to others

the way it does still remains a big mystery in neuroscience. The hard problem is also known as the classical mind/body problem – "How the flesh in mind gives rise to the feeling of consciousness?"

However, the still unrecognized and hardest of all the known problems of consciousness is whether consciousness is a non-local universal rather than a local neurobiological phenomenon. The very fact that human mind is able to perceive and experience the reality of the eternal and non-local universal laws points to the non-locality of human mind. Another related question is whether there exists free will in the universe. These questions arise because even if all conscious beings became extinct from the planet Earth, the spontaneous, self-existent (free-willed), eternal, and omnipresent laws of the universe would still prevail. There are many known planets in the universe that may not be inhabited by life but the same natural laws still prevail there. The laws that govern atoms, electrons, and photons, as well as mass, energy, space, and time would still be spontaneously active so long as the universe is in existence. Even quantum wave functions remain in dormant existence as potentialities in absence of a conscious observer. The consciousness of the human mind is able to perceive the free-willed or self-existent universal laws and the spontaneity of the universal phenomena such as the spontaneous acceleration of the universe, spontaneous decay of the atom, and wave-particle duality (wherein a particle mass spontaneously convert to a wave of energy and vice versa). And so we need to ask if the spontaneous existence of the natural laws and phenomena is attributable to a universal consciousness and if biological consciousness is nothing but a sub-level reality within the overall universal consciousness.

Seen in this light, the neuro-biological mind has no bearing on the laws of nature and their universal, eternal, and non-local existence. It is well known that within a short time following a person's death when all the material ingredients of the body and brain are still intact, the brain stops generating the correlates of mind. What changes occur in the physical states of the brain a moment before and a moment after death that lead to the cessation of the biological consciousness? This paper addresses these issues within the context of modern neuroscience and related problems in contemporary physics.

To understand the true nature of the universe, one must realize that the universe consists of conscious beings and hence is conscious. The fact that every location in space and every moment of time in the universe is aware of the universal laws points to the existence of awareness of a universal mind or consciousness. The widely known biological consciousness is only a limited manifestation of the universal consciousness since inanimate brain matter cannot generate universal consciousness or spontaneous behavior. If neurobiological consciousness were generated by brain, it would be limited only to the local bodily sensory perceptions/experiences and not the cosmic or universal experiences. Hence, to develop a universal understanding of consciousness a comprehensive and integrated model of matter, mind, and consciousness is necessary that explains both the inanimate matter and conscious universe. The universe is not just a collection of inanimate matter in the form of particles, atoms, planets, stars, and galaxies. 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 universal non-causal presence 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.

This paper presents a scientific approach to address the following questions: What powers the biological or so-called brain-produced consciousness, and how does consciousness causally affect brain processes? What is a potential physical theory of consciousness, and do we have free will? Did consciousness evolve or has it been present in the universe all along? Can consciousness persist after bodily death? It demonstrates the power of a wholesome consciousness-integrated science to reveal the ultimate universal reality or existence and physical basis for consciousness (qualia) of the human mind.

THE PERSISTENT PARADIGM OF MODERN NEUROSCIENCE– "BRAIN CREATES MIND?"

Donald Hoffman [2] summarizes the current dilemma of neuroscience as to "How brain creates mind?" as follows - "Despite substantial efforts by many researchers, we still have no scientific theory of how brain activity can create, or be, conscious experience. Current theories ……. fall short of the minimal standards of quantitive precision, novel prediction, and explanatory scope that are normally required of a scientific theory."

The prevailing view in modern neuroscience is that it is the brain that creates the mind. Biological consciousness is treated as an epiphenomenon of the brain under the assumption that there is nothing other than biological consciousness in the universe. Let us examine this view a little more closely. At the outset, this assumption implies that if all the brains in the universe were to stop functioning, the universe would cease to exist. This is parallel to the well-known observer's paradox of quantum mechanics –"Is there a moon if no one is looking?" Furthermore, to say that the brain creates the conscious experiences is very much like saying that "radio creates music" or "TV creates news".

