

Paper Title: In Search of the Universal Reality and Purpose – A Scientific Investigation
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Abstract:

Science has struggled for centuries to understand the universe. Great scientific achievements in recent decades have enriched material life on Earth. However, mysterious and irresolvable paradoxes have plagued the otherwise successful theories of science. This paper attempts to explain these paradoxes and how they can be remedied. Most widely accepted and successful scientific theories are shown to be incomplete due to the missing physics of spontaneity in them. One of the most serious outcomes of this deficiency is the predicted meaninglessness of the universe and life in it, thus making science itself meaningless. The paper attempts to return the meaning to both science and the universe. The paradoxes and ensuing meaninglessness are shown to be artifacts of modern theories not taking into account the spontaneity or consciousness inherent in nature as observed in the wave-particle duality, spontaneous motion in the universe, the spontaneous decay of particles, and human consciousness.

This paper is an account of the search for a scientific approach for inclusion of the observed spontaneity in nature into the scientific theories, specifically the general theory of relativity, to resolve the paradoxes and questions that haunt modern science and cosmology. This approach resolves major shortcomings of the widely accepted Big Bang Model (BBM) and fills in the big gap in the fundamental understanding of the apparent duality that exists between the behaviors of the microscopic quantum particles and macroscopic classical objects. The proposed model reexamines the basis for Heisenberg uncertainty and concludes that the uncertainty is an artifact of the presumption of a fixed space and time and not a universal reality. The proposed scientific approach provides a seamless integration between the classical and quantum reality as well as a fresh perspective on scientific reality as it relates to the ultimate universal reality. A successful agreement between the predictions and observations of the universe demonstrates the validity and credibility of the proposed approach.

The presented approach also closes the gap between science and religion. It provides a physical basis and answers to many of the philosophical questions related to time and evolution. It also restores the once lost simplicity, beauty, purpose, and meaning not only to science, but also to the universe and life in it. It also demonstrates that the existing paradoxes of the modern science and cosmology leading to an apparent absence of purpose in the universe are artifacts, rather than universal realities, of the missing physics of spontaneity in the modern scientific theories. Spontaneity or consciousness in nature is shown not to be a “Ghost” but a “Host” in the atom. Its existence is a physical reality and not a metaphysical myth that can be excluded from a rigorous scientific theory. A critical

review of the current scientific method and theories is undertaken with the objective to facilitate their integration with purpose and meaning.

Biography:

The author, Avtar Singh, has Doctor of Science and Master of Science degrees in mechanical engineering from Massachusetts Institute of Technology, Cambridge, Massachusetts, USA. Earlier, he obtained his Bachelor of Engineering (Honors) degree from Birla Institute of Technology and Science, Pilani, India. Professionally, he has been involved in state-of-the-art research and development in various fields related to science and engineering over the past 30 years. He has been a long-term member of key professional organizations including the American Society of Mechanical Engineering and American Nuclear Society. He has published more than fifty papers in professional journals and organized/chaired technical sessions at professional conferences. He has received the 'Best Paper Award' from the American Nuclear Society as well as several technical excellence awards from reputed employer companies. He has recently authored and published a new book entitled- "The Hidden Factor: An Approach for Resolving Paradoxes of Science, Cosmology and Universal Reality". The book describes a new innovative scientific approach to resolve the mysterious and irresolvable paradoxes that have plagued the otherwise successful theories of science. The book integrates science and religion by forwarding a common approach that resolves key issues dividing them.

Paper:

INTRODUCTION

What I can recall, it all started one evening about five 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? Does the universe have a purpose? My teacher says that it does not." My answer was a casual agreement with the teacher due to the common belief that physics deals with the reality of the inanimate matter and not the real life or consciousness, and many a prominent scientists openly believe that there seems to be no purpose to the universe. However, his questions triggered a deep anxiety within my subconscious. Deep inside I felt that my answer to his questions had no basis; it seemed like a programmed or cultured response by any scientist to such questions.

To understand the true nature of the universe and its purpose, one must understand the dimensions of the purpose itself. An unconscious or inanimate matter itself can be useful in solving some worldly need or purpose of a conscious being, but it cannot have a purpose of its own because of the lack of a free will or consciousness. The inanimate matter can not have a purpose or meaning because it can not act on its own behalf or have a self-induced motion to affect a change in its own state of being. A purpose is always affiliated with a conscious phenomenon or being. Hence, to understand the purpose of the universe and life in it, one must realize that the universe is conscious and 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 and established phenomena of the spontaneous decay of particles, the wave-particle duality, the spontaneous or self induced motion and expansion of the universe, and the eternity and omnipresence of the laws of nature provide the scientific evidence of consciousness in the universe. Furthermore, the presence of conscious beings in the universe and the prevailing cosmic order are not possible in a universe that is not conscious.

Most of us affiliate a purpose with the desire for acquisition of material things such as wealth, property, a position of power, or fame. Such a purpose is related to achieving a desired level of existence (material living) by a conscious being. Once achieved, the purpose ends, and a new desire or demand may arise leading to a new purpose. The purpose of the primate life as propagated by science, specifically the theory of evolution, is to survive longer by overcoming threats to life by predators and adaptations to challenges posed by hostile environments. Fight for survival and survival of the fittest are key aspects of the evolution theory. The purpose of human life, on the other hand, is perceived by some as the fulfillment of material, social, cultural, and/or religious (moral) values or needs. A still higher level of purpose beyond the mere prolongation of life or survival by evolution is the realization of the eternal truth or reality, which is beyond the clutches of space and time. Obviously, such a purpose is not achievable thru the evolution of the material body alone, but can only be achieved through the enhanced consciousness or awareness of the human mind to uncover deepest mysteries of the universe. The purpose of such an ultimate evolution is the enlightenment of the human mind and not a mere prolongation of the temporal bodily living. The power of such a higher-level purpose lies in that it represents the ultimate evolution of not only the physical body but also the human mind and consciousness, wherein the survival transcends into revival and a mere prolongation of the material life transcends into the realization of eternity and omnipresence.

Propelled by the power of such an ultimate purpose, I looked towards a rigorous scientific approach to fulfill it. My endeavor described here resonates well with the personal experiences of Paul Davies expressed in his statement below:

“Survey the pinnacles of human achievement, in engineering, science, art or human compassion, and ask: What drove their creators? What propelled them to such soaring heights of accomplishment? Single-minded, dedicated purpose! The ability to achieve is worthless without the power of purpose to mobilize it. It will be thrilling for me to learn how others are motivated in their endeavors, as I am in mine.”

