

### Is the 'Big Bang' a Big Myth?

Inflationary big bang theory is the consensus model of the origin of the universe in contemporary cosmology. According to this theory, the universe emerged from randomly fluctuating quantum fields that apparently originated instantaneously from nothing. It is further theorized that these quantum fields congealed into stars, planets, and eventually living organisms such as human beings with sufficient neural complexity to generate consciousness. These theories are associated with the reductive, materialistic, bottom-up matter-mind-consciousness ontology still prominent in modern science. In this perspective, consciousness emerges from randomly fluctuating bits of energy/matter, which somehow bind into neural networks that generate conscious mind; and then in some quite mysterious way, conscious mind gains causal power to direct behavior of the whole organism. This paper describes an alternative, logically consistent, holistic view from ancient Vedic science that is a top-down consciousness-mind-matter ontology. In that holistic view, the source of everything in nature, the unified field, is conscious Being. Remaining within the unified field, nature limits itself or condenses into mind and matter. In the holistic view, the origin of the universe is better characterized as a 'Big Condensation' rather than the 'Big Bang.' The holistic view is consistent with unified field theories, symmetry breaking, quantum decoherence, the 'arrow of time,' and the 2<sup>nd</sup> law of thermodynamics – all of which imply that the universe originated from the lowest entropy, super-symmetric, perfectly orderly unified field. Holistic Vedic science provides empirical means to resolve fundamental paradoxes in the reductive materialistic, bottom-up ontology, including the so-called hard problem of consciousness, order emerging from fundamental random disorder, and everything emerging from nothing.

**Key words:** *Vedic science, unified field, consciousness-mind-matter ontology, big condensation*

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“A common misconception is that the big bang provides a theory of cosmic origins. It doesn't. The big bang is a theory...that delineates cosmic evolution from a split second after whatever happened to bring the universe into existence, but it says nothing at all about time zero itself... [T]he big bang leaves out the bang. It tells

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us nothing about what banged, why it banged, how it banged, or, frankly whether it ever really banged at all.” – Theoretical physicist Brian Greene (2004, p. 272)

The pretheoretical assumption of the independence of objectivity and subjectivity has been fundamental to the objective approach in modern science. Progress in the 20<sup>th</sup> Century has gone beyond this assumption. For example, in the orthodox interpretation of quantum theory, objectivity is not independent of subjectivity. The subjective conscious observer is central to observation and measurement, as that which collapses the quantum wave function into classical objective reality. This entails a major quandary. Neither of the two most successful theories in modern science – quantum theory and relativity theory – bridge the gap between objectivity and subjectivity, matter and mind. But the most fundamental theory – unified field theory – requires that the gap be bridged completely (Boyer 2007).

***Progress on the mind-body problem: real nonlocal space underlying matter***

Historically the relationship of objective matter and subjective mind was prominent in philosophy, associated with the mind-body problem, and more recently with the so-called hard problem of consciousness. It also is recognized to be fundamental to the measurement problem in quantum physics and the explanatory gap between brain and mind in neuroscience. Research on these problems now concerns subtler, entangled, nonlocal levels of nature. This research has led to the rational conclusion that matter does not have a material basis. Though quite challenging to accept given the belief in materialism or physicalism still prominent in the mainstream of modern science, cutting edge quantum, quantum gravity, and unified field theories are now positing real, nonlocal, non-material levels of nature (Bohm & Hiley 1993, Hameroff & Penrose 2000, Smolin 2001, Greene 1999, 2004). The belief that conscious mind is just in the head is no longer tenable, because minds as well as brains are no longer theorized to be just localized physical matter but also processes in an underlying nonlocal information space or mind-like field.

This is increasingly evident in interpretations of quantum theory that have progressed beyond the original orthodox view mentioned above, which held that there is no quantum reality. Quantum wave collapse is now theorized to be an objective reduction, occurring spontaneously through quantum decoherence in interaction with the classical environment (Bohm 1980, Bohm & Hiley 1993, Hameroff & Penrose 2000, Smolin 2001, Greene 1999, 2004). This implies that both quantum and classical objects relate to ontologically real levels of nature, and moreover that they causally interact. Further, the neorealist interpretation based on Bohmian mechanics posits the quantum potential or psi wave as an ontologically real field underlying all matter (Bohm 1980). It describes a subtle but real nonlocal pilot wave that guides real local particles. Elaborations of this interpretation

identify this non-material wave as a causally efficacious field of nonlocal mind or mental space underlying all matter (Bohm & Hiley 1993).

