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**An assessment on the feasibility of describing a revised
theory of space and time based on the Bhagavata Purana**

Abstract

There is an inherent need for education systems and mental health models to begin incorporating principles of non-local science in their approach to education for a population to gain general intelligence. Contemporary education is lagging in comparison to scientific progress due to the adoption of concepts that are considered outdated in current scientific terms. While education systems have not moved away from physical theories the scientific community began departing from this scientific framework in the year 1900 with the dawn of the discovery of the Planck Constant. The Bhagavata Purana provides a robust framework to encompass various spatial features of reality required to describe non-local sciences. This research attempts to assess the extent towards which the Bhagavata Purana can reconcile the various issues in contemporary scientific theory. Through review of Newton's Principia Mathematica, Immanuel Kant's Critique of Pure Reason, articles on Einstein's Theory of Relativity, various academic papers regarding quantum physics as well as published articles on topics of space and time, various reference frames used for perceiving reality is compared to the Bhagavata Purana. The research concludes that the true nature of time according to the Bhagavata is ontological and relative to the reference frame used by the observer to perceive reality and stresses that the only way to perceive the true ontological state of Time is through a practice called devotional service. This research also recommends that there should be further research done in this area through the phenomenological research of time and space.

1.0 Introduction

The Bhagavata Purana regards ontology¹ as the ultimate form of knowledge and refers to it as primary knowledge. All other descriptions of reality as a phenomenal manifestation is considered secondary knowledge. It is this secondary knowledge that general philosophy describes. The subject of space and time² is considered to be the most fundamental to human experience. This is because the variety and change that we perceive is the starting point of all sciences. There is however an evident tendency of science to move away from variety and operate as far as possible in terms of homogeneous and uniform substances (Barbour 1982, 251). Such tendencies to reduce phenomenal variety began with the rise of kingdoms, civilizations, sciences and bureaucracy which invariably led to the necessity of organizing large scale populations resulting in what is known as rationalization.³

The Bhagavata Purana is an indirect form of revelation known as Smṛti which is said to be divine in origin through human agency. Its inherent fluidity to present itself as objectively overarching knowledge adjusted according to time, place and consciousness of the audience allows it to be imparted to the public at large (Bryant 2003, 10). It is capable of dismantling human reason from the tight grip of subjective time that is reinforced by physical theories through rationalization into an invariable experience of a person's true ontological state should the earnest reader be mindful of the concepts of this literature in his daily life. Human intuition and the concepts of time and space are necessary attributes that represent a suitable framework to have an understanding of reality. Such a notion is similarly shared by Immanuel Kant (1781) in his Critique of pure reason. Kant had an inclination towards mechanistic and physical attributes due to his focus on debates between Newton (1643-1727) and Leibniz.

The verse below from the Bhagavata Purana represents one of the many different aspects of space and time described in an intuitive manner.

“Prahāda Mahārāja accepted whatever the Lord had offered him, and he prayed for the Lord to deliver his father. In response to this prayer, the Lord assured him that in the family of such a pure devotee as he, not only the devotee's father but his forefathers for twenty-one generations are liberated.”

¹ Ontology according to contemporary philosophy is a branch of metaphysics that studies the science of being (<https://plato.stanford.edu/entries/metaphysics/>).

² Space and Time refers to the absolute notion of reality and space-time refers to its relative nature.

³ This according to Max Weber was one of the negative effects of replacing traditions, values and emotions as motivators for behaviors in society with rational and calculated ones in society's pursuit of organizing large scale populations

The verse above, indicates that whatever processes that go forward in time are equally symmetrical and applicable backwards in time. This aspect of time reverse symmetry cannot be adequately described by the physical sciences. The area of research for this dissertation is the conceptual descriptions of space and time in the Bhagavata Purana and its potential to contribute to contemporary science. The purpose of this research is to make a comparative analysis of the various contemporary scientific theories and to compare and contrast it against the conceptual descriptions of the space time construct within the Bhagavata Purana. The focus of this research is to assess the extent towards which the Bhagavata Purana can reconcile the various issues in contemporary scientific theory. It is hoped that the conclusions of this research would assess and summarize if a new and revised theory of space-time can be developed from this research.

2.0 Concept of Space and Time

Before we proceed to speak of space and time representations we should first consider in what way should a proper representation of its attributes be described. However, before we can answer this question we should first consider prevalent theories.

2.1 Newton's Principia – Absolute Space and Time

Lacking metaphysical and ontological depth, Newton's principles put the subject (observer) separate from the object and separated reality from intuition⁴. It was a necessity inherent within his purpose to perfect the manual arts. This necessity allowed Newton to create a frame of reference called absolute time and space. In his view absolute space is prior to matter and absolute time is true and mathematical existing independently of events and processes. This can be seen as Newton's metaphysical definition of space and time which is meant to be overarchingly objective as its purpose was meant to be a reference frame based on geometry. Our subjective experience of time according to Newton represents its secondary quality and is said to be relative, apparent and common (Kant 1781, 83).

2.2 A-Theory of Time

The A-Theory of time has attributes similar to Kant's internal intuition of time which will be discussed below. The basis of this theory is the notion that there is an objective present moment which proceeds in the sequence of past, present and future perceived as the flow of time. The present moment is a unique point in time known by our conscious experience. It

⁴ Newton attempted to perfect a practical art called mechanics through the principles of accurate geometry. As stated in Newton's principia all manual arts belong to practical mechanics and that which perfects this practical art is geometry (Newton 1846, 73)

separates the past from the present by the process of temporal becoming denoting the shift in status from unactualized to actualized. Although the A-Theory asserts that such an experience is subjective, an objective experience of this shift has never been accounted for by this theory. This theory suggests that due to this shift, the universe is irreversible and that this irreversibility gives the direction of time (McGrath & Jebb 2015, 57-58).

