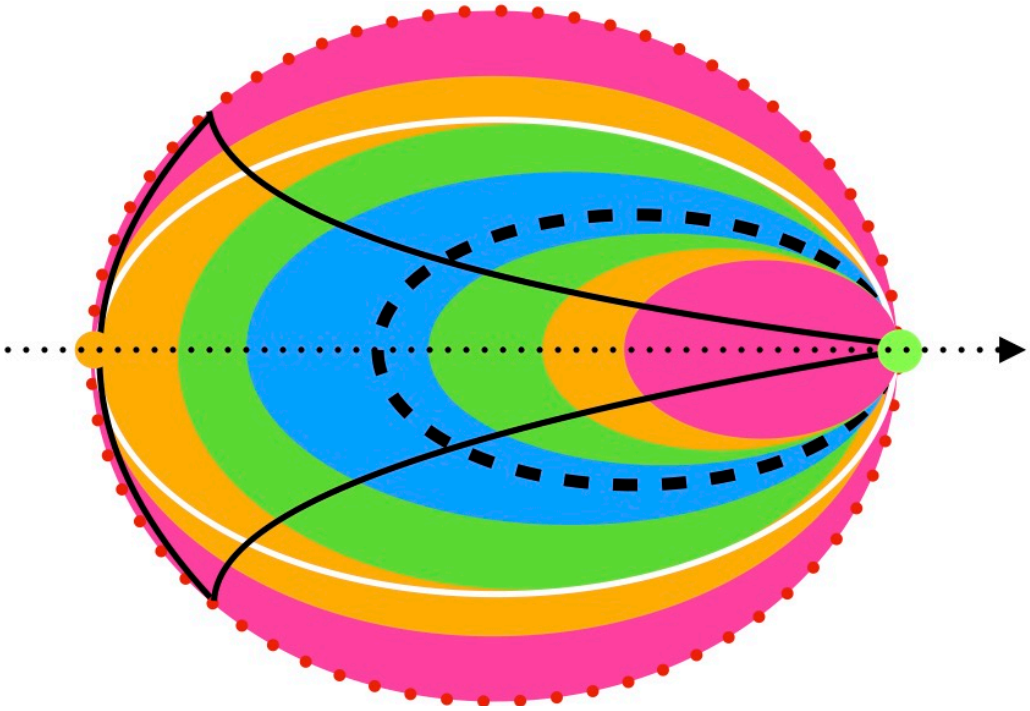
THE TEMPORAL CAVITATION MODEL OF COSMOLOGY

THE PARADIGM OF A DYNAMIC UNIVERSE



A Conceptual Sketch of a Proposed Dynamic Universe

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November 13, 2023.

"No single thing abides, but all things flow.
Fragment to fragment clings; the things thus grow
Until we know and name them. By degrees
They melt, and are no more the things we know."

From "De Rerum Natura" c. 55 BCE
By "Titus Lucretius Carus

THE TEMPORAL CAVITATION MODEL OF COSMOLOGY…….by Paul J. Caracristi

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ABSTRACT……

The Cavitational Model of Cosmology presents a novel framework for understanding the Universe, emphasizing the interconnected roles of Time and Space. It delves into key cosmological concepts, such as the [1]Latent and [2]Patent realms, Time-Space fields, Spacetime fabric, gravity, levity, quantum fields, whiteholes, and blackholes. This model challenges traditional views in cosmology by offering alternative explanations for phenomena like gravity, dark matter, and dark energy, suggesting that these can be addressed through a reinterpretation of Time, Space, Energy, and Matter.

The model suggests that the transition from the Latent realm (a potential energy state) to the Patent realm (the observable universe) is driven by energy fluctuations, creating a temporal cavity where Time and Space fields interact dynamically. These fields influence energy flow across Spacetime, which in turn affects fundamental constants like the speed of light and the universe's curvature.

A key proposition is that Time's inflation and deflation, tied to the interaction of these fields, controls the universe's expansion and influences how we measure cosmic age and distances. The relationship between [3]levity and gravity is redefined as complementary forces, potentially explaining phenomena like dark matter and dark energy without requiring new forms of unseen matter.

The model also reexamines [4]blackholes and [5]whiteholes. Black holes absorb energy, while whiteholes disperse it, representing two ends of cosmic processes. The idea challenges traditional views on blackhole singularity, proposing that they may dissipate into the Latent realm over time, cycling energy between the realms.

Further implications include the emergence of Matter and Antimatter, linked to the dominance of levity or gravity fields during their formation, which contrasts with conventional particle physics theories.

Empirical validation is essential for this model to transition from theoretical speculation to a widely accepted cosmological framework. Suggested experiments involve studying the

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[1] Latent-realm. Refers to an asymptotic energy state from which our Universe emerged and to which it will eventually submerge. It is in a state that is analogous, static, implicit, potential, intangible, asymptotic and governed by certainty, continuity, stasis, and negentropy.