Similar progress is reflected in quantum gravity theories. For example, string theories propose six or seven compactified higher dimensions. Although higher dimensions relate to additional mathematical degrees of freedom needed to explain string motion, they also are conceptualized as higher spatial dimensions. Geometric 'objects' such as strings and branes in higher-dimensional space are proposed to be the source of all material objects (Greene 1999, 2004). This implies causal interactions between 'objects' or processes in some form of conceptual, mathematical space and material objects in physical space, starting to bridge the gap between them. Also, superstring M-theory posits zero-branes in a non-commutative geometry that imply a real field underlying particulate matter (Greene 1999). Further, mathematical formulations in loop quantum gravity and black hole thermodynamics posit a pure geometry of quantized information space that generates physical space (Smolin 2001). These theories are beginning to outline a real field of nature that is more fundamental than the four fundamental particle-force quantized fields identified in modern physics as the basis of matter (Boyer 2007a).

***Nonconventional, nonlocal space is underneath the Planck scale.***

The ultimate unification of all of nature is sometimes theorized to be where the four fundamental forces merge into a super-unified state. This is theorized to be the level of the Planck scale,  $10^{-33}$  cm (Bohm 1980, Greene 1999, 2004, Smolin 2001). This theory is generally consistent with quantum gravity theories that describe material existence as fundamentally discrete and quantized. But it doesn't yet provide a model of a completely unified field. Quantized higher-dimensional space and a pure geometry of quantized information bits or qubits also don't describe a completely unified field. Discontinuous quantized bits need to merge into a continuous wholeness beyond all differences, gaps, boundaries or membranes, completely unitary and one with itself. The quantum principle in terms of the Planck scale, thought to be the smallest possible size of any object in nature, cannot describe the most fundamental level if nature is completely unified. The theories described above which posit nonconventional space underneath the Planck scale suggest that the notion of space-time ending at the Planck scale refers to conventional physical space-time only (Bohm & Hiley 1993, Greene 1999, 2004).

In the theories that do posit space-time as ending at the Planck scale, there is either motion within the limitations of the speed of light (relativity theory) or quantum mechanical tunneling that instantaneously ports objects, in the form of information, between regions of space even outside the light cone without traveling in between (quantum theory). On the other hand, in the Bohmian interpretation of quantum theory mentioned above, for example, the subtle psi wave field mediates nonlocal

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effects (Bohm 1980, Bohm & Hiley 1993). Interactions in this field would not be the mechanistic, classical causality of localized relativistic space-time, but rather nonlocal, entangled causality. These subtle interactions would be neither instantaneous nor limited by the speed of light. Fortunately, the notion of space-time is becoming disembedded from Einstein locality and gravity, the speed of light, quantization, and the particle interaction model of causality (Boyer 2007 2007a).

In this deeper and more holistic understanding, space and time are better conceived as infinity and eternity, with increasingly limited levels within them. The levels can be likened to air being subtler than earth and water, and space being subtler but permeating air, water, and earth. Objects or forms in information space or mind-like field would have extension in nonlocal, nonconventional space; but nonlocal space would still not be the completely unified level. It would be an intermediate level, in which real, non-material objects causally interact in the form of entangled waves of information/energy not built of Planck-size quanta and not limited to the speed of light.

This provides a basis to reconcile contrasting views of space in relativity and quantum theories. According to Einstein's relativistic space-time theory, motion – including any form of information transfer – is limited to the speed of light. In this theory, the notion of space-time or any object existing right now outside of the light cone is undefined and cannot be known right now. This means, for example, that we can see that the Sun radiated light about 8 minutes ago (it takes light about 8 minutes to travel from the Sun to the Earth); but we still don't know, and can never know according to the theory, if the Sun is radiating light at this moment right now. In contrast, according to non-relativistic quantum theory, instantaneous quantum mechanical tunneling anywhere in the quantum field is possible (teleportation). The first notion relates to conventional, local physical space in our familiar gross level of nature, and the second notion generally relates to the subtler relative level of nature in which motion is entangled, nonlocal, much faster than the speed of light, but still not instantaneous. The level of instantaneity relates to the ultimate unified field, transcending all finite notions of space and time (Boyer 2007a).