2.3 B-Theory of Time

The philosophical theory of time that is most complementary with the concept of relativity is the B – Theory of time where space and time is interpreted as being the totality of events and is also known as the “Block Universe”. In this context, all events are said to have the same status of being subjectively real irrespective of its order and that the present is observer dependent. This theory accommodates the irreversibility of the universe similar to the A-Theory. It differs however by asserting that temporality is not an intrinsic attribute of time but a consequence of the boundary conditions of the universe that results in the observed laws of natural science. In Kant’s view as will be explored below, these boundary conditions are the limitation of our senses that are receiving inputs from the totality which the B-Theory refers to. The main problem with the B-Theory is that it is unable to account for the observer’s common internal intuition of the flow of time (McGrath & Jebb 2015, 57-59). This issue will be resolved in our further analysis below.

2.4 Relativistic Model of Space-Time

This research is more concerned about the descriptions of reference frames that refer to the characteristics of change. Central to this purpose is the fact that all change and variety need to be expressed in terms of uniform standards. Space and time are the ultimate reference frames when it comes to causal order within contemporary theories.

Einstein’s special theory of relativity solved the problem of describing these reference frames when accounting for accelerations by postulating that the speed of light is constant throughout the vacuum of the universe irrespective of the motion of all observers and that the laws of physics are the same for all non-accelerating observers. This led to the concept of relative space-time instead of absolute space and time. Being one of the most empirically corroborated theories in the whole of science, relativity describes time as an intrinsic quality of existence. So intrinsic is time’s nature to existence according to the principles of relativity that it is impossible to describe time in total isolation from its relation to space. At this point for the sake of

progress in this research we can safely depart from the absolute theories of space and time when describing the metaphysics and ontology in this research.

2.5 Immanuel Kant and the intuition of Space and Time as an intuitional reference frame

Kant provided a detailed exposition describing the intuition of space and time in his theories. He asserts that determination of phenomena are intuited prior to sensory perception. Space therefore takes the form of all phenomena observed and experienced by our external senses. It is the form and basis of our external intuition and is the representation of our sensibilities.⁵ Such a representation that is limited by our external sensory perception in the opinion of this research is the boundary conditions of the universe on human observers as depicted in the B-Theory of time. Time in the context of human perception according to Kant has only one dimension which is the momentary nature of each moment. Different times are successive but not coexistent just as different space are coexistent and not successive. Time in human perception is seen as a pure form of our internal sensate intuition of the self and our internal state, not a general conception therefore conforming to aspects of the A-Theory of time. In this way, Kant establishes the intuition of space and time as the basic reference frame of reality. According to Kant, time is not a reality with attributes nor does it exist in things permanently. While it has nothing to do with shape or position, it determines the relations of representations with our internal state. Since these relations are expressed in our external intuition of space, time is also a form of intuition. Time therefore is a condition a priori of all phenomena (Kant 1781, 83-84). It is based on this understanding that this research derives an important conceptual purpose of the Bhagavata Purana as will be discussed below.

The notion that different times cannot be coexistent is synthetic. It cannot spring out of conceptions alone. It is contained immediately in the intuition and representation of time. This according to Kant is due to the infinite nature of time that cannot be perceived by the natural function of our human faculties due to the limitation of our empirical intuition of space. This limitation by our senses are the boundary conditions of the universe as described in the B-Theory of time. Therefore, he states that the original representation of time is that one unlimited time at the foundation of existence (Kant 1781, 78-80). It should be noted however that the notion of Kant's eternal time lacks metaphysical definitions and it conflicts with the special theory of relativity as well as the B-Theory of time. It is also in conflict with the concept of non-locality of the universe since the relativity of space-time does not recognize anything faster than the speed of light. By referring to eternal time as a reference frame the concept of relativity breaks down since acceleration cannot be measured using eternity as a reference frame. It also breaks the closed loop of causality that is required in the concept of relativity. In

⁵ According to Kant, space does not represent the properties of objects neither does it represent relations between objects (Kant 1781, 78-80).

other words, an eternal concept of time requires conceptual descriptions which separate eternal and temporal realities to allow conformity to the special theory of relativity, the A-Theory and B-Theory of time as well as the attribute of non-locality of the universe according to quantum theory. In other words, the integration of these theories necessitates the dual realities of the eternal and the temporal world as additional reference frames to describing space and time.

2.6 Generic Theory of Time

Can widely differing theories be integrated into a single robust theory? The integration of different theories requires a common denominator that is able to be used in describing a revised integrated theory of time. This common denominator should be in the form of conceptual descriptions that are free from metaphysical and philosophical interests and prejudices unlike most views that do not promote a generic character of time. In an effort to have a revised theory of time that has traceability from physical theories, the neutral word “displacement” will be used to connote transition from one phase to another. It is because we restrict the notion of displacement only to motion that we restrict descriptions of time and space to mechanical metaphysics. Displacement if seen in a generic way in the context of space and time should represent unique throbs or pulsation representing private intrinsic time. Time is co-intensive with actual displacements. Just as space is co-intensive with actual entities in the world. If viewed in such a way, the generic description of time through displacement allows it to be universal even when describing existence in different worlds from ours. It also allows for the description of internal and external intuition of time and space respectively using the same denominator of displacement. In doing so it represents a useful tool to integrate the theories of time discussed above (Biser 1946, 664-668).

Time in its generic sense is the most common denominator of all displaced entities and situations. Other qualities of time in this generic view are that time is a pure and unique relation not influenced by the nature of situations it engenders. Time ensues from displacements and is not the displacements of situations thus making it devoid of any qualitative attributes unlike events which are the basis of describing time in contemporary physical theories. Displacement is devoid of qualitative content. It makes no distinction between experiential and non-experiential aspects of nature. Such a generic description is necessary if we are to give a definition common to all situations irrespective of being succession of sensations or changes in energy levels in atomic systems. Time is therefore a relation connecting phases of situations which persist or displace one another resulting in permanence and flux (Biser 1946, 664-668).