The biological-consciousness, mind, or ego is reflected in the well-known phrase – "I feel, therefore I am." This "I" or the feelings are the precipitant perceptions of the individual brain and its neural circuits formed by the past evolutionary experiences. Thus the biological consciousness has its genesis in the universal consciousness and merely represents its bodily manifestation formed and adapted thru the evolved circuitry of the individual brain. The biological "I", the ego or the mind, is merely a reflection of the universal consciousness in the colored or impaired mirror of the individual brain. Just as when the radio malfunctions or breaks down the music stops, when the brain malfunctions or breaks down, such as during a coma or death, the mind stops working ceasing the conscious experiences. The universal consciousness, however, prevails or exists unaffected by the malfunction of the individual brain, just like the electromagnetic spectrum generated from the radio station remains unaffected by the malfunctioning of the individual radio. This is evidenced by the eternal and non-local presence of the spontaneous (self-existent) universal laws or quantum wave functions irrespective of the death of the individual brains or conscious observers. For example, the planet Mars still exists along with all the prevailing natural laws irrespective of the potential fact that all its possible living inhabitants with brains/minds in the past might have been vanished due to some natural or accidental causes.

In recent times, philosophers, cosmologists, and some mainstream cognitive scientists have rejected materialistic approach and supported alternative and wholesome theories regarding the brain and mind. Philosopher John Searle writes [3] - "Consciousness is irreducible not because of it is ineffable or mysterious, but because it has an essentially subjective first person mode of existence and therefore cannot be reduced to third person phenomena." The Templeton prize-wining cosmologist George Ellis states [3] - "The standard mistake that fundamentalists make is to posit a partial cause as the whole cause. Yes, the neurons are there. That's a partial cause of what's going on. What these neuroscientists are missing, though, is the top-down action in the brain, which is the part that gives life its actual meaning. And, if you choose to look from the bottom up, you will never see that meaning…..Now, the physicists tend to miss both the same-level and the top-down view. And, it's the same with these neuroscientists."

Research [3] has shown that a desirable and more wholesome physical state of the brain can be induced deliberately via meditation at the free will of the meditator. Obviously this phenomenon cannot be explained by the current materialistic paradigm of neuroscience that all functions of the mind can be attributed to brain circuits. In fact, recent studies demonstrate that a persistent training in meditation can create or alter brain circuits and neurons demonstrating that mind can create brain. The neuroscience research [2] at the University of Wisconsin at Madison suggests that by meditating regularly, the brain is reoriented from a stressful fight-or-flight mode to one of increased contentment. Scientists are discovering

that with enough practice, the neurons in the brain will adapt themselves to direct activity in the frontal concentration-oriented area of brain.

Thus we come to the conclusion that the materialistic paradigm of modern neuroscience that the brain generates mind may be only partially correct. Brain may modulate/amplify sensory signals to experience qualia, thoughts, and emotions but it does not generate the self-existent universal consciousness or free will. The mind thus represents a subset or part of a universal consciousness colored or limited by the evolved physical properties of the individual brain circuits molded by its evolutionary life experiences. Brain merely acts as the radio and translates the wholesome expression of the universal consciousness into the body language of the mind or the biological consciousness of the "I".

How does physics come into the picture within the context of our argument that there is indeed a fundamental universal consciousness or awareness in form of the universal laws beyond the neuro-biological mind? There are some fundamental challenges to using the reductionist scientific approach to solve the problem of consciousness as described [4] below - "Any search for the foundations of consciousness is equal to the attempts to present connections between consciousness and objects as connections between one object and another. ….. But, as was mentioned before, consciousness is not such a thing as body….." Searle is among the growing number of philosophers who have argued [5] that we must expand our notion of the physical to solve the mind-body problem. Searle proposes to leave the mental intact and to enlarge the physical (to the universal scale) until it can accommodate the mental in its unreduced form.

PARALLELISM WITH PHYSICS PROBLEMS

Jerry Josties and James W. Christy [6] suggest that the problems of modern neuroscience can be resolved by a deeper consideration of the failed world view of Physics in which they arose - ".. Physics provides precise description of the measurable aspects of our experience, via the mathematical laws of nature…. We contend that in such a larger context many of the mysteries of Physics and Neuroscience can be engaged constructively…." The definition of human mind in neuroscience is limited to reason, thought, memory, and awareness of the subjective experiences. One of the most fundamental implications of the modern neuroscience is that the brain determines the mind, and the brain is subject to all the laws of the physical world. Since these laws (as described in the current scientific theories) are materialistic-only and do not entail consciousness or free will, the fundamental presumption is that brain and mind, like the physical objects and the world, are fully determined by the natural mechanistic and deterministic laws leaving no room for a free will.