STRENGTHS AND LIMITATIONS OF SCIENCE

Great achievements of science over the last few centuries, specifically in the last few decades, 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. One of the most serious outcomes of the existing and widely accepted scientific theories is the apparent sense of meaninglessness and absurdity of the universe and life in it. 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 existing scientific reality is based on observations of the material universe alone and extrapolations of the existing theories of the inanimate matter. The scientific theories are incapable of predicting the origin of spontaneous motion such as the Big Bang, the observed acceleration of the universe, and spontaneous phenomena such as the wave-particle duality and spontaneous decay/birth of particles. The well-established laws of motion in science are unable to provide any clue as to what induced or originated the first motion of the inanimate matter in the universe. Spontaneity is assumed to magically emerge somehow from quantum soup or an agglomeration of inanimate particles of matter. It is ironic that although the existing scientific method relies on experimental observations, there exists no clue or even a scientific definition as to who the observer is. The sobering fact is that the collective knowledge of science has been able to reveal only 4% of the universe [3]; the rest (96%) is unknown dark matter and dark energy.

There is an inherent assumption or belief of science that unless an observed phenomenon can be explained in terms of the behavior of some material particles, it cannot be accepted as reality. What is ironical that the science of the inanimate matter resorts to a blind faith in the existence of some exotic particles that comprise dark matter and are never expected to be detected by any scientific instruments. Modern scientific theories are contradictory to the accepted scientific method in describing the observed behavior of the expanding universe in terms of the dark matter and/or dark energy, which have no verifiable proof of existence other than the unproven extrapolation of the incomplete theories of science devoid of the physics of spontaneity. Such an extrapolation beyond their range of validity leads to a set of inconsistent, absurd and unverifiable scientific realities such as the multiple universes and existence of multi-dimensions beyond the four (three space dimensions and time) dimensions experienced by the human mind. The fragmented fabric of the universe, the fundamental uncertainty prevailing in the universe, and the ultimate demise of the universe into the oblivion, predicted by the existing theories are mere artifacts of their incompleteness. Moreover, quantum mechanics and Heisenberg's uncertainty pull the rug from under the common human experience of the existence of the classical world and science's very own deterministic laws that are supposed to be universal and have no uncertainty. Hence, the picture of reality painted by the incomplete theories of science is internally inconsistent, unverifiable and counter to common human experience.

In a statement accepting the 2004 Templeton prize, George Ellis made the following remark regarding the limits of science:

“In the face of some who claim that the powers of science are limitless, it is important to try to understand what aspects of existence science in fact

can and cannot comprehend. As I mentioned above, I believe the boundaries here are becoming clear, for example science cannot and never will be able to handle issues of aesthetics, ethics, metaphysics, or meaning..... In particular, human thoughts, emotions, and social constructions are both causally effective, and cannot be compassed by present day physics. Consequently even the most advanced physics today is unable to give a causally complete account of the factors that are effective in shaping the physical world we see around us,because it is unable to encompass human thoughts and intentions. Furthermore, by its very nature it is unlikely to ever do so.”

Charles Hard Townes (at The Templeton Prize News Conference, March 9, 2005) pointed to the challenges faced by science in revealing the universe and life:

“If the universe has a purpose or meaning, this must be reflected in its structure and functioning, and hence in science.There are many mysteries in science. We seem to know only about five percent of the matter in our universe - this is such a small fraction, and what is the remainder? We are convinced the other matter is there, but it's not stars, light, or gas. What is it? It's clearly there according to cosmological behavior, but we don't know what in the world it is.

We assume the laws of physics are constant, and have faith in that, but could they suddenly change? And if not, why not?

Quantum mechanics and general relativity are wonderful, and tell us a lot. But it appears they are not consistent with each other. What is it we are missing?

Science is so successful we are enthralled and believe it, but there are profound mysteries. Another mystery facing us in human life is free will. According to present science, we individuals really can have no freedom of choice, yet we think we do. And there is the question as to what really is consciousness, or a conscious being. Intuitively we think we can make some free choices, and know what consciousness is, but our present science and logic simply do not fit our ideas very well. Are there completely new phenomena and laws of science to be discovered, or can we never understand fully?”

INTEGRATION OF THE MISSING SCIENCE

Since the existing scientific theories deal with the inanimate matter alone, they are incapable of addressing human thought, intentions, creativity, free will and hence the purpose in the universe. This leads (misleads) many a scientists to conclude that there is no purpose in the universe. The erroneous conclusions of the current incomplete theories of the inanimate matter including the Newtonian mechanics, Big Bang Model (BBM) and

particles physics, have misled us to believe that we live in a universe that came into existence for no reason, and which consists of nothing more than a collection of mindless particles moved by blind and purposeless forces towards a pointless final state of nothingness. With such a gloomy state of the perceived scientific reality, I did not have much to loose in making an honest and bold attempt to integrate spontaneity or consciousness into the scientific approach. My biggest challenge was how to achieve such integration. Consciousness is often characterized by many a scientists as the ‘Ghost in the Atom’ and considered to be outside the realms of physical sciences. Or, worse yet, it is often assumed that some existing laws predetermine even the animate or conscious behavior and there is nothing like free will that exists. My fear was that any new theory or approach involving consciousness will most probably be shot down by orthodox scientists on grounds of violation of the widely accepted classical scientific method or scientism requiring materialistic verification and validation via classical experiments. What if the consciousness or free will is a real physical phenomenon, which is beyond the grasp of the classical experiments that employ fixed space/time and physical measurements suitable only for classical objects or phenomena? What if the physical phenomenon of consciousness has its roots below the size domain of materially comprehensible Planck’s scale?

My efforts were propelled by my strong belief that a science that leads to a purposeless universe is a purposeless science. A scientific method devoid of the spontaneity, which is inherent in nature, can represent only partial or local reality and is incapable of comprehending its purpose. The power of integrating purpose into science comes from the integration of reality in all its domains including the material and non-material. The non-material domain here does not mean the super natural, but natural and observed phenomena of spontaneity in the universe comprehensible to human beings. 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. My definition of the consciousness in the universe 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 but a scientifically observed physical phenomenon, which has its roots and is dominant below Planck scale.