In the generic theory of time, intrinsic time is that which is inherent in pulsation similar to Kant’s notion of our internal intuition of time as mentioned above. Such a time in generic

theory is considered private. A temporal stretch on the other hand is undivided, engendered and enjoyed as a solid continuum. A temporal stretch however is divisible into finite number of parts each of which is a concrete stretch for some actual event or process (Biser 1946, 664-668). Such a description bears resemblance to the description in the Bhagavata Purana of finite time at a micro scale even up to the planck constant as will be discussed below.⁶ Both the generic theory of time as well as the Bhagavata Purana view these finite number of subordinate parts serving as a duration for some actual process or event (SB3.11). The description of this duration in the Bhagavata Purana is highly advanced in that it characterizes different forms of displacements in the form of metaphysical representations that are ontological in nature ultimately. Since at a micro-scale time is finite and there are no instants of time nor is there empty time, there is a lower limit to time below which a subdivision cannot serve as duration for an actual process referring to the planck constant. Time in the view of the Bhagavata Purana is as discrete as space as well as ontological in origin. The recognition of the discrete attribute of time is in line with the space-time view of special relativity.

Space in the generic view of time should then include anything that has content or spread such as shadows, brain processes, energy and physical bodies if it is to provide any depth towards knowledge. In a general sense it means anything that is subject to pulsation and displacement. The becomingness of the phenomenal world represents the succession and persistence of phases of space resulting in a fluent continuum of spatial states (Biser 1946, 664-668).

2.7 Sub-Atomic Phenomena and Quantum Mechanics - Conceptual Fabric of Space and Time

Apart from Einstein's theory of relativity, Quantum Mechanics is one of the most empirically corroborated theories in the whole of science. Quantum Mechanics describes phenomena at microscopic states of sub-atomic particles measured by the planck constant. The conclusions of Quantum Mechanics suggest that its fundamental difficulty is a failure to recognize that space-time is always observed and construed from within as opposed to classical physical theory that observes phenomena from a detached frame of reference that is outside the universe (McGrath & Jebb 2015, 53). The underlying basis of the uncertainty principle is that the real interconnection of everything in the universe is by means of quantization. We should also note that this principle does not describe the general status of particles in the entire system as thermodynamics does. The generic theory of time discussed above provides a good framework to phrase this interconnection suggested by the uncertainty principle. However, there remains

⁶ Albert Einstein suggested from his experiments on photoelectric effects that light waves acted like particles and that the amount of energy each particle of light could deliver can be measured (Crease & Goldhaber 2014, 37).

a gap in quantum theory between the states of objective possibility (denoted by wave functions) and that of subjective certainty (particle state which forms objects) which this theory refers to as the collapse of the wave function.⁷

The key issue at hand within the context of this research is the measurement of time at micro-scales. Classical physics which shares the notion of time with quantum mechanics does not consider limitations which depend on the nature of our sense organs and necessitates measuring devices that are capable of magnifying distances or times to any desired extent (Ditchburn & Motz 1937, 46). Our senses limit our intuition to three dimensions or lower. In such circumstances we are unable to recognize or perceive quantum processes at quantum scales right up to the Planck⁸ constant. From the point of view of this research, the inability of this theory to recognize the limitations of the senses is also the root cause of the lack of completeness of this theory or any other theory for that matter when it comes to describing ultimate reality. It should be noted that the basic difference here is contemporary science measures an event by numbers which are (synthetic a priori constructions) not suitable for human intuition. The Bhagavata Purana describes and quantizes time by means of (a priori) presupposed descriptions of sub-atomic processes (SB 3.11) that can be receptive to intuition.

3.0 The Philosophical Gap of Science

Improving our knowledge about time is best achieved by integrating philosophical ideas with physics and cognitive science which will help us identify current gaps in time as well as the potential to solve some of the conceptual problems of modern physics that remain outstanding such as quantum non-locality (McGrath & Jebb 2015, 62).⁹

From a philosophical standpoint, one of the main reasons for such a lack of depth in quantum mechanical theory is that physical sciences do not pay attention to ontological status as a frame of reference. Scientists are not competent enough in philosophy to be cognizant of issues between realism and idealism (Lenzen 1949, 279). Lack of connection made between properties of things and laws of relations may be one of the main reasons why fundamental concepts in Newton's induction such as time are reduced to observed laws (Miller 2009, 1055). Quantum

⁷ Collapse of the wave function refers to the state when a wave collapses to become a particle (Crease & Goldhaber 2014, 37).

⁸ In 1900 Max Planck discovered that radiation occurs with discrete energies that are quantified through a constant known as the Planck constant (<https://plato.stanford.edu/entries/qm-copenhagen/>).

⁹ Quantum Mechanics reveal that the universe is non-local. This means that there are influences that act with speeds that are faster than light in a vacuum suggesting that in classical physical terms that there are causes that act from outside our reality since Einstein's theory of relativity assumes that the speed of light is constant throughout the universe.

Mechanics according to C.G. Darwin is still partly covered by the scaffolding of mathematical formalism. It is felt that the time has come to remove a good deal of this mathematical scaffolding in place for a more intuitive view of space and time (McCrea 1939, 159).

If ever a mathematical theory of space and time is to be developed in a natural way, one must first begin with topological¹⁰ relations and then proceed with methods to arrive at Cartesian coordinates (Bohm 1962, 274). According to Heisenberg, the nature of scientific understanding does not begin with mathematics but the juxtaposition of different intuitive pictures and distinct types of forces. The content of physical thinking should be involved only when transforming the intuitive concepts into a coherent meaningful picture with mathematics itself playing a secondary role. There is need for questioning the origins of pictures on which our ideas are based (Bernstein 2007, 483).