[2] Patent-realm. Refers to our physical Universe, in a state that is differentiated, explicit, dynamic, physical, systemic and constantly evolving, defined by uncertainty, probability, diversity, and entropy-driven complexity

[3] Levity is a partner interaction to Gravity. It has a repelling property which is the inverse to the attracting property of Gravity.

[4] Blackhole. Is a region of spacetime where gravity is so strong that nothing, including light and other electromagnetic waves, possess enough energy to escape it. https://en.wikipedia.org/wiki/Black_hole

[5] Whitehole. Refers to a structure that manifests an extreme concentration of levitational interactions or repulsive forces. https://en.wikipedia.org/wiki/White_hole

Cosmic Microwave Background (CMB) for anomalies, analyzing gravitational wave data, examining redshift patterns, and conducting high-energy particle physics experiments. If validated, the Cavitational Model could revolutionize our understanding of the universe's structure, evolution, and the interplay of its fundamental forces.

BACKGROUND……

"[6]Imagine the universe as a vast, ever-changing ocean. Space is the water and Time is the wind that causes the currents in this ocean. Initially, the ocean is still and latent, representing a state of potential energy, much like a calm sea before a storm. This latent realm is the implicit source of all possibilities, waiting for the wind to transition it into a patent realm, a realm of the explicit source of all manifestations.

As the energy in this latent realm fluctuates, it creates ripples and waves that form a temporal cavity where Time and Space energize and interact, forming a current or fabric of Spacetime. As they interact, their disparate energies cause levity, gravity and the quantum fields to emerge as complementary forces that shape the cosmic landscape.

As we navigate this cosmic ocean, we realize that the boundaries between the latent and patent realms are fluid. The transition from latent potential to dynamic manifestation is a continuous process, driven by energy gradients. This seamless continuum may suggest a different perspective on the idea of definite beginnings or ends, depending on how one interprets the interplay between latent and patent realms. Therefore, suggesting that the latent and patent realms are in an ever-changing state of flux."

At the quantum level, the principles of quantum mechanics, such as Heisenberg's uncertainty principle, impose fundamental limits on our ability to precisely measure and understand particle's positions and momenta simultaneously. This inherent uncertainty restricts our knowledge at the smallest scales of matter.

On cosmological scales, understanding the universe's structure, origins, and ultimate fate involves dealing with vast, complex systems. This enormity and complexity introduce uncertainties due to the limitations of observational techniques and theoretical models.

As we push the boundaries of our knowledge, the complexity of the problems we face increases exponentially, requiring immense computational power. For example, simulating the interactions of particles in a large quantum system or modelling the dynamics of galaxy clusters involves computations that grow in complexity at an astronomical rate.

Computation requires energy, and as the complexity of the problems increases, so does the energy required to perform the necessary computations. This relationship suggests

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[6] This is a metaphor for the Patent realm as it emerges from the Latent realm, expands, develops and submerges back into the Latent realm.

practical limits to how far we can push our understanding purely due to energy constraints. Eventually, the energy cost of furthering our knowledge may exceed the resources available.

Our current theories and models, whether in physics, chemistry, biology, or any other field, have their limits. These frameworks are built upon assumptions and approximations that may break down at extreme scales. For example, general relativity and quantum mechanics are both incredibly successful but currently incompatible in extreme conditions, such as inside black holes or at the very beginning of the universe.

To extend our understanding beyond current limits, new conceptual frameworks or paradigms may be required. Developing these new theories is not only a matter of intellectual effort but also of computational and experimental capability.

In practice, the limits of computation, energy, and observational capabilities mean that there will always be aspects of the universe that remain beyond our full comprehension. This doesn't negate the value of scientific inquiry but highlights the need to prioritize and optimize our efforts within these constraints.

The recognition of these limits also has philosophical implications. It challenges us to reconsider the nature of knowledge, the scope of human understanding, and our place within the universe. It may lead to a more humble perspective, acknowledging that while we strive for greater understanding, mysteries will always remain elusive.

INTRODUCTION……

This paper explores a speculative cosmological model that proposes new ways to conceptualize the dynamics of Time and Space. While these ideas are not currently part of mainstream scientific discourse, they are intended to stimulate further thought and exploration, offering an alternative perspective that complements existing theories.