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 if not “the answer”. The feeling of vacuum or emptiness inside me kept pushing me to become a seeker of reality and a researcher to dig deeper into physics and philosophy to find some clues to what governs the dynamics of spontaneity in nature. My deep thirst for searching the purpose in the universe provided me a great challenge as well as opportunity as a scientist to advance the frontiers of science beyond the inanimate matter. The power behind this purpose propelled my search with such a tremendous and spontaneous energy that left me astonished as to where it came from. Since, I did not consider myself an orthodox classical or materialist scientist, I did not hesitate to think outside of the box and venture beyond the fixed boundary walls of the established classical scientific method or scientism, with a hope that it can be further enhanced to provide answers to more important and deeper questions of life and the universe. Starting from brushing-up my

fundamental knowledge of physics, I studied extensively the recent publications dealing with the subject. I began to see some distant parallelism and similarities between the dynamics of inanimate matter and spontaneity or consciousness. A turning point in my understanding was the book [2]- ‘The Large, the Small and the Human Mind’ by Roger Penrose. I began to believe that the secret of the inner workings of consciousness was hidden in the physics that governs the behavior of the small. I began to focus on developing an understanding of the inner workings of quantum mechanics, which is still a black box to science. Since I wanted to keep my approach simple, I started to look deeper into the theory of relativity for possible headways to unravel the mystery of the small and below the quantum scale. Since the spontaneity is an inherent and observed reality in nature and physical laws of the universe, I chose to pursue the spontaneous phenomena such as the spontaneous decay of particles, wave-particle duality, and spontaneous motion (accelerating expansion) of the universe, commonly observed and investigated by science.

RESULTS OF THE INTEGRATED SCIENTIFIC APPROACH

The power of purpose provided me courage and inspiration. Some mysterious energy helped me overcome great challenges and provided creative intuition to put forward a scientific approach, in the form of a book [1] entitled- ‘The Hidden Factor: An Approach for Resolving Paradoxes of Science, Cosmology and Universal Reality’. The proposed approach integrates the observed spontaneity in nature into the general theory of relativity to resolve paradoxes and questions [3,4] haunting modern science and cosmology. A new mathematical theory [5], the Gravity Nullification model (GNM), is proposed that solves the cosmic conundrum including the unresolved mysteries of dark energy, dark matter, vacuum energy density, and accelerating expansion. GNM integrates the missing physics of spontaneous decay of particles into the existing physics theories, specifically the general theory of relativity, without altering its original formulation. Closed form mathematical expressions are derived for a relativistic universe expansion, which predicts both the observed linear Hubble expansion in the nearby universe and the accelerated expansion exhibited by the supernova observations. The integrated model addresses the key questions with regard to the undiscovered principles of nature, and the birth and evolution of the universe.

Comparison Against Supernova and Other Data

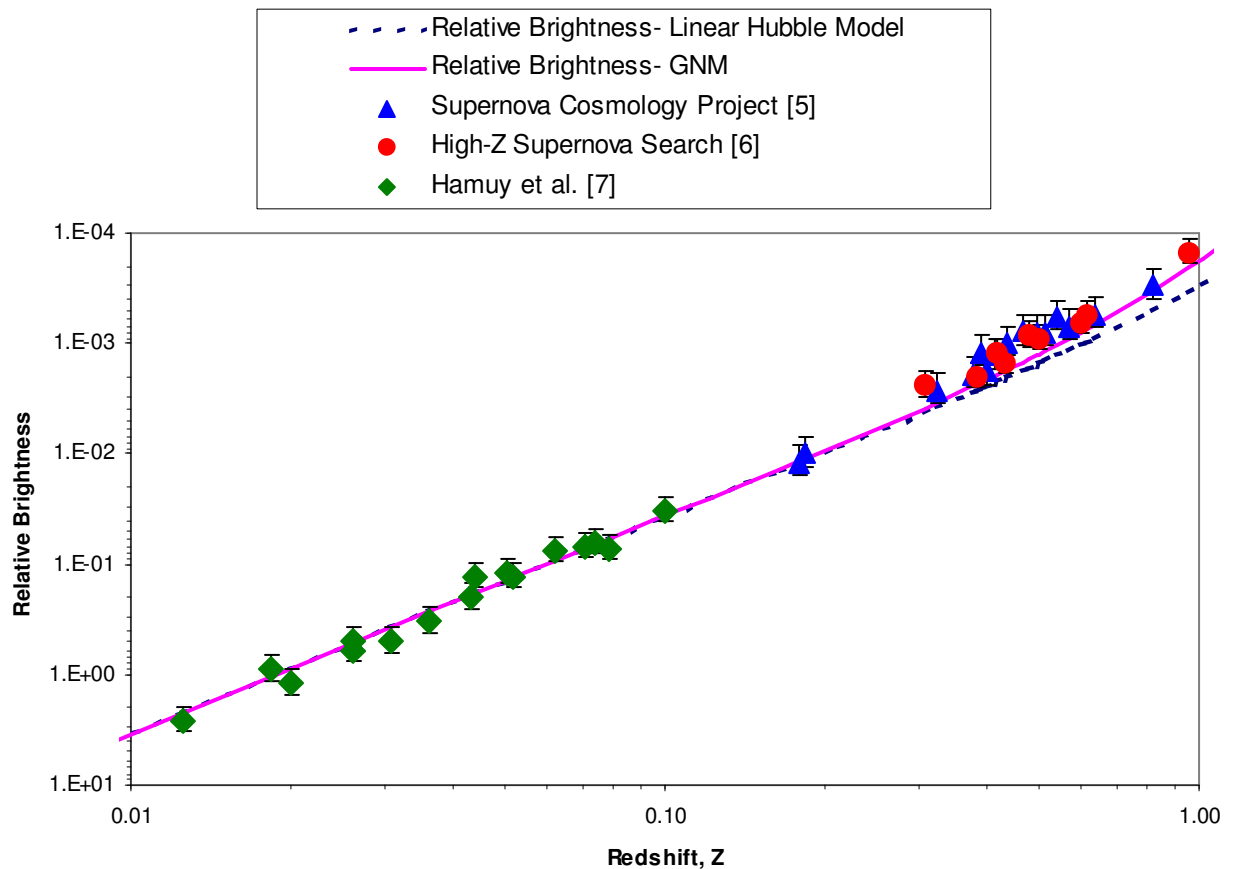
Predictions of the model are in close agreement with the supernova data and other observations of the universe, as shown in Figure 1. By observing distant, ancient exploding stars, physicists and astronomers [6, 7, 8] have determined that the universe is expanding at an accelerating rate. This observation implies the existence of a mysterious dark energy in the empty space. The surprising discovery is based on observations of type Ia supernovae, very bright astronomical "standard candles" that all have the same intrinsic brightness. The degree of brightness measured via their observation can reveal their distance from the earth. By comparing the distance of these exploding stars with the redshifts of their home galaxies, researchers have calculated the rate of expansion of the universe during its historical evolution. The observations of distant type Ia supernovae

place them significantly farther away than would be expected from their redshifts, suggesting that the unknown dark energy is pushing the stars and galaxies in the universe farther apart faster than it did in the early universe. Thus instead of slowing down, as everyone had expected, the expansion of the universe is in fact speeding up.