4.0 Bhagavata Purana and the Topology of Space-Time

The Bhagavata Purana is based on the principle of oneness and simultaneous difference. This principle can be more accurately described in scientific terms by a chaotic non-linear regressive system.¹¹ Chaotic dynamic systems according to Russel, Murphy & Peacocke (2000) is not only known to exist in hydrodynamics and plasma physics. It pervades physics, meteorology, chemistry, biology, evolution and cosmology. The primary rules of causation in the context of this system are laws that are beyond our empirical experience and the secondary rules of causation represents our phenomenal world in which we derive our natural laws of physics. By adopting such a view we can come close to having a conceptual framework that can be grasped by the human mind with regards to the concepts of time and space in the Bhagavata Purana. This represents a practical way to connect the different theories of time in a way that it reconciles into a singular and wider concept of time and space that asserts the existence of two complete sets of equipotent laws. One corresponds to the efficient causal order of the world and the other to its teleological order thus conforming to the necessity of an eternal and temporal world that reconciles contemporary theories of space and time (McDonough 2008, 674).

5.0 Knowledge of Space and Time

¹⁰ Topology studies the properties of spaces that remain unchanged under deformations over time (<http://mathematics.stanford.edu/research-areas/topology/>)

¹¹ Chaos is typically understood as a mathematical property of a dynamical system. A dynamical system is a deterministic mathematical model, where time can be either continuous or discrete. The context of this research refers to our universe as such a dynamical system that is non-linear and regressive (returning to less developed state) in time (Markie 2017). A system that has such characteristics is called a chaotic non-linear regressive system. Thermodynamics displays such characteristics when we observe gas disperse over time in a closed environment.

The rationalist empiricist dispute in epistemology has extended into the area of metaphysics, where philosophers are concerned with the basic nature of space and time. The basic principles of metaphysics cannot be taken from experience (Markie 2017). Kedarnath Bhaktivinoda Thakura, one of the prominent philosophers of the Gaudiya Vaishnava school asserted that the phenomenal world should be the object of logical scrutiny alone and that which transcended logic is exclusively reserved for the innate seeing ability of the soul. Faith in the srutis and smirtis that is unfettered by the rational process of the mind is the key to unlocking this ability. This ability is no other than our intuition and is possessed by everyone should they pursue this ability. In other words, our intuition according to the Bhagavata Purana sits on a different ontological reference frame from our faculties of reason. The ability to recognize this is wholly dependent on an epistemology that recognizes such metaphysical truths. Faith according to Bhaktivinoda Thakur is a natural quality of the soul that is attained when the observer achieves a reconciliation with his perception of space and time as a whole which will be discussed in the conclusion (Dasa 1999, 148-150).

Reference Frame 1: - In contrast to the reference frames in the Bhagavata Purana, Immanuel Kant's ontology for time and space begins in the mind at the point prior to cognitive sensing referring to our intuitive capacity to receive representations (Kant 1781, 51). Such a receptive capacity is what Bhaktivinoda Thakur referred to as the soul in his description about intuitive capabilities mentioned above.

Reference Frame 2: - Kant's ontological framework begins at the intuitive process in the mind. The Bhagavata Purana however describes an overarching framework that exist before and after the observer's experience of time in this reality. It is also able to describe a framework for processes that occur prior to our experience described by physical theories. Although time according to the Bhagavata Purana is the fundamental force that creates our experience of reality there exists a state prior to time and consists of the basic elements of reality at its uncombined state. The ontological Reference Frame 4 of Figure 1 refers to these basic elements of reality at its combined state being intuited by our intuition. Similarly, in a more simplistic way, the ontological reference frame 2 of Figure 2 being discussed in this paragraph refers to the intuition of time which according to Kant is the condition prior to (a priori) all phenomenal manifestation (Kant 1781, 60).

Reference Frame 3: - Both reference frame 2 and 3 of Figure 2 should not be viewed as a successive process. This is due to the lack of overarching metaphysical descriptions present in Kant's conceptualization of space and time. Nevertheless, reference frame 3 of Figure 2 is the basis of all external empirical intuition (Kant 1781, 54-59).

Reference Frame 4: - This reference frame contains all external empirical intuitions (when reference frame 2 and 3 are combined as space and time in its many representations)

somewhat similar to reference frame 4 of Figure 1. Kant's reference however has a much narrower scope covering mechanical and physical aspects of phenomena compared to the Bhagavata Purana (Kant 1781, 52).

5.1 Epistemological aspects of the Bhagavata Purana

The Bhagavata Purana is considered Smṛti. Such knowledge which changes over time serves as an integrating knowledge of eternal truths that are in the Śruti which in this case is the four Vedas. Therefore, it recognizes the metaphysical, ontological and teleological definitions of the Śruti and Smṛti which represents two separate a priori truths of this literature. The Bhagavata Purana being a description of an ontologically absolute person integrates all knowledge in the Śrutis by descriptions of His purpose in the form of ontological and teleological descriptions of space and time. Unlike the Bhagavata Purana, Kant's Critique of Pure Reason does not describe the eternal nature of knowledge, it does however suggest that metaphysics is beyond the range of experience which is in line with the Bhagavata Purana's view of the metaphysics of Vedānta (Kant 1781, 10-11).