***Everything condenses from and within the unified field.***

In holistic Vedic science, space and time can be conceived in terms of the unified field as infinite eternal existence (Maharishi Mahesh Yogi 1997). It is conditioned in the process of phenomenal manifestation into tangible levels of increasing localization, discreteness, and mass. These levels are perhaps more easily conceived as mediums, ethers, or 'fluid-like' sheathes much more abstract than conventional physical space-time. Each grosser level is permeated by, built of, and emerges ontologically from, its subtler underpinning.

In that view, subtler levels or domains of nature don't have to be conceived as fundamentally new spatial dimensions. There is no outside of the unified field; everything that exists is within the unified field. There might be individual big bangs with respect to specific black holes in conventional space-time. With respect to the entire cosmology of existence, however, the big bang could not be an explosion but rather an implosion or condensation, because everything resulting from it remains inside the unified field. It would not create space-time, but rather be a limitation of infinite eternity – perhaps a 'Big Condensation,' but not a 'Big Bang' creating space-time from nothing (Boyer 2007a).

***The unified field is the coexistence of opposites of infinity and point.***

In the top-down consciousness-mind-matter ontology of holistic Vedic science, the ultimate, indescribable unified field can be described as inherently conscious, orderly, and dynamic. To explain the process of phenomenal manifestation, the 'nature' of the unified field is described as the simultaneity of infinite silence and infinite dynamism, wholeness and part, infinity and point. In each point is infinity, and the infinite singularity contains infinity of points. It is the coexistence of opposites of infinity and point; but it is non-dualistic. Remaining beyond all duality, to explain phenomenal manifestation it is attributed two coexisting opposite qualities. To explain how the opposites coexist, the unified field is described as infinite self-referral, instantaneously reverberating from infinity to point and point to infinity, infinitely referring or curving back upon itself. In the process of phenomenal manifestation, the apparently opposite qualities of infinity and point become expressed in increasing limitation, extending from infinite wholeness, totality of pure existence, or Being to the phenomenal appearance of no consciousness, no intelligence, and no life at the most expressed levels of gross, inert matter. Phenomenally, it unfolds from infinite interdependence or Oneness to infinity of independent points, or oneness.

***Space-time as infinite eternity is present everywhere and doesn't 'blast out.'***

In holistic Vedic science, our familiar, conventional, physical space-time is a phenomenal limitation of the infinite unity that is already present everywhere. Space doesn't begin at a point and expand out in all directions from an almost infinitely dense singularity or Planck-size quantum blasting out in a big bang. Rather, infinite space and eternal time phenomenally condense many 'points' simultaneously (everywhere). The subtlest finite, nonlocal level of space-time is the closest to the infinite self-referral of infinity and point. At the grosser level of conventional physical space-time, infinite self-referral appears completely hidden in local object-referral. This is our familiar objective world, in which discrete, independent, local objects are the predominant experience.

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The subtler, nonlocal level doesn't have the particular limitations of conventional physical space-time associated with Einstein locality and gravity, the light cone, the speed of light, and Planck-size quantization that characterize our familiar objective world. However, four-dimensional space-time is sufficient to provide the experiential framework for the senses of perception; and no higher-order spatial dimensions need to be postulated. That is, the phenomenal universe and the capacity to experience it match or refer to each other. In holistic Vedic science, conventional physical space-time relates to the locus of experience or frame of reference associated with sensory experiences in the ordinary waking state of consciousness (Boyer 2007).

This expanded, holistic conception of space is consistent with the contemporary model of space as flat, in the sense of extending in all three directions without being curved.

Theoretical physicist Brian Greene (2004, p. 249-250) states:

Normally, we imagine the universe began as a dot...in which there is no exterior space or time. Then, from some kind of eruption, space and time unfurled... But if the universe is spatially infinite, there was already an infinite spatial expanse at the moment of the big bang... In this setting, the big bang did not take place at one point; instead, the big bang eruption took place everywhere on the infinite expanse. Comparing this to the conventional single-dot beginning, it is as though there were many big bangs, one at each point on the infinite spatial expanse. After the big bang, space swelled, but its overall size didn't increase since something already infinite can't get any bigger... [T]his example of infinite flat space is far more than academic... [T]here is mounting evidence that the overall shape of space is not curved... [T]he flat, infinitely large spatial shape is the front-running contender for the large-scale structure of space-time.