Figure 1: Comparison of the Supernova and other data against predictions of the linear Hubble model and GNM.

GNM Predicts Dark Energy and Cosmological Constant or Vacuum Energy

The predicted fractional dark energy, gravitational potential energy, and kinetic



energy of the universe corresponding to the epoch of the data in Figure 1 are shown in Figure 2. The dark energy during the early age, up to about 2 billion years, of the universe consists primarily of the gravitational potential energy. At about 9 billion years, the gravitational energy and kinetic energy even out. Following this period, the dark energy again dominates in the form of the increasing kinetic energy fueling the accelerated universe expansion. At early age or size, the universe is dominated by the gravitational potential energy that requires a substantial amount of the total maximum mass to convert to the gravitational potential energy leading to a decreased actual mass of the universe. As the size of the universe increases, the gravitational energy decreases and

the kinetic energy increases. The dark energy dominates at very small and very large sizes. As the size R increases from small values, the dark energy first decreases and then increases with a minimum occurring at around 9 billion years, which coincides with the time when the maximum universe mass occurs.

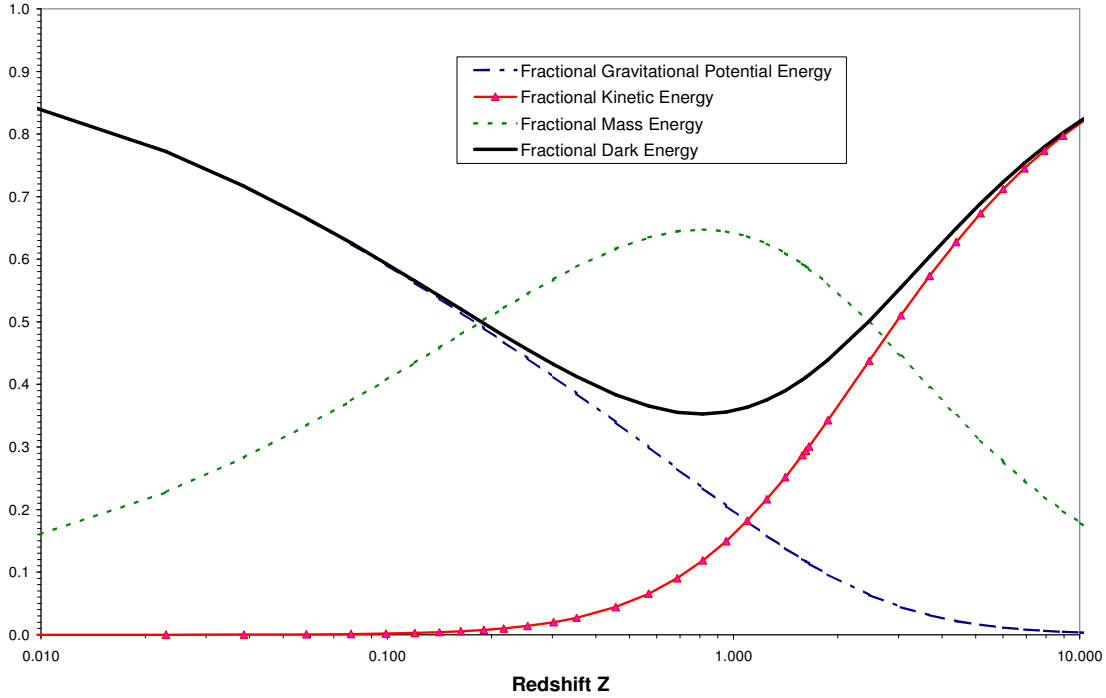


Figure 2: Predicted fractional dark energy, gravitational potential energy, and kinetic energy of the universe.

GNM predicts the dark energy or vacuum energy and explains the concept of anti-matter as follows. The concept of anti-matter is a direct artifact of the assumption in the widely accepted universe models that the net energy of the universe is exactly zero. Hence, the energy contained in the matter in the universe must have a counterpart, the so-called anti-matter, to annihilate the existing matter-energy. But anti-matter is nowhere to be seen or observed in the universe, and hence the dilemma – ‘Where is the anti-matter?’ According to GNM, the universe has a net positive non-zero matter-energy, and hence there is no need to invoke the concept of anti-matter at all. However, just as the matter and gravity are complimentary, the concept of anti-matter may be considered complimentary to the anti-gravity or the vacuum energy of expansion opposing the gravitational pull. The Cosmological Constant or the spontaneous decay energy of the particles representing the dark energy also acts as the anti-gravity. Anti-matter is not matter by its very definition, and hence it probably can never be detected in the form of real particles. Quantum theory is internally inconsistent in predicting a tremendous amount of energy in the vacuum space, ironically off from reality by 120 orders of magnitude. A vacuum energy of this magnitude would rip apart every atom and particle in the universe and hence is far off from the reality of the observed structure of the

universe. The vacuum energy density predicted by GNM is consistent with the supernova and other observations of the universe.

GNM Eliminates Black Hole Or Big Bang Singularity

The proposed model eliminates black hole singularities in the existing Big Bang Model [4] and the need for the incredible inflation in the early universe. GNM predicts the actual mass m of the universe as a function of its size or radius R , as shown in Figure 3. The actual mass increases with increasing size or age of the universe until a maximum mass is reached at about 9 billion light-years. The mass decreases with size during later years as the universe expands to bigger sizes. As shown in Figure 3, the calculated mass of the universe is less than the Planck's mass when the universe radius is of the order of 10^{-100} meters. At still smaller radii, the predicted mass of the universe decreases to even smaller values. GNM thus has no singularity at small values of radius of the universe and does not have an absolute time moment of the beginning of the universe representing time $t=0$ in the Big Bang Model.