Kant considers time and space to be two forms of presupposed (a priori) knowledge from which various synthetical cognitions can be drawn as depicted in Figure 2. They are the two basic forms of all intuitions that make synthetical a priori (presupposed facts that have additional empirical information attached to it) propositions possible. He also asserts that forms of knowledge derived from our external empirical intuitions are conditions by our senses (boundary conditions) and determines the scope and purpose of this knowledge in so far as its applicable to sensate phenomena (Kant 1781, 58-74). The ultimate ontological position of the Bhagavata Purana is that reality finally rests on a singularity that represents ontological personhood and retains an absolute transcendent ontology consisting of knowledge, eternity and bliss. The reference frames that are used to describe space and time by this literature as described in Figure 1 above is replete with different personalities who represent an ontological reference frame with a particular causal trajectory in time. Although these reference frames represent personalities who are individual beings that have unique functions that define the teleological aspects of reality, such descriptions are beyond the scope of this research. The ontological reference frames described in Figure 1 are in a whole part relationship with this absolute personality who represents the whole to all observers. In this way the Bhagavata Purana easily bridges the external intuitive notion of greater time through the manifestation of the phenomenal world with the individual internal intuition of momentary and successive time. Unlike physical theories that represent metaphysical realism, this literature is not only a detailed and robust idealistic philosophy, but it goes beyond idealism and time in its ontological representation of reality to describe theologically a supreme absolute personality's

participation in a system which describes a whole part relationship that displays time reverse symmetry (Bhaktivedanta Archives 2003).

According to the Bhagavata Purana, objects within the phenomenal world are nothing but the transformation of phenomena described by language. However, the actual reality is the ingredient cause as described in its analogy whereby the clay being the ingredient cause transforms into different pots. Since the various pots may be created into forms and later dissolved back into clay, language mostly describes such temporary forms perceived by our eyes, nose, tongue, touch and taste (SB11.3.36 & 10.87.15). This is in line with Kant's notion that space and time are our pure forms of intuition that serves as the foundation of all our external intuitions described in words by our language that come in the form of substance, force, divisibility, sensation, impenetrability, hardness and color (Kant 1781, 75-76).

Kant asserts in his later years that space and time are nothing but our own ways of representing or perceiving the world and does not ultimately give us insight into the ultimate nature of reality. The pure intellect alone gives us insight through the conception of the world as a universe containing substances connected to each other through their common dependence on the ultimate cause that is God. This can then make way for an undisputable metaphysics where the limits of our sense perception are recognized and that this necessary restriction is not the limits of reality itself (Guyer 2006, 28). According to Kant, human intellect contains even in its most unphilosophical state cognitions of space and time that are (a priori) presupposed (Kant 1781, 34). The intellect referred to by Kant is the capacity of the soul to receive this intuition if one were to interpret this from a Gaudiya Vaishnava standpoint as mentioned above.

Based on the universal primary and secondary rules of causation described in various forms of Vishnu by the Bhagavata Purana, the first proposition of this research which will be synthesized in the conclusion is as follows. Although time is an internal intuition, the external intuitions of space can help us intuit time by concepts that can bridge the gap between our external and internal intuitions. This according to the Gaudiya Vaishnava school is the purpose of the Bhagavata Purana's description of performing sacrifices to the Supersoul Vishnu (ontological reference frame 1 of Figure 1) who represents our internal intuition of time and external intuition of space. It is based on this fact that this research proposes ontological reference frames to be the most suitable framework to establish a robust theory of space and time.

5.2 Metaphysical and Ontological aspects of Bhagavata Purana

The primary rules of causation according to the Bhagavata Purana is Karanodakayasi Vishnu representing the origins of material creation. The second and third manifestation being Garbhodakayasi Vishnu and Ksirodakayasi Vishnu represent secondary laws and the true representation of time respectively unlike Kant's concept of eternal time. They are represented as the initial process of disbursement in the context of space and time in ontological reference frame 1 of Figure 1. We should also note that since primary causation rules are prior to secondary causation rules, this aligns with the current findings of quantum mechanics that the universe is essentially non-local with action or influences from a distance. Since there are influences that travel faster than the speed of light, such a concept also rejects Newton's absolute nature of space and time as well as the constant nature of the speed of light throughout the universe in the Special Theory of Relativity by Einstein. Although disagreeing with such fundamental concepts of classical and relativistic physical theories, in a stark contrast the Bhagavata Purana agrees with more recent scientific discoveries such as the true measure of standard atomic time being the measure of the speed of light across a photon. This is no different from the definition of time according to the Planck scale (McGrath & Jebb 2015, 53).

The three modes of nature according to the Bhagavata Purana are the modes of passion, goodness, and ignorance. They represent the forces of creation, maintenance and destruction respectively and act as a reference frame when describing events in space and time. These forces can be thought of as the properties of time and space in a manner whereby the forces of negentropy, equilibrium and entropy in thermodynamic systems operate. They represent the constant changes that operate successively as a cycle over cosmological timeframes called Yugas (SB12.3.26). This provides a practical way for a person to construct an intuitive notion of greater timescales. The ability of a person to do this according to the Bhagavata Purana is a purifying act in a person's pursuit towards grasping a whole part relationship with reality.

The Bhagavata Purana is also able to describe time in the most fragmented description known to contemporary science. It has methods of quantifying time that serves as a good framework for contemporary science to describe concepts that can bridge the gap between quantum mechanics and physical theories. This will be covered below.

6.0 A New Perspective Of Time – Salient Features of the Bhagavata Purana

Although the analysis above reveals that there are many commonalities that can be derived to form salient concepts for future theories, the first question that should be addressed prior to proposing a revised perspective of time is whether time and space has an arrow or direction at all? One of the most fundamental and unanswered questions regarding space and time is the direction of time (Narlicker 1965, 281). According to the Bhagavata Purana, although the

individual observer experiences a past, present and future, time in reality is reverse symmetric. Although its description does not provide a mechanical view of time it does however provide a suitable presupposed pictorial concept (a priori) intuitive enough for us to have a conception of reality (Bernstein 2007, 483).