Since the human mind is an intermediary between the observations (recoded 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. The well-known physicist Freeman Dyson during an interview with 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. The manifestations of the way the subatomic or quantum world acts lead one to think that mind is a reasonable way to describe what's going on. Dyson states - "Well simply that it seems to make choices…. the fact is that you have an atom of uranium; it sits there on the table and then tomorrow it's gone…….. 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; that to my mind implies that the thing makes a choice. ……So that this freedom that the individual atom has to have…. seems to be an indication of some rudimentary form of mind."

As suggested above by Freeman Dyson, the two most fundamental aspects of the spontaneous decay of atoms are the spontaneity or the free will without any external causation and the decaying process wherein the fixed stationary mass transforms into the radiative kinetic energy in the form of alpha particles moving close to the speed of light. Thoughts in a contemplative or meditative human mind can be compared to the quantum particles that can decay 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 shown by quantum mechanics to be filled with particles that are born and decayed instantly at their free will (without an external causation), the argument of similarity between the human mind and the micro-mind can be extended to the macro- or the universal mind. In the following discussion, we will elaborate on the physics of the universal mind and consciousness unifying the three kinds of minds stated by Dyson.

The brain-mind problem is parallel to the mass-energy problem in physics. How a mass or particle behaves as a wave carrying energy under certain conditions is similar to how the brain acts as mind. Thoughts of the mind generated via kinetic firings of neurons are similar to packets of kinetic wave energy. Any thought or emotional activity of the mind involves energy flow, consumption or generation. We feel exhausted or invigorated after an arduous or joyful activity respectively, demonstrating the energy flow out or into our body. The neuron firings in our brains represent a form of kinetic energy or wave energy related to our conscious and free-willed or self-induced mental activities without any imposed external physical force. Thoughts or emotions are free willed activities in this sense, similar to the generation of a photon, a kinetic energy wave packet, via self-induced decay of quantum particles. Both processes are spontaneous or self-induced without the presence of an external physical force.

In a recent New York Times article [7], 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 - "The standard illustrations of Einstein's equation - bombs and power stations - have perpetuated a belief that $E = mc^2$ has a special association with nuclear reactions and is thus removed from ordinary activity. This isn't true. 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."

Spontaneous conversion of mass into energy and vice versa is observed in natural phenomena such as wave particle duality, spontaneous birth and acceleration of the universe, and spontaneous decay and birth of particles including radioactive decay phenomena. How does such observed spontaneity in natural phenomena relate to the consciousness of the human mind? Is there a common theory that can explain both the wave-particle (mass-energy) phenomenon and the mind-brain problem?

Renegade biologist Rupert Sheldrake suggests [3] that the workings of mind and brain can be understood by the physical notion of the electromagnetic field proposed by Michael Faraday in the nineteenth century. According to Sheldrake, mind can be best understood as an information field that is anchored in the brain but extends far beyond it into the empty space. Dean Radin, a senior scientist at the institute of Noetic Sciences (IONS) relates [3] the phenomena of brain, mind, and consciousness to the mysterious world of quantum physics. The electromagnetic (EM) field theory of consciousness, presented by J. McFadden [8] is based on the equivalence of matter and energy, apparent in Einstein's famous equation, which implies that there is no a priori reason why consciousness should be associated with the matter of neurons rather than the EM field activity within and between neurons. However, whereas information in neurons in digital, discrete and spatially localized, information in EM fields is analogue, integrated, and distributed. McFadden equates the conscious mind with the brain's electromagnetic (EM) field. In contrast to quantum consciousness models [8] that require a physically unrealistic level of quantum coherence between neurons or microtubules within neurons, these theories have no such

requirement. However, the wave-mechanical properties of these two theories are entirely consistent with conventional physics and the current knowledge of neurophysiology. Quantum models [9] of mind are based on quantum mechanics utilizing the following physical arguments by S. Hameroff - "At its core, all chemistry (and biochemistry) is quantum mechanical, though quantum effects are generally considered to wash out at supra-molecular levels due to environmental interactions (decoherence). However in some circumstances biology may utilize quantum effects at mesoscopic and macroscopic scales (e.g. Davies 2004)." Concluding his critical review and analysis of various approaches to the brain-mind-consciousness problem, Craig Hamilton [3] concludes - "Perhaps the most promising and ultimately satisfying theories are the integral ones that acknowledge the essential reality of different levels and dimensions of existence, allowing interiors and exteriors, consciousness and matter, to be seen as different sides of the same event, neither reducible to the other."