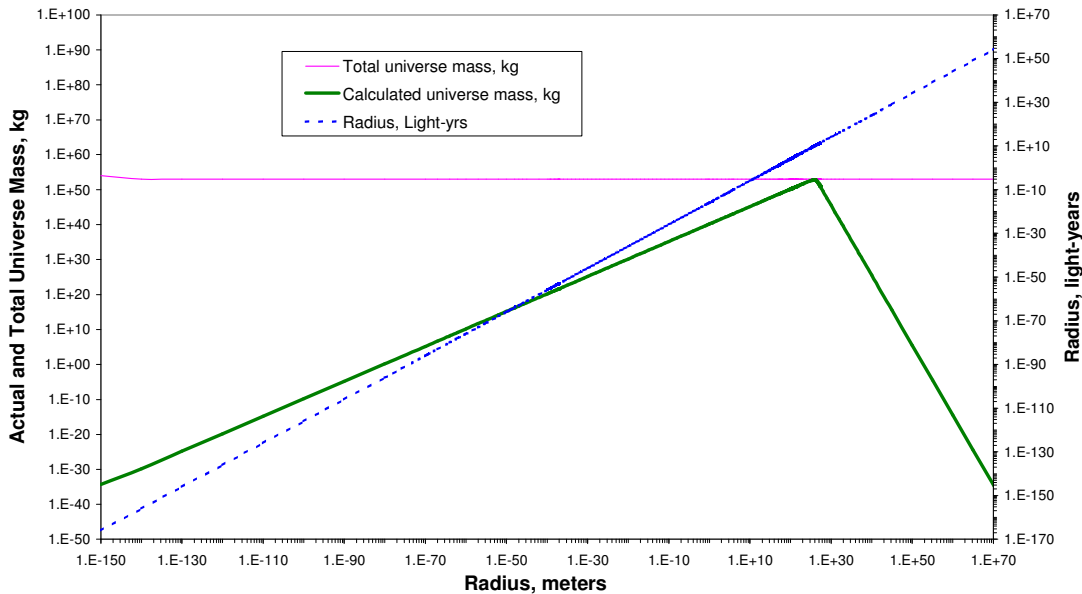


Figure 3: Universe mass versus radius predicted by GNM, demonstrating no black hole singularity and mass creation in the early universe.

GNM Predicts Creation of Matter In Stars and Galaxies In The Early Universe

GNM also predicts the observed creation of matter in stars and galaxies in the early universe, as shown in Figure 3. The GNM calculated mass of the universe is less than the Planck's mass when the universe radius is much smaller than the Planck's length. The actual mass increases with increasing size or age of the universe until a maximum mass is reached at about 9 billion light-years. The mass decreases with size during later years as the universe expands to bigger sizes. The predictions of GNM are consistent with the recent observations of mature galaxies in the very early universe. The current widely accepted models (the standard model) of the formation of matter and structure evolution fail to predict the observed massive structures in the early universe.

GNM Explains Away The Dark Matter Myth

GNM also dissolves the dark matter myth, which is shown to be an artifact of a misapplication of Newtonian laws to the relativistic motion of stars and galaxies. Stars in the spiral galaxies are observed to rotate with a finite tangential velocity around the center of the galaxy due to the attractive pull of the gravity of the matter. The observed tangential velocities of the stars are so fast that the centrifugal force of rotation ought to make them fly off into the intergalactic space. The astronomers have, until now, explained such large rotation velocities by claiming existence of large amounts of invisible dark matter. The existing dark matter theories suggest that the dark matter may exist in the form of black holes, unknown subatomic particles, dead or dwarf stars or planets in a massive "halo" around the center of the galaxy and extending out radially outward to the outer boundaries of the galaxy. The dark matter theories invariably assume that the Newton's laws hold in the inner and outer galactic regions. Although the proof of the assumption of the Newton's law is lacking, most scientists prefer this explanation to the alternative that Newtonian gravitational theory needs modification for application over galactic distances. The gravitational attraction of the non-luminous matter postulated, by existing theories, to be extending far beyond the visible limits of the galaxy leads to the flat rotation curves. There has been growing acceptance of the idea that majority of the matter that exists in the universe is dark. Understanding the physics and origin of the dark matter, both in black holes and halos of galaxies is currently a major open challenge to elementary particle physicists and astronomers in explaining the observed expansion of the universe from recent observations.

GNM provides an alternative theory to the Newtonian laws for explaining the nature of the observed characteristics of the star velocities in spiral galaxies. A detailed treatise of the predicted and observed galactic star velocities is provided in reference [1]. GNM predictions indicate that the so-called dark matter may be a mere artifact of the incorrect application of the Newtonian laws at galactic scale. The effects of the dark energy or vacuum energy become significant at these large scales and cannot be ignored to predict the observed dynamics of stars at galactic distances.

GNM Eliminates the Need For Super-luminous Inflation

GNM eliminates the need for the super-luminous inflation, which is regarded as one of the leading theories as part of the Big Bang Model to explain the existence of uniformity in the microwave background radiation. GNM predicts that at very large radii or size, the ensuing space dilation predicted by the relativity theory leads to the coherence or uniformity observed in background radiation. The degree of coherence or uniformity is represented by the amount of space dilation. Another argument against the super-luminous inflation scenario is that there is no independent experimental evidence that it did occur. Also, the extraordinarily dense matter at the beginning of the universe could not possibly move at a super luminal speed without violating laws of relativity and conservation of mass-energy.

GNM Explains the Paradox of Parallel Universes

GNM explains the paradox of parallel universes in relativistic terms as follows. The theory of parallel universes [9] has been advanced by its proponents to explain the mysterious collapse of the wave function consisting of infinite number of states to one classical solution experienced by a conscious observer. Each of the infinite number of universes corresponds to a probable classical outcome that can occur when an observer looks at the quantum system. GNM provides a physical understanding of the many possible outcomes signifying parallel universes, of an observation depending upon the characteristics of the observer. According to GNM, the mass-energy-space-time dilation is directly dependent upon the relative velocity between the observer and the observed. Two different observers traveling at different speeds experience different mass-energy-space-time and hence different physical realities. At low velocities, the mass-space-time act as fixed or classical as assumed in the Newtonian mechanics. Different mass, space and time configurations can exist, alluding to the existence of parallel universes, for different observers moving at different speeds relative to each other. However, at large velocities when V approaches C , the mass, space, and time dilate to almost zero and the events/phenomenon observed by different observers experience quantum coherence becoming completely coherent with each other. Hence, at large velocities close to the speed of light, the many apparent parallel sub-universes coalesce into one. In a way, higher velocity may represent a higher level of the observer consciousness leading to a non-locality or non-relativity in what is observed.