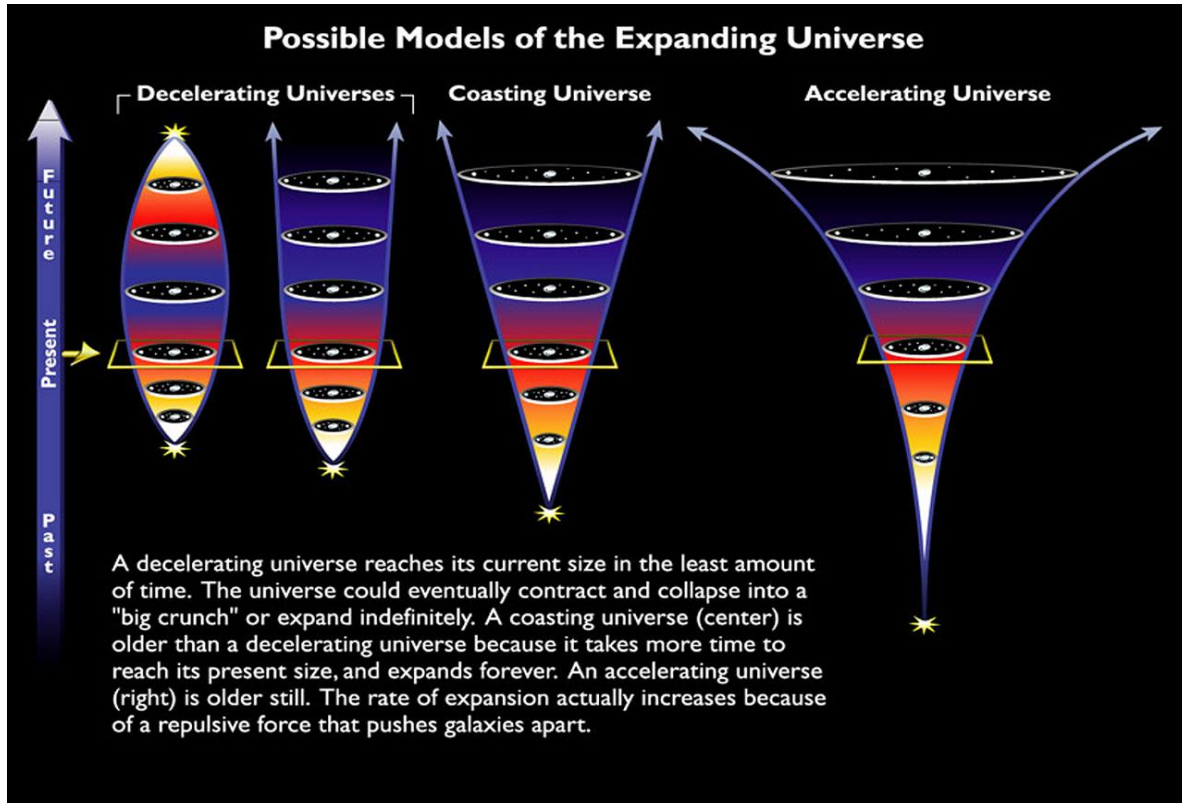
Should we accept the presupposition of the Bhagavata Purana that the ultimate reference point of time is eternal, the literature states that the individual observer would be able to perceive ultimate reality in three different levels of perception (differing according to the cognitive ability of a person who perceives reality in a whole part relationship) that evolves from metaphysical to ontological. In an ascending order of consciousness an individual would elevate his consciousness from Brahman to Paramatma and finally Bhagavan (SB1.2.11). Brahman refers to a metaphysical attribute of an impersonal reality and aligns to sciences that perceive Brahman to be like the inconceivable impersonal superposition of electromagnetic waves as described in Heisenberg's uncertainty principle (Bohm 1962, 267). Paramatma represents a higher level of consciousness that situates a person's cognitive reference frame ontologically as reference frame 1 per Figure 1. This perception of space and time situates an individual correctly in the path towards perceiving the ultimate eternal reference frame of time through the practice of devotional service. In the view of this research the Bhagavata Purana suggests that the eternal reality of Bhagavan represents pure intuition which upon His act of intuitively glancing manifests time through the expansion of the phenomenal world we call space in the form of electromagnetic waves representing the various energy forms that are emitted from His glance (SB3.5.23-37). God's intuitive perception of time is reverse symmetric and represents the original observer presupposed in all physical theories of time. It is in this intuitive reference frame which has the ontological position of Paramatma that contains all kinds of relative perceptions of all observers in space and time (SB1.2.11). Should an individual observer's reference frame reside in relative space and time which represents our phenomenal world the observer's reference frame remains false and this is referred to in the Bhagavata Purana as *ahamkara* or false ego (SB3.5.28-29). Upon advancing to the state of Bhagavan, the observer's reference frame due to his advancing level of consciousness takes an ontological shift towards eternity. Such a shift is not obtained but granted through God's mercy (SB11.28.16).

Reference frame 1 of Figure 1 refers to space and time in its universal form representing the sum total form of God's phenomenal manifestation that takes the form of a lotus flower (SB3.8.15).

"Into that universal lotus flower Lord Viṣṇu personally entered as the Supersoul, and when it was thus impregnated with all the modes of material nature, the personality of Vedic wisdom, whom we call the self-born, was generated."

This is no different from the shape of the block universe proposed by the B -Theory of time.

Diagram 3: Several models of the past, present and future states of an expanding universe constructed after the launch of the Hubble Telescope for deep space exploration



Source: <https://www.spacetelescope.org/images/opo9919k/>

From a cosmological viewpoint the arrow of time takes the concept of an expanding universe since the red shift in light spectrum from distant galaxies suggest that galaxies are receding from us and one another (Narlicker 1965, 282). In addition to this, current astrophysical data tells us that the universe is expanding at an accelerated rate (McGrath & Jebb 2015, 60). From the depiction of an accelerating universe in diagram 3 above we can deduce that the description of the universe in the Bhagavata Purana as a lotus flower (to be discussed in conclusion) is coherent with the latest astrophysical data.