A SUGGESTED UNIVERSAL APPROACH TO CONSCIOUSNESS

The approach presented in this paper resonates well with the above views pointing to the complementary or equivalence of various states of existence of the same basic event or entity that could be termed as the universal consciousness. The approach demonstrates the synonymy between the physical equivalence principle and spontaneity or consciousness inherent in nature. It also addresses the hardest of all the known problems of consciousness as to whether consciousness is a universal rather than a neurobiological phenomenon and if there exists a free will in the universe.

It is a universally accepted notion in modern physics that the vacuum (space) energy exists in the universe independent of matter in the form of electromagnetic photons. It is also recognized that under certain circumstances photon energy can get converted to matter and vice versa. Furthermore, both material particles and electromagnetic photons are known to exhibit wave (energy) like properties in many types of particle physics experiments. It is also universally accepted that the nucleus of any atom when raised to sufficiently high-energy states can disintegrate spontaneously. A special case is that of natural radioactivity which occurs even when the nucleus is totally isolated from external influences. A radioactive atom may not decay for billions of years and can then suddenly and spontaneously decay. The decay constant of such processes cannot be theoretically calculated but can be measured experimentally. Particles and anti-particles can spontaneously annihilate and generate photon pairs. Photons can disappear and produce electron-positrons pairs.

The ultimate implication of the proposed model is that the universal consciousness is a complimentary state of the universe wherein all the matter has dissolved into kinetic energy representing an omnipresent, eternal, and isotropic Zero Point electromagnetic field out of which all the matter originated in the first place. The universe thus is a continuum of various mass-energy states, the rest mass being at one extreme end and the pure electro-magnetic kinetic energy (the Zero Point energy) being at the other end. The equivalence of all these mass-energy states is governed via the conservation of total mass-energy and momentum of the universe. The universal consciousness, that powers the brain to generate the neuro-biological mind or "I", is represented by the extreme state of kinetic energy (V=C) representing the Zero Point energy field in the fully dilated mass-space-time continuum of the universe.

The biggest hurdle related to the scientific description of the universal consciousness, is that all of modern physics is grounded in classical materialistic observations or measurements limited to sizes above Planck's scale. Any natural phenomena occurring below Plank's scale are immeasurable via available instruments and hence simply ignored from consideration in conventional physics. It is often realized that the root cause of failure of the modern science to predict ninety six percent of the universe may be due to the ignorance of physics (e.g. quantum gravity) of the small below Planck's scale. But, since it is humanly impossible to perform measurements below Planck's scale, such an argument can neither be confirmed nor refuted in conventional physics. The Zero Point energy field representing the universal consciousness

resides at scales below Planck's scale and hence, not amenable to conventional physics experimentation and measurements. However, the model presented in this paper predicts the Zero Point state as an asymptotic state at V=C.

SPONTANEOUS MOTION IN THE UNIVERSE – A DIRECT PHYSICAL EVIDENCE OF CONSCIOUSNESS

Since the classical inanimate matter bounded by strong forces cannot possibly induce any motion or change in its state on its own, all physical motion that is the key subject matter of physics theories must have its origin in some sort of universal self-induced spontaneity, free will, or consciousness. A universe devoid of consciousness would be motionless universe. An airplane is capable of flying, but it cannot fly without a conscious pilot. A car is capable of moving, but it cannot move without a conscious driver. The origin of the flying motion of the airplane or acceleration of a car needs a conscious being and his/her conscious choice or free will to make it move from the stand still position. Even Schrödinger's Cat paradox in quantum mechanics results directly from the motion or actions rooted in the consciousness or free-will of the live cat. A dead motionless cat would force a distinct and deterministic outcome of Schrödinger's experiment without any paradoxical probabilistic outcomes.