GNM Provides A Fresh Perspective On The Beginning and Future Evolution Of The Universe

The integrated approach also provides a physical basis and answers to many of the philosophical questions related to time and evolution. The most widely accepted history of the evolution of the universe assumes that the universe started with a Big Bang at the beginning of the time followed by an inflation scenario involving a “superluminal expansion.” The Hubble expansion dominated the later evolution that led to the formation of cold molecular things such as stars, galaxies, terrestrial planets, and life forms when the universe starting from a hot Big Bang, had expanded and cooled. Now the universe

expansion is accelerating due the mysterious dark energy that may lead to an ultimate demise of the universe as it cools down to its near death.

GNM results provide a different perspective on the birth and evolution of the universe. In fact, GNM predicts the observed Supernova and other Hubble expansion data without even a consideration of time as a parameter. GNM represents the universe as a set of states with varying mass and energy as a function of its size. Time is only an after-the-fact entity calculated as a ratio of the universe radius and the speed of light. Time is not used at all in the GNM mathematical formulations to predict the observations of the universe. Time is considered, as in the theory of relativity, only a relative and not an absolute parameter. Hence, the universe does not have an assigned clock with an absolute time. From this point of view, the history of time including the moment of the beginning, the period of evolution, and the future evolution of the universe is an absurd question or concept from a holistic universe point of view. As far as the universe is concerned, it has no time history involving an absolute synchronicity all over the universe. The widely used assumption in the existing theories is that when we look farther in space, we are looking into the past. This assumption flies in the face of the isotropic nature of the universe used as the basis in all the universe models. If universe has a prescribed direction in time and varies accordingly, it cannot be isotropic. GNM does not support the notion of an absolute universal time as a descriptor of the overall universe as we see around us. This vindicates the following viewpoint of Einstein:

“To those of us who believe in physics, this separation between past, present, and future is only an illusion, even if a stubborn one.”

GNM Eliminates the Need for Incredible and Unsupportable Assumptions

The field of cosmology is known for consideration of or allowing the use of several extraordinary and incredible theoretical assumptions lacking a scientific proof, which are often invoked to explain the actual observations or theoretical results that lead to otherwise irresolvable paradoxes. Some of these are listed below:

- Anthropic principle
- Fine tuning or design of the universal constants and laws
- Time variation of the following to explain paradoxes of the universe evolution:
 - Gravitational laws
 - Speed of light
 - Hubble constant
- Assumption of the zero net energy of the universe (borne out of nothing), violating the fundamental laws of conservation of mass-energy
- Mysterious weirdness of quantum mechanics including the observer paradox
- Mysterious or hypothetical particles and strings
- Multiple dimensions beyond the ordinary 3 space and a time dimension
- Parallel universes
- Superluminous inflation during the early universe evolution
- Occam's razor principle

GNM eliminates the need for invoking these unfounded assumptions, which cannot be supported by theoretical arguments, experimental observations, or common human experience. GNM explains the observed universe behavior and data with a consistent physical and mathematical approach without any modification to the well-accepted theory of relativity. GNM goes even beyond and explains [1,3] away the inconsistencies between the relativity theory and quantum mechanics. This approach also fills in the big gap in the fundamental understanding of the apparent duality that exists between the behaviors of the microscopic quantum particles and macroscopic classical objects. The proposed model reexamines the basis for Heisenberg uncertainty and concludes that the uncertainty is an artifact of the presumption of a fixed space and time and not a universal reality. The model explains in mathematical terms the inner workings of quantum mechanics and resolves its well-known paradoxes including the quantum gravity and the observer paradox. The proposed scientific approach integrates the classical and quantum realities as well as provides a fresh perspective on scientific reality as it relates to the ultimate universal reality. GNM provides a seamless integration among the special and general theory of relativity, Newtonian theory, and quantum mechanics without a violation or disallowance of any one of them. A successful agreement between the results of existing scientific experiments and observations of the universe demonstrates the validity and credibility of the proposed approach.

GNM also restores the once lost simplicity, beauty, purpose, and meaning not only to science, but also to the universe and life in it. It also reconfirms that the existing paradoxes of the modern science and cosmology leading to an apparent absence of purpose in the universe are artifacts, rather than universal realities, of the missing physics of spontaneity in the modern scientific theories. Spontaneity or consciousness in nature is shown not to be a “Ghost” but a “Host” in the atom. Its existence is a physical reality and not a metaphysical myth that can be excluded from a rigorous scientific theory. The power of purpose comes from the integration of all elements of physical reality including matter, energy, and the spontaneity or consciousness. The universal reality represented by the new model is *One* whole, eternal and omnipresent Zero-point energy, which can manifest itself in different relative states of matter, energy, space and time. The proposed approach also restores simplicity and beauty to physics to enhance its credibility, comprehensibility, and acceptance. It also restores the once lost elegance to the “Absurd Universe” [10] predicted by the current theories.

BRIDGING THE GAP BETWEEN SCIENCE AND RELIGION

Another important mission of my research was to close the gap between science and religion. The ongoing debate between science and religion over the past few centuries has been led by the basic differences in the methods of science and religion to perceive reality. Science has searched for the ultimate reality by fragmenting the observed reality into pieces or tiny particles of matter. Religion, on the other hand, has ignored scientific observations and relied on faith to propagate the concept of a creator – the God. Science has ignored the inherent spontaneity/consciousness in nature, while religion has ignored

the actual observations of the universe. Both science and religion have inhabited their own parallel universes without any reconciliation as reflected in statements below:

"Certainly I see the scientific view of the world as incompatible with religion, but that is not what is interesting about it. It is also incompatible with magic, but that also is not worth stressing. What is interesting about the scientific world view is that it is true, inspiring, remarkable and that it unites a whole lot of phenomena under a single heading."