Now that we have determined the cosmological arrow of time in an intuitive sense of geometry, a chronological sequence of its various ontological reference frame as described in Figure 1 needs to be juxtaposed against this intuitive picture of the universe. Time from the standpoint of the Bhagavata Purana is the living force of the universe that has an overarching objective attribute of greater time and a subjective attribute denoting the momentary present

which forms an individual's experience. The objective attribute referred to as Garbhodakaśāyī Viṣṇu belongs to ontological reference frame 1 of Figure 1. This objective attribute of cosmological time is in a whole part relationship with the subjective attribute of time being the intuitive capability of a living being that is limited by his empirical intuition. The objectively overarching and subjective view of time is described in reference frame 1 and 2 of Figure 1 respectively. It refers to the three different energies of nature that determines the inclination of the living being. They are referred to as the modes of goodness, passion and ignorance which are preservative, creative and destructive forces of nature respectively. In terms of the perception of time the literature suggests that the three different inclinations being introversion, extroversion and ignorance determines our cognitive ability to perceive subjective and objective concepts of time that leads an individual to perceive events and circumstances in a certain way (SB11.25).¹² It provides teleological concepts of human nature that helps us understand events involving human action in the past, present and future.

Metaphysically, time according to the Bhagavata Purana is the binding force of all basic metaphysical elements of this world referred to as "Kala Sakti" which is an energy form that represents to us the phenomenal world. When speaking about time the Bhagavata Purana conforms to the relativistic viewpoint of space-time as proposed by Einstein. The planck scale of quantum theory according to the Bhagavata Purana is the subtle form of eternal time (SB 3.11.1).

*The material manifestation's ultimate particle, which is indivisible and not formed into a body, is called the atom. It exists always as an invisible identity, even after the dissolution of all forms. The material body is but a combination of such atoms, but it is misunderstood by the common man.*¹³

It describes the universe to be at a unified state resembling a field of energy at its unmanifest state which refers to a state unaffected by time. When the universe remains at its own form without forming into different bodies it is referred to as the unlimited oneness (SB3.11.2).

"Atoms are the ultimate state of the manifest universe. When they stay in their own forms without forming different bodies, they are called the unlimited oneness. There are certainly different bodies in physical forms, but the atoms themselves form the complete manifestation."

This suggests field properties of the universe that can be equated to the elusive Higgs Field which is theorized to be the fundamental fabric of existence and resembles the impersonal

¹² Introversion and Extraversion are human inclinations measured by the Myers Briggs Test Indicator

¹³ It should be noted that the concept of atoms originated from natural philosophy denoting matter at a state that is no longer divisible (<https://plato.stanford.edu/entries/atomism-ancient/>). One should bear in mind that the original concept of atom was changed by contemporary science adopting Newton's law but is now back to a concept resembling its original past with the advent of quantum physics.

form of God referred to as Brahman.¹⁴ Time is at its original form the latent potential within the Supreme Personality of Godhead who controls the disbursement of this world through the ontological reference frames in Figure 1. Below this ultimate ontological position of eternal time is the unmanifest aggregate state that is called the great time as depicted in ontological reference frame 1 of Figure 1 (SB3.11.3-4). The various descriptions of space-time in the Bhagavata Purana are a subset of this aggregate and referred to commonly as the Supersoul or Garbodakayashi Vishnu that enters the expanded universe as Karanodakayasi Vishnu represented in Figure 3 (if it is viewed from the limitation of a 3-dimensional geometrical view universal in human perception) and ontological reference frame 1 in Figure 1 (SB.3.8.15).

7.0 Conclusion

The right view of time as the Supersoul from the standpoint of the Bhagavata Purana is said to be in a practical and intuitive sense like two birds sitting on a tree (SB 11.11.16).

“By chance, two birds have made a nest together in the same tree. The two birds are friends and are of a similar nature. One of them, however, is eating the fruits of the tree, whereas the other, who does not eat the fruits, is in a superior position due to His potency”

According to this description the true nature of time is ontological and cannot be expressed by words but can be experienced by devotional service. This refers to regulative practices that are capable of dismantling the tight grip of time on an individual to reveal his true eternal ontological state. This state according to the literature provides the true perception of time for an individual observer. It therefore is plausible from an objective standpoint that based on this research time is purely an ontological state that appears to be relative space-time or a metaphysical state (the inconceivable Brahman) in our universe. The origin of this ontological state is eternal in nature (SB 8.17.27).

“O my Lord, You are the beginning, the manifestation and the ultimate dissolution of the three worlds, and You are celebrated in the Vedas as the reservoir of unlimited potencies, the Supreme Person. O my Lord, as waves attract branches and leaves that have fallen into deep water, You, the supreme eternal time factor, attract everything in this universe.”

If viewed from a subjective standpoint time appears momentary and phenomenal. The ability to intuitively recognize and reconcile the objective and subjective is referred to in this literature as self-realization. It also reconciles the A-Theory of time with the B-Theory of time by pointing to an ontological state not inherent in our biological make-up to achieve this reconciliation. It

¹⁴ The Higgs Field is a field that generates mass through its interaction with other particles. This is the field that gives fundamental mass to particles and is said to be universally existent (<https://physics.aps.org/articles/v6/111>).

describes a state of realization that intuitively recognizes that the objective and subjective forms of time are seated in our internal state prior to our external intuition. The objective time that manifests this phenomenal world acts as an impartial guide to our subjective intuition of time described intuitively as two birds on a tree (SB 3.29.1-2).

“Devahūti inquired: My dear Lord, You have already very scientifically described the symptoms of the total material nature and the characteristics of the spirit according to the Sāṅkhya system of philosophy. Now I shall request You to explain the path of devotional service, which is the ultimate end of all philosophical systems.”