Using the argument above, one could conclude that any motion or change in state of a physical system directly or indirectly requires spontaneity or consciousness. While classical matter represents a static or bounded (by strong nuclear forces) form of consciousness in classical fixed space and time, the natural or unbounded consciousness represents free willed motion or pure kinetic energy in fully dilated relativistic space-time. This leads to the following scientific description of the universal consciousness:

"Consciousness is the absolute kinetic energy (V=C) of the extreme kind, represented by the complimentary Zero Point state (eternal and non-local energy field) of the universe in a fully dilated mass, space, and time continuum."

INTEGRATION OF THE MISSING SCIENCE OF SPONTANEITY OR CONSCIOUSNESS

Roger Penrose [10] revealed that the secret of the inner workings of consciousness was hidden in the physics that governs the behavior of both the small below the quantum Planck's scale and the large scale dark energy fueling the accelerating expansion of the universe. 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). The non-material domain here does not mean the super natural, but well-known natural and observed phenomena occurring at below Planck's scale that are comprehensible to human mind. The so-called dark energy causing the observed accelerating expansion of the universe is one example of such a non-material and scientifically acceptable natural physical phenomenon. The definition of the consciousness in this paper refers to the scientifically observed spontaneity in the universal phenomena, and not to a super natural "Ghost" in the atom. The consciousness is not an epiphenomenon of brain but a scientifically observed physical phenomenon of spontaneous mass to/from energy conversion allowing their complimentarity or co-existence.

In order to integrate consciousness into a physical model of the universe, consciousness is defined as the physical dimension or property that allows a system to induce a change to its own mass-energy (kinetic or thermodynamic) state without an external agency. It is hypothesized that the consciousness or 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 activities. The physics of consciousness provides a foundation for the spontaneous mass-energy conversion or

complimentary wave-particle states as depicted by mass-energy equivalence principle. Such consciousness is physically synonymous with the inherent spontaneity (non-causal) observed in the naturally occurring phenomena such as 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 OF THE INTEGRATED SCIENTIFIC APPROACH

A detailed scientific thesis including the proposed mathematical model and results is documented in the form of a book [11]. Specific details of the model are also included in references [12, 13, 14, & 15] 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 superluminous 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. Λ represents Einstein's Cosmological constant, G is gravitation constant, and C is the speed of light.

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

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 theory.

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

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

Figure 1: LHM and RUE predicted velocity ratios.

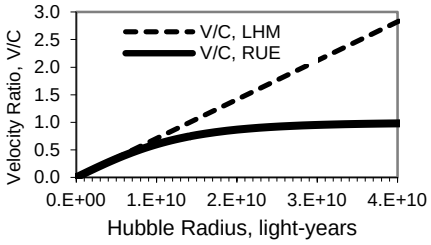
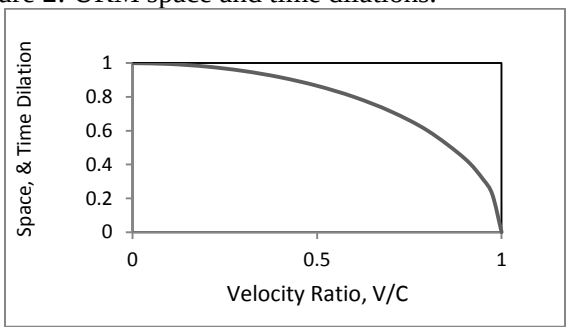


Figure 2: URM space and time dilations.



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 (RKE) 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 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.