— Richard Dawkins

"I believe, therefore, that it is impossible to decide moral questions by the scientific technique, and that the two things are independent."

— Richard Feymann

What is often ignored, however, is the fact that the differences or conflicts between science and religion are nothing but the brainchildren of the inherent deficiencies and inconsistencies within their individual domains. Modern science, especially cosmology, is paralyzed with unresolved paradoxes (quantum gravity, dark matter, dark energy, and evolution of the universe etc.) and singularities (Big Bang, black holes etc.). The flagship theories of science namely Newtonian theory, relativity theory, and quantum mechanics suffer from unresolved inconsistencies among them that prohibit a generic representation of the observed universe behavior. These theories may explain results of individual experiments, but fail to predict observations needing extrapolation to the universe scale. Such failures raise doubts if these theories represent the universal laws accurately and completely. Similarly, religion is paralyzed by multiplicity of traditions and beliefs of different sects and ideologies. Even within a given religion, there may exist several sects each with their own sets of interpretations of God, truth, reality, and morals. The tragedy is that such differences have not been subtle and have led to widespread violence, suffering and death. If science and religion are fragmented and conflicting within their own domains, how can one expect them not to conflict with each other? How can they achieve reconciliation? Any claims of an absence of conflicts between them may serve as a good diplomacy or hope, but not a reality. It is important to realize that unless the internal conflicts and inconsistencies within science and religion are eliminated, a bridge between the two cannot be built. The good news is, as the results of this work show that there is a common cause paralyzing both science and religion, and it is within our reach to eliminate this cause. This root cause is the ignorance of the inherent consciousness or spontaneity in the universe by both science and religion. Science without religion is lame, religion without science is blind, and without consciousness they are both paralyzed.

An integrated scientific model that includes spontaneity or consciousness is shown to go a long way in answering the fruitless debate and conflicts between science and religion. The model builds a bridge of consciousness between the two apparently different islands of science and religion. There is a common misperception that human mind and consciousness are outside the domain of science, which is supposed to address only the utilitarian purposes or material conveniences of human life. Results of this research refute this misperception and demonstrate that an integrated science including

spontaneity or consciousness, the *Scienciousness*, can address issues important to life such as the purpose and meaning.

The power of purpose of seeking the universal reality rewarded me more than I bargained for. It motivated my scientific inquiry that led me to realize a well kept secret of nature that a common set of universal laws govern the behavior of the matter, mind and consciousness. The insights I gained via integrating consciousness into the physical laws, shattered all barriers dividing science and religion, and led to a natural transcendence between their apparently opposing aspects such as evolution (time) and eternity, survival and revival, chaos and order, and meaninglessness and purpose in the universe. I realized the fundamental commonality between a complete (integrated with consciousness) theory of everything in science and the wisdom of the ages underlying the essence of all religions.

GNM Integrates Purpose and Meaning Into Science

When the observed spontaneity or consciousness in nature is properly integrated into the scientific theories, the inherent purpose and meaning in the universe are demonstrated in the basic eternity, omnipresence, wholeness, certainty and order in the universe. The realizations provided by the integrated approach are 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 a cosmos with order, certainty and comprehensibility and not chaos. These realizations provide meaning and purpose to the universe. The integrated scientific model shows that the manifested part of the universe in the form of matter in particles, atoms, planets, stars and galaxies does have an important purpose that is to provide an objective evidence to enable us to realize the more significant but un-manifested part of the universe. The manifested universe is not the ultimate destination but only a stepping-stone or a doorway to the kingdom of truth. The power of purpose lies in realizing the one in many, the whole in parts, the unchanging in changing, the contiguous in discrete, the consciousness in particles, the order in chaos, and the simplicity in complexity. The model also unfolds the following universal realities and their apparent purposes:

- Relativity, and not uncertainty, rules the universe wherein all things and phenomena are related in spite of their apparently different form, location and time. The apparent uncertainty depicted by the reductionist science is an artifact of forcing the reality into the classical fixed space and time, which by nature are relativistic. Relativity represents relatedness or connectivity among universal phenomena.
- 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 confusion, are the dominant characteristics of the universe for human beings to enjoy and cherish.
- Time and evolution represent relative realities of matter and primates respectively, with an apparent purpose to propel them towards eternity via transformation (enlightenment) of matter into energy or enlightenment of the primate mind to a higher level of consciousness.

- There is only one single whole universe, which encompasses multiple sub-universes representing various relativistic (matter-energy-space-time) states of the one whole Zero-point energy.
- Spontaneous decay of particles is not a mindless or ghostly supernatural phenomenon, but a conscious or free willed physical phenomenon with a distinctive purpose to power the universe evolution and expansion against the clutches of gravity. The energy of the vacuum, the Cosmological Constant, has its genesis in the spontaneous or free-willed decay of the atom from mass into energy. This energy not only powers the so-called nothingness of the empty space in the universe, but also the empty space within every atom of matter. No matter or life could exist without this vacuum energy in the universe. The *Ghost in the atom* [9] of the reductionist science is in reality the *Host in the atom* and in the empty space, without which no creation is possible.

The human beings are blessed with a capacity to realize these universal realities via a complete and wholesome science integrating spontaneity or consciousness and the inanimate matter. The integrated model of the universe also provides a scientific support for eastern as well as western philosophies based on humility, compassion and enlightenment as the basic ingredients of life. The model represents the spontaneous (voluntary or free-willed) decay of self-decaying particles from matter into energy as the fundamental ingredient of the universe. A particle of matter has an identifiable form that is limited in space and time. As this particle decays (spontaneously or at its own free will) to become the Zero-point energy, it gives up its identity and achieves a state of fully dilated space-time representing eternity and omnipresence (an infinitely large wavelength). The implied purpose or lesson learned here for the human mind is that when we voluntarily (free willed) adopt humility, we give up our ego (identity- individual, social, economic etc.) and that naturally transcends us into a state of universal (unlimited) love and compassion. Just as the spontaneous self-decaying property of the particles resolves the apparent paradoxes of scientific theories encompassing the material-only universe, the humility with ensuing love and compassion resolves paradoxes of the human mind encompassing only the material life. What is also intriguing is that just as the self-decaying of the mass causes the particle to enlighten (lesser mass and weight), humility or renouncement of the ego leads to the enlightenment of the human mind. The universal reality depicted by the integrated model can be directly translated to the power of purpose in the universe as follows:

- A common or universal set of relativistic laws govern the behavior of matter and mind. Relativity, and not uncertainty, rules human mind or the ego and has a deeper purpose. Good cannot exist without evil, just like energy cannot exist without matter or space cannot exist without time. Similarly, faith cannot exist without doubt, light cannot exist without darkness, day cannot exist without night, and birth cannot exist without death. Just like the two faces of a coin, these apparent opposites are connected and cannot exist without one another. Each of the opposites has a deeper purpose that is to allow the existence of the other.
- The vacuum or the Zero-point energy representing the laws of the universe is eternal and omnipresent beyond space and time. All life in the universe comes from it, lives in it and ends in it. The two apparently opposite faces of reality mentioned above

transcend into the one whole, eternal and omnipresent Zero-point energy, the supreme consciousness, which is a physical reality and not a metaphysical or supernatural myth.