The Bhagavata Purana therefore indicates that the ultimate reconciliation point between all philosophical systems describing space and time is the practice of devotional service during the study of material nature, the living entity and the Supersoul. Not only does the literature reconcile the A and B Theory of Time, it also accounted for the phenomena of action at a distance for influences that travel faster than the speed of light in Quantum Physics and Special Theory of Relativity by referring to eternal knowledge from the Vedas about a timeless world (SB10.16.49). Eternal time is said to influence different forms of energies in reference frame 2 through reference frame 1 of Figure 1 in a manner that sets the teleological direction of time. This reconciliation of the eternal and phenomenal is achieved by referring to the principles of oneness and simultaneous difference (mentioned above) of the Brahma Sutra that was put in principles by Lord Chaitanya Mahaprabhu (SB7.3.31).¹⁵

“O almighty Lord, although You have no reason to become involved in material activity, still You act through Your eternal potency of time to arrange for the creation, maintenance and destruction of this universe. You do this by awakening the distinct functions of each of the modes of nature, which before the creation lie dormant. Simply by Your glance You perfectly execute all these activities of cosmic control in a sporting mood.”

This research concludes and reaffirms Immanuel Kant’s conclusion of perception, that it is neither the mind that conforms to phenomena nor does phenomena conform to the perception of the mind. It is our intuitive capacity that intuits the phenomenal manifestation through concepts that describe space-time (Kant 1781, 18-19). It is the finding of this research that this universe has the properties of relative space-time that manifests space in microscales of time and that we as humans only perceive its objects when it reaches the point that it can be represented in three dimensions for our perception. It is for this reason that the synthetic a priori attribute of mathematics quantify such representations mostly in seconds and minutes

¹⁵ Chaitanya Mahaprabhu refers to a Bengali saint from the 16th Century of India who is considered an avatar within the Gaudiya Vaishnava institution. He revived the popularity of the Bhagavata Purana (Chatterjee 1983, 100-103). It is the assertion of the Chaitanya Caritamrta that in the context of this research the saint represents a direct dispersion in time and space that originates through the primary rules of causation from a timeless reality beyond space and time.

for an observer who has a boundary condition of perceiving reality at the range of 60 to 200 frames per second. The reference frames in Figure 1 deserves more in-depth research in order to develop sciences capable of defining events and processes at microscales prior to seconds and minutes in such a way that these processes define the quantification of time at quantum scales. This can eventually lead the way towards finally describing the metaphysical and ontological processes that lead up to a collapse of the wave function. This binding force that drives the collapse is no other than the energy of time known as Kala Sakti in the Bhagavata Purana

“This cosmic manifestation, the material world, is also Your body. This total lump of matter is agitated by Your potent energy known as kāla-śakti, and thus the three modes of material nature are manifested. You awaken from the bed of Śeṣa, Ananta, and from Your navel a small transcendental seed is generated. It is from this seed that the lotus flower of the gigantic universe is manifested, exactly as a banyan tree grows from a small seed.”

The intuitive description of the lotus flower along with the personal stories representing ontological reference frames in Diagram 1 represents an intuitive way to understand reality in a deeply connecting way for a person with just basic education as opposed to the descriptions of NASA in Figure 3. In addition to this, the manifestation of the present from the past and to the future has a direction that is not defined dynamically as in kinematics but an overarching framework above its metaphysics and ontology in the form of teleology. Although such teleological purpose naturally appear as an irreversible process from the standpoint of the observer within a whole part system, time itself is reverse symmetric to the extent that it fulfills the overarching teleological purpose of our reality (SB 7.10).

Should these conclusions be assessed based on Webb’s model of knowledge depth in terms of reproducing it, applicability, strategic thinking value and extended thinking capacity it is without a doubt evident that the Bhagavata Purana displays far more depth than other theories discussed (Hammond, Herman and Pellegrino 2013, 5). To begin with, the entire concept of space and time is described in a very personal manner that enables a person from any walk of life to imbue himself with such ideas. In terms of applicability, this literature stresses that the knowledge gained should be applied in daily life through a well-defined regulative practice that dovetails the practitioner to experience reality in a whole part relationship thus making it easily applicable universally across cultures. Such a practice although requiring extreme discipline resulting in extensive intuitive development cannot be easily accepted by contemporary liberal society. Despite such barriers, the reproduction of this literature has been very successful in current times with transmission in different forms of media and languages across many countries around the world. Finally, in terms of strategic and extended thinking capacity this literature has great research value as a form of integrating a priori concepts for many areas of research such as paleo-geography, geology, archeology, theoretical physics, astrophysics as well

as teleological research that has major implications to the world order such as the search for extra-terrestrial life forms. The next step of this research paper should it be successful is to apply this paper as a base for the phenomenological research of time to compare the conceptual understanding of space and time in society against their perceived experience of time. In doing so, it is hoped that such research will reveal the gaps in societies between reality and the actual perception of phenomena in space and time. To further enhance our understanding of reality in the context of a phenomenological research of time, A. A. Robb's axiomatic theory of space and time is a recommended method due to its two primary assumptions. Firstly, the presence of uniqueness in reality and secondly that there exists in reality degrees of complexity which do not correspond with intuitive scientific ideas of time and space (McCrea 1939, 145). In doing so, future phenomenological research of space and time should begin with the test of the three modes of nature as illustrated in reference frame 2 of Figure 1 in an effort to develop a multidimensional model of space and time based on the presupposed (a priori) concepts of the Bhagavata Purana.

It is the finding of this research that since the dispersion of all space (according to the generic theory of time) in time is an observation by intuition, then assuming the relative nature of space-time, there lies an observer who is relative to the various observed dispersions (including thought processes) in space. Such an observer is the subject of ontology which is the primary form of revelation by the Bhagavata Purana describing our phenomenal reality and beyond. The reconciliation of all concepts of space and time discussed above lies in the subject of ontology as described in the Bhagavata Purana.

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