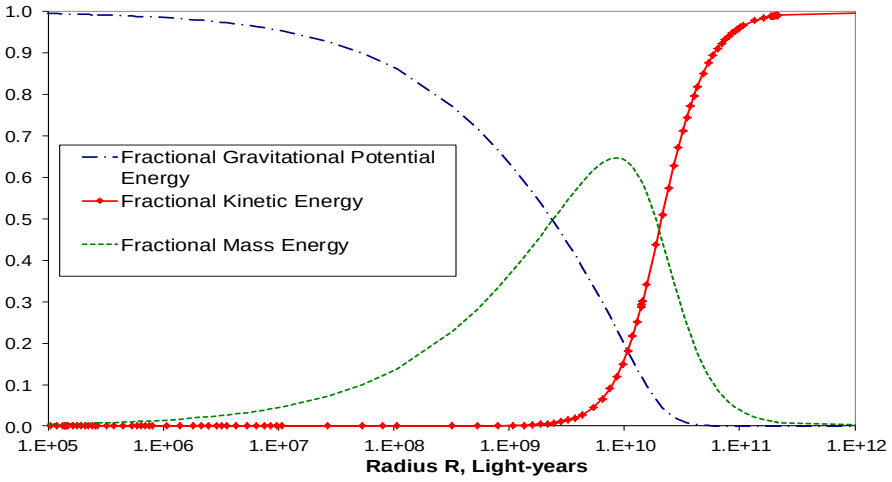
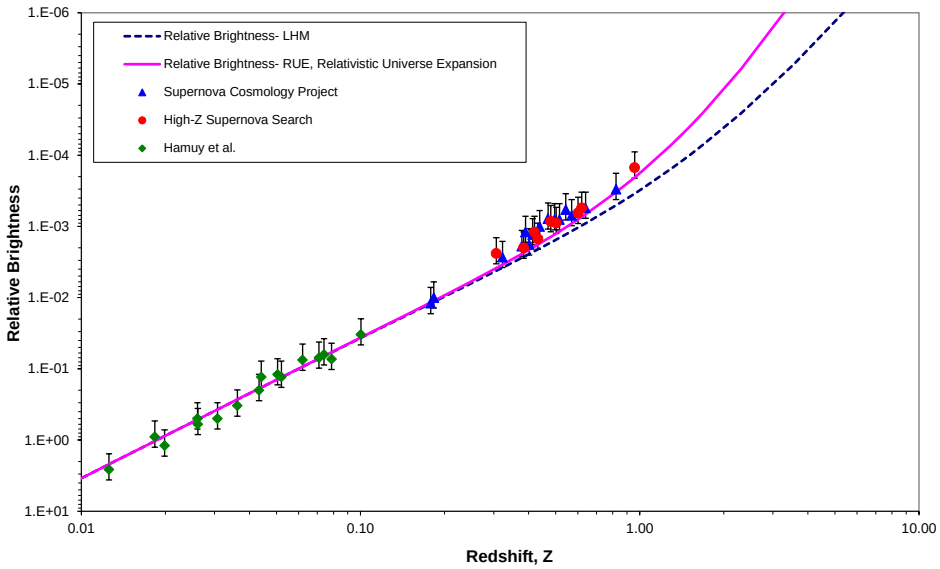


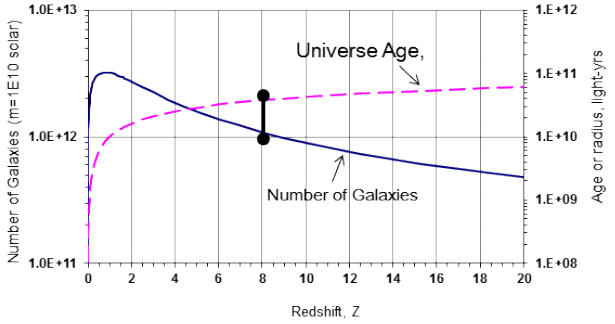
Figure 4 shows comparison of the supernova [16 &17] and other near-field [18] data against the predicted relative brightness for LHM versus RUE. A good agreement is seen between the predictions of the RUE and the measured values. The LHM under-predicts the trend of the observed data beyond Z=0.4, indicating 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 vindicates the RUE model predictions.

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



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 [19]. The model also predicts the results of a recent study [20] 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 1010 solar mass, the UR predicted total number of galaxies up to z = 8 falls between the maximum of 3.2x1012 x and minimum of 1.1 x1012 which is in close agreement with the published results, maximum of 2.7 x1012 and minimum of 1.4 x1012, in reference [20]. 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 in the near future.**

Fig. 5: Evolution of number of galaxies (mass = 1E10 Solar) and universe Age vs. Redshift Z



A NEW PERSPECTIVE ON UNIVERSAL REALITY

URM equation (1) represents the universal reality as a time-invariant or quasi-static continuum field of various mass/energy/space/time states of the universe 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. Hence, space is not exactly expanding or galaxies are not really moving in a fixed space and time. This eliminates the current paradoxical questions such as to what the universe is expanding into and what was there before the Big Bang. 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 in the entire universe. URM depicts 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~ ∞) universe. Near-field states at small V (V/C <<1) and R are primarily matter/gravity dominated while the far-field (V/C~1 or large R) states are anti-gravity or cosmological constant (kinetic energy) dominated as shown in Figure 2. 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 following a unique universal clock. The so-called Big Bang is a singularity at time zero, but URM predicted universe has no singularity. As described in ref. [11] and appendix, URM also explains inner workings of quantum mechanics.