- Matter, energy, space, and time represent one whole continuum, and the law of its conservation is the supreme or mother of all laws of nature. This simple law powers the simplicity, beauty, order, wholesomeness (holiness), and purpose in the universe. This law governs the fundamental reality of the universe that what exists now, always existed in the past and will always exist in the future, and that what does not exist (nothingness) now, never existed in the past nor will it ever exist in the future. Nothing can be borne out of nothing.
- Humility, compassion and enlightenment are the fundamental properties of the universe consisting of both matter and consciousness in it.

GNM Provides A New Perspective on the Free Will Dilemma

The reductionist approach of science is often tied to the determinism of the natural laws. The determinism, as seen by Einstein, is interpreted to explain away free will, and indeterminism or uncertainty, defended by Neils Bohr, is seen as the idea that freedom actually exists. GNM shows that a different or possibly opposite conclusion can be supported by a deeper interpretation of the deterministic natural laws.

The natural laws simply determine the outcome of a free-willed and chosen input by the observer or experimenter. The result is not a priori assigned or decided by an external agency enforcing the laws, and is not independent of the input. In other words, the laws do not determine the fate, but only determine the process that applies to the input. The actual result or outcome is, however, dependent upon the input. The free will resides in the selection or choice of the input by the human observer. If an input is changed at the free will of the observer, then the result changes according to the deterministic law. The ultimate result is in the hands or at the choice of the free will of the human observer. For example, the law of gravity is deterministic, but it does not determine whether a person would fall to the floor or walk straight up. Any one of these outcomes is under the control of the free will of the person or some other external environmental factors completely unrelated to the determinism of the law of gravity. Similarly, the reductionism is a chosen (free-willed) interpretation or approach of a reductionist observer and completely unrelated to the determinism of the natural laws.

The Heisenberg uncertainty or indeterminism of the motion of a particle, such as an electron, has no relation to the determinism or indeterminism of the laws of nature but to the choice of the human observer regarding the frame of reference of the observation. Heisenberg chose to observe the location and velocity of a particle, which is moving close to the speed of light and under the influence of relativistic motion, in a fixed or Newtonian frame of reference of the classical science. It is well known that space and time under relativistic motion dilate as opposed to the Newtonian fixed space and time. This very free-willed choice of the selection of the frame of reference by Heisenberg led him to the incorrect conclusion that the uncertainty is inherent in nature. The truth is that the observed uncertainty is an artifact of the choice of Heisenberg in his selection of the

Newtonian fixed space and time. Heisenberg may have made this choice to maintain consistency with the prevailing scientific method wherein the real-life experiments are constrained by the practical limitation of the fixed space and time. If he had chosen a (more appropriate, howsoever impractical) frame of reference wherein the observer moves at the same speed as the electron with equivalent relativistic effects, no uncertainty would have been observed or seen in describing the exact motion of the electron. On the other hand, an observer moving at exactly the speed of light would see all classical objects completely disappear due to the total dilation of space and time. Hence, the observed indeterminism or uncertainty is not inherent in nature and is not the basis for free will, but rather an artifact of the choice of the frame of reference at the free will of the observer.

GNM Provides A Perspective on Ethics and Morality

The GNM model also sheds light on the origin of ethics in the ongoing debate on science-religion-ethics triad, and the true nature of deep ethics. The proposed universe model supports the moral nature of the universe as depicted by the self-decaying particles of matter that lose their own mass and identity to enliven the universe and propel life in it. This vindicates the following views expressed by George Ellis and Nancy Murphy [11,12]:

“Indeed it is only if ethics is of this nature that it has a truly moral character, that is, it represents a guiding light that we ought to obey....If true, this is a very important feature of the nature of the universe.”

“Here I claim that at a deep level, there is a universal ethic agreed on by all religions - namely "kenosis" (self-emptying, giving up, or self-sacrifice). Much religious practice however contradicts that inspiring ethic, and indeed has a horrific historical record, which is rightly rejected by humanitarians, scientists, and the broader public. The science-and-religion movement will need to be seen to be free of this negative kind of thought and practice.”

CONCLUDING REMARKS

The results of this work show that there is a common cause paralyzing both science and religion, and it is within our reach to eliminate this cause. This root cause is the ignorance of the inherent consciousness or spontaneity in the universe by both science and religion. The consciousness is not an epiphenomenon but a scientifically observed physical phenomenon, without which the achievement of the theory of everything would only be a pipedream of science. Science without religion is lame, religion without science is blind, and without consciousness they are both paralyzed. An integrated scientific model that includes spontaneity or consciousness is shown to go a long way in answering the fruitless debate and conflicts between science and religion. The model builds a bridge of consciousness between the two apparently different islands of science and religion.

There is a common misperception that human mind and consciousness are outside the domain of science, which is supposed to address only the utilitarian purposes or material conveniences of human life. Results of this research refute this misperception and demonstrate that an integrated science including spontaneity or consciousness, the *Scienciousness*, can address issues important to life such as the purpose and meaning. It also resonates with the following futuristic views expressed by Paul Davies [13]:

“However, this view of two implacably opposed belief systems constantly at loggerheads is seriously misleading. For those religious thinkers prepared to engage the scientific agenda in a constructive spirit, the coming decades will be a time of excitement and renewal. Science need not be the enemy of religion. Indeed, far from threatening mankind's spiritual wellbeing, science is increasingly seen as positively inspirational. As scientists unlock more and more secrets of nature, so they reveal a universe of stunning beauty and ingenuity, a grand cosmic scheme truly worthy of our awe and celebration.”

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