In holistic Vedic science, the self-referral dynamics of the unified field curving back upon itself characterizes the mechanics of manifestation at all levels of nature. On the unmanifest level, it is infinite self-referral. On the ultramacroscopic manifest level, it is associated with a mandala form (like a circle or sphere) as in the concept of Hiranya garbha or the cosmic egg. On the ultramicroscopic level, it is associated with curving back into discrete, quantized particles such as point particles and atoms. "Prakritim swam avashtabhya visrijami punah punah (Bhagavad-Gita, 9.8) Curving back upon My own Nature, I create again and again." (Maharishi Mahesh Yogi 1997, p. 37)

***The unified field is a lowest entropy, super-symmetric field of perfect order.***

In quantum field theory, space is not empty nothing; it at least contains vacuum fluctuations, or zero point motion (Greene 1999). With the advent of unified field

theory, the universe is more appropriately viewed as manifesting from something – even from the source of everything (Hagelin 1987, 1989, Greene 1999). In sequential stages, phase transitions spontaneously occurred as temperature dropped and the universe expanded, in which the four particle-force fields differentiated. This can be likened to phase transitions of H<sub>2</sub>O condensing from steam to water to ice as temperature drops. At each stage, symmetry is reduced. In this view, the fundamental forces potentially pre-existed in the perfectly symmetric, super-unified state. But also, as the source of continuously occurring quantum vacuum fluctuations, zero point motion or inherent dynamism, the unified field continues. If it continues even after the theorized big bang and the forces differentiated, then it is more than the unification of the four fundamental forces. The underlying unity doesn't go away when diversity begins. All diversity is within unity. The perfect symmetry of the unified field is undisturbed by symmetry breaking into finite manifestation. This is crucial for understanding the source of order expressed in the laws of nature. Order emerges from the perfectly symmetric, lowest entropy state of the unified field, not from fundamental random disorder.

***Higgs field theory relates to the condensation of the unified field into matter.***

To explain the spontaneous phase transitions of symmetry breaking or condensation into particles with mass, the theory of Higgs fields developed in recent decades. Higgs field theory is considered to be one of the key concepts proposed in the past century in theoretical physics (Greene 2004). According to this theory, in the third phase of symmetry breaking into the weak and electromagnetic forces, a Higgs field condensed to a nonzero value when the temperature of the universe dropped to about 10<sup>15</sup> degrees, creating a Higgs ocean – analogous to steam condensing into water. The Higgs ocean is theorized to be a kind of viscosity throughout space that resists change in motion, giving the property of mass to particles. Another Higgs field – grand unified Higgs – was proposed to explain the earlier second phase of symmetry breaking of the strong and weak nuclear forces. A third Higgs field was proposed to explain the first phase of symmetry breaking when gravity emerged. This first Higgs field relates to inflationary big bang theory.

***Inflationary cosmology assumes everything came from literally nothing.***

Einstein's formulation of general relativity predicted that space, and the entire universe, would either shrink or stretch. Because this contrasted with his belief in a static universe, he added another term – the cosmological constant. This allowed the equation to contain a negative value, meaning that gravity could be repulsive rather than just its familiar attractiveness. If the value of the cosmological constant were carefully chosen, repulsive and attractive forces could balance out, resulting in a static universe. When evidence showed that the universe is expanding,

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however, Einstein withdrew the cosmological constant from his equation for gravity, reportedly identifying it as his greatest blunder (Lincoln, 2004). But it was later revived, associated with Higgs fields and the modification of the standard big bang model called inflationary big bang theory.

According to this theory, for an extremely brief time period of 10-35 seconds at the outset of the big bang, gravity became a repulsive force that drove the emerging universe into a colossal expansion. This inflationary event acted as a Higgs field, contributing a uniform negative pressure to space that produced a repulsive force so strong that the universe expanded by a factor as much as 10<sup>90</sup>. This is much faster than the speed of light, but it is thought not to be inconsistent with it. This is because the speed of light applies to motion through space, whereas inflationary expansion refers to the inflation of space itself.