URM OFFERS A FOUNDATION FOR A THEORY OF CONSCIOUSNESS

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. URM vindicates physicist Freeman Dyson's assertion 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. Thoughts in a contemplative or meditative 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 are born and decayed 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.

Using the above arguments, it is apparent that URM formulations represent an integrated model of the spontaneous mass-energy-space-time conversion or equivalence that also governs the physical mechanism of consciousness 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 [21]. 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, or expressed differently, the information gain of the corresponding ZPF information state compared to the disordered initial state.

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 at V<C. This is in contrast to the ZPF of the quantum model 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 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 ∞. It also represents the unmanifested zero-entropy and expansive domain of the eternal (living) universal laws depicting the fundamental universal 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~ ∞). Lower level consciousness states at small V (V/C <<1) and R are primarily matter/gravity dominated while the higher level (V/C~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, coexistent, or equivalent transcendent states and not evolutionary states evolving in a fixed space/time. Human mind thus represents a small subset or replica of the universal mind or consciousness. Electrical activity emanating from the brain is displayed in the form of brainwaves that are measurable. The ongoing and future neuroscience research may be able to establish direct correlation between the measured electrical activity and level of consciousness predicted by the theoretical models.

An intelligent living system or human observer is capable of intentionally transcending from one level of consciousness to another just as a self-decaying 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 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.

The URM model also unfolds the following universal realities:

- Consciousness or spontaneity in nature provides transcendence and phase-transition mechanism to achieve equivalence or complimentarity 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.
- Non-locality, and not locality, is prevalent in the universe with no censorship from God in making parts of the universe incomprehensible to a fully conscious human being.

- Simplicity and beauty, and not the complexity and uncertainty, are the dominant characteristics of the universe.
- There is only one single whole universe, which encompasses multiple states (sub-universes) representing various relativistic (matter-energy-space-time) states of the one whole Zero-point energy. The so-called nothingness or vacuum actually represents the wholesomeness or everything-ness of the ZPS of consciousness. Consciousness is not the *Ghost in the atom* [22] as claimed by the reductionist science. In reality it is the *Host in the atom* and in the empty space, without which no creation is possible.

CONCLUDING REMARKS

A multi-disciplinary and universal approach to consciousness is presented. Consciousness issues within the context of modern neuroscience and related problems in contemporary physics are addressed. In such a larger context, many of the mysteries of physics and neuroscience are explained with an integrated model. The integrated model provides a direct relationship between the physics concepts of space, time, mass, and energy, and the consciousness concepts of spontaneity and free will. The observed spontaneity in natural phenomena, which include human mind, is modeled as the higher order or universal consciousness. The integrated model explains the recent observations of the universe and demonstrates that the higher order consciousness is a universal rather than a biologically induced phenomenon. The neurobiological mind is shown to represent a subset of the complimentary states of the prevailing higher order universal consciousness in the form of the continuum of space-time-mass-energy. The proposed approach integrates spontaneity or consciousness into a simplified form of the widely-accepted general relativity theory to provide a cohesive model of the universe as one wholesome continuum of matter-mind-consciousness. The model represents the essential reality of conscious experiences of the mind as lower level equivalent and complimentary states of the zero-point energy or universal consciousness, which represents the spontaneous kinetic energy of the extreme kind. It is the ultimate complimentary state wherein everything in the universe is experienced as the zero-point energy field in a fully dilated mass, space, and time continuum. Consciousness, spontaneity, or free will in nature is shown to be a physical phenomenon describable via natural physical laws and not an epiphenomenon. Its existence is a physical reality and not a metaphysical myth that can be excluded from a rigorous scientific theory. The consciousness integrated model also provides a scientific basis for understanding the universal reality and addressing metaphysical issues such as the purpose of the universe [15].

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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 [11,12,13,14, and 15] 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 expanse 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. It also resolves the ongoing conflict between science and religion.