Inflationary big bang theory has been described as the consensus view in contemporary cosmology. This theory is additionally strengthened because it is said to explain how matter formed into stars and galaxies. But what triggered inflationary expansion? How did nothing blast out in a big bang?

An elaboration of inflationary theory proposes that the big bang emerged from a pre-inflationary period, in which the gravitational field and the Higgs field were bumpy, chaotic, and highly disordered. Eventually a random fluctuation produced the values needed for inflationary expansion. But this certainly doesn't sound like everything came from nothing. Astronomer David Darling (1996, p. 49) states the issue clearly:

“What is a big deal is how you got something out of nothing. Don't let the cosmologists try to kid you on this one... “In the beginning,” they will say, “there was nothing – no time, space, matter, or energy. Then there was a quantum flutter from which...” Whoa! Stop right there... First there was nothing, then there was something. And the cosmologists try to bridge the two with a quantum flutter, a tremor of uncertainty that sparks it all... and before you know it, they have pulled a hundred billion galaxies out of their quantum hats... You cannot fudge this by appealing to quantum mechanics. Either there is nothing to begin with, no pre-geometric dust, no time in which anything can happen, no physical laws that can effect change from nothingness to somethingness, or there is something, in which case that needs explaining.”

***Inflationary cosmology needs to be consistent with unification theories.***

How inflationary cosmology fits with theories of the unified field is of concern. If the unified field is the lowest entropy, super-symmetric state, then the theory of the pre-inflationary period that low entropy came from inflationary expansion might seem to suggest that something existed prior to the unified field. Also of concern is how the pre-inflationary period fits with quantum gravity theories that posit

information space or higher-dimensional space generates conventional physical space. Information space is not characterized as just a bumpy, chaotic, randomly fluctuating field. It at least suggests order in the sense of generating the functional structure of physical space-time and all matter in it. This is more consistent with the unified field as a super-symmetric state of lowest entropy, rather than reductive theories of pre-inflationary and inflationary cosmology. Also, important concepts such as the 'arrow of time' which states that time moves in a forward direction from past to future, the 2<sup>nd</sup> law of thermodynamics which states that nature tends toward entropy through time, and the related concept of quantum decoherence, are all consistent with the unified field as the super-symmetric state of lowest entropy and source of order in nature.

A more integrated way of looking at these issues is that pre-inflationary theory is another angle in the attempt to understand the subtler, non-material level of nature underlying the Planck scale. This subtler level as a pre-inflationary period or 'pre-conventional' space would include the order in nature that creates the gravitational field, Higgs field, and inherent dynamism. It would be underneath gross or conventional physical space-time and quantized fields, as their immediate source – again underlain by the ultimate unified field. Overall, these theories are progressing toward three domains of nature: 1) the conventional, physical space-time field; 2) a nonlocal field of nonconventional information space or mind-like field, and 3) the lowest entropy, super-symmetric, perfectly orderly unified field. This is consistent with ontological levels of nature in Vedic science (Maharishi Mahesh Yogi 1963, 1967).

***Three core issues in cosmology relate to forces of nature in Vedic science.***

In these theoretical developments concerning the origin of the universe, three issues are emerging: from whence the order, from whence the dynamism, and from when the mass? These three fundamental issues are beginning to match up with the three fundamental forces of nature in holistic Vedic science, called Sattva, Rajas, and Tamas (Maharishi Mahesh Yogi 1967). These fundamental forces can be related to the principles of attraction (gravitation), activity (inherent dynamism), and inertia or resistance to change (mass, Higgs fields). In the gross material domain of conventional physical space-time, Sattva can be related to the attractive force of gravity; Rajas can be related to inherent dynamism; and Tamas can be related to inertia or resistance to change, the concept of mass and Higgs fields.

***Fundamental forces in Vedic science match the known fundamental forces.***

In holistic Vedic science, the three fundamental forces condense into five fundamental principles or constituents comprising all phenomenal objects in the gross material domain of nature. They are expressed in sequential enumeration, or

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symmetry breaking, into the ancient delineation of five basic constituents of space, air, fire, water, and earth (Maharishi Mahesh Yogi 1967). Unfortunately these ancient concepts have been interpreted much too crudely, and have not been seriously considered with respect to their relationships to the known fundamental forces in modern physics (Lincoln 2004).

These five constituents express the abstract principles of vacuity (space), mobility (air), transformation (fire), liquidity (water), and solidity (earth). They also can be described as fields, concentric sheathes, or ethers with progressive limitations, each more expressed one embedded in the previous one and expressing an additional limitation or quality. The constituent of space, for example, contains in latent form the other four properties, but expresses only the qualities of space.

As physical phenomena, these five fundamental constituents would be expected to map onto the quantum particle-force fields. A reasonable mapping, consistent with sequential symmetry breaking, is that space relates to gravity, air to gravity and the strong nuclear force, fire to gravity, strong and weak forces, and water and earth to all four including electromagnetism. In holistic Vedic science, these five fundamental constituents of space, air, fire, water, and earth together constitute the most expressed, grossest domain of phenomenal existence, or the ordinary material world. They also directly correspond to the ordinary five senses of perception. Although no additional ontological levels of existence emerge from them, a vast diversity of phenomena manifest from their combinations and permutations. These phenomena comprise the ultramicroscopic, microscopic, macroscopic, and ultramicroscopic levels of the physical universe that have been the object of objective science. Cutting edge theories referred to in this paper are progressing beyond this gross relative level of nature to the underlying subtle nonlocal relative level of nature, and further to the ultimate, infinitely self-interacting unified field.

***Consensus is based on empirical experiences shared by its contributors.***

Modern science focuses on ordinary sensory experience and logical reasoning as the basic means of gaining knowledge. Experience relates to careful observation of natural phenomena presented to the ordinary senses. Logical reasoning is exemplified in rigorous mathematical logic to analyze and predict them. To protect against unreliable subjectivity in experience and reasoning, the objective approach relies on consensual validation, or public inter-subjective agreement. It is important to recognize, however, that consensus is based on – and constrained by – the level of functioning of those who contribute to it. Practically the entire empirical enterprise of modern science is based on logical reasoning and sensory experience characteristic of the ordinary waking state of consciousness. Modern scientists are so engrossed in ordinary waking experience that there is virtually no recognition of this state-dependent limitation of modern science.

The ordinary waking state of consciousness is characterized by the experience of being conscious of some object of experience. This is a representational, reflective mode of knowing in which there is a separate object of experience, process of experience, and experiencer. It is the phenomenological basis for the common definition of consciousness as being conscious of a separate object of experience. It directly relates to the pretheoretical assumption of the independence of observed and observer that is a core and outdated belief in the objective approach of modern science.

***Vedic science includes systematic technologies to verify the unity of nature.***

Holistic Vedic science is comprehensively articulated in the language of modern science by His Holiness Maharishi Mahesh Yogi in Maharishi Vedic Science and Technology (Nader 2000, Inaugurating Maharishi Vedic University 1996). It identifies the objective, reductive, materialistic perspective in modern science as a product of the typical range of experience in the ordinary waking state of consciousness that produces fragmented, partial knowledge.

When the fragmented, reductive view that the whole emerges from combining fundamental parts is experienced as primary, the wholeness or unity of life is lost. This is called Pragya aparadh, 'the mistake of the intellect' (Nader 2000). Development of higher states of consciousness reestablishes wholeness or unity as the natural primary experience. Systematic developmental technologies, described in that aspect of Vedic science called the Yoga Sutras, are applied to validate through direct empirical experience the underlying levels of nonlocal mind and the transcendent unified field – in the inner laboratory of the mind (Boyer 2007).

***Conclusion***

The reductive materialistic perspective still prominent in modern science is associated with a bottom-up matter-mind-consciousness ontology in which the whole emerges from combining fundamental parts. Holistic Vedic science enumerates how the parts manifest from the whole, in a consciousness-mind-matter ontology. The whole creates the parts. The phenomenal origin of the universe is a condensation of the total potential of the ultimate unified field into limited manifest levels of nature—what might be called the 'Big Condensation.' This is consistent with developing theories of the unified field as the lowest entropy, super-symmetric, super-unified state of perfect order. It is a logically consistent and more comprehensive alternative to the reductive materialistic perspective and related inflationary big bang cosmology. Vedic science includes systematic developmental technologies to resolve fundamental paradoxes that the reductive materialistic, bottom-up ontology has not resolved, including the so-called hard problem of

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consciousness, order emerging from fundamental random disorder, and everything emerging from nothing.

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