This paper examines the form of the Cosmos from a contextual rather than a content perspective. It presents a cosmological model that employs principles of [7] 'abstractive synthesis' rather than techniques of [8] 'perceptive analysis' to achieve a holistic result. In other words, this approach embraces holistic abstractions instead of reductive conceptions. This is not a rejection of the reductive approach but a supplementary view of the existing data needed to achieve a more complete and internally coherent model. This

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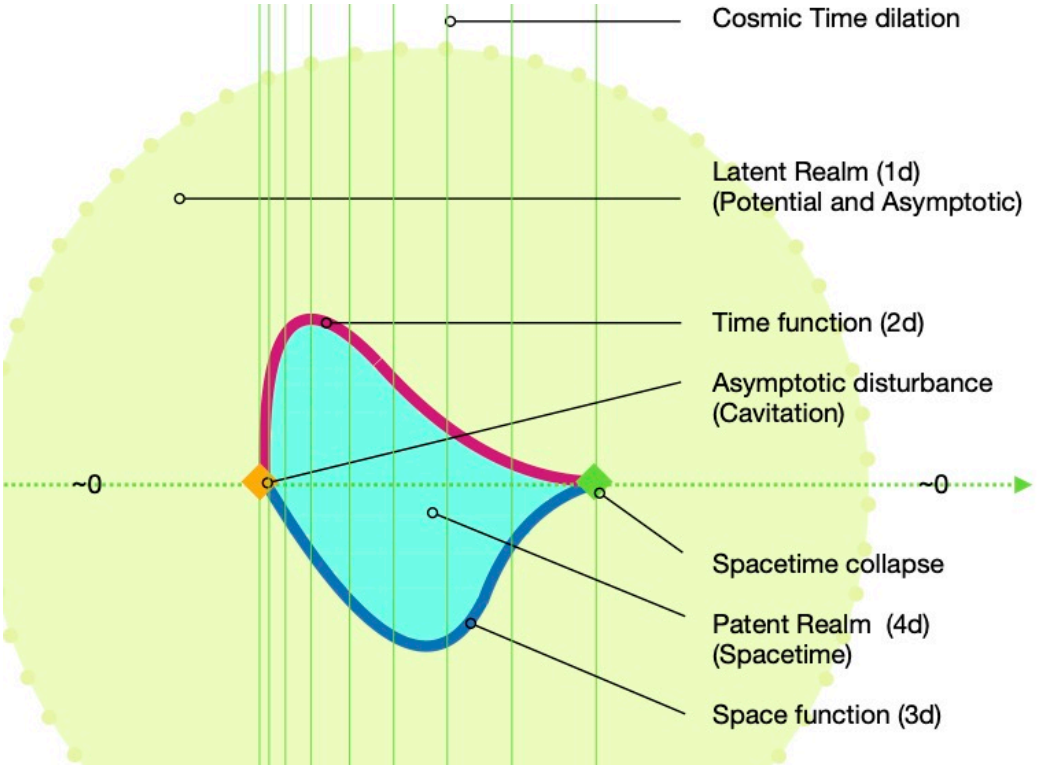
[7] Abstractive synthesis. Refers to a cognitive or mental process where the mind abstracts and synthesizes elements from various experiences or pieces of information to form a coherent and generalized understanding.

[8] Perceptive analysis. Refers to the process of carefully and insightfully examining information, experiences, or phenomena through the lens of perception. It involves discerning subtle details, understanding underlying patterns, and recognizing deeper meanings or implications. This type of analysis combines acute observation with thoughtful interpretation, allowing for a detail understanding of the subject matter.

process parallels the compositional design process used by architects in architecture, composers in music, and artists in art.

Within the context of the physical and metaphysical realms, human knowledge suggests that our understanding of reality stems from the perceptions of the human mind. However, our mind constructs mental models to make sense of the limited information received through our earth-bound senses to create abstractions.

Our perceptions, though subjective, could be seen as forming the basis for what we collectively consider as objective reality, especially within the context of this theoretical model. Classical logic can lead to erroneous conclusions if applied to chaotic complex systems like the Universe. Therefore, to properly and unambiguously understand a dynamic Universe, we need mathematical proofs that are indicative, verifiable, and constructive (as defined by [9]intuitionistic logic); otherwise, the results may be contradictory and anomalous, pushing our scientific efforts off course without even being aware of it.



SK-1 The Four Dimensions of the Latent and Patent Realms (NTS)

[9] Intuitionistic Logic. Refers to systems of symbolic logic that differ from the systems used for classical logic by more closely mirroring the notion of constructive proof. In particular, systems of intuitionistic logic do not assume the law of the excluded middle and double negation elimination, which are fundamental inference rules in classical logic. https://en.wikipedia.org/wiki/Intuitionistic_logic

To understand the nature of this new paradigm, we must realize that our limited grasp of the nature of Time is presently contributing to many cosmological anomalies. Traditionally, Time has been considered a constant value. However, it is proposed here that Time varies in its flow rate (or velocity), depending on the epoch and circumstances in which we observe it. This variation causes the Universe to become a much more varied and complex phenomenon.

To potentially address current cosmological mysteries and anomalies, it may be valuable to explore the antecedent conditions of the Universe, as suggested by this conceptual model. In particular the origin of the Time and Space fields, therefore introducing an even greater degree of complexity into the present Concordance model.

Given the significant challenges faced in cosmology over the past fifty years, this conceptual approach is offered as a starting point for further exploration and discussion. Including the nature of Gravity, Dark Matter, Dark Energy, matter-antimatter asymmetry, blackholes, and the structure of the Cosmic web. Understanding the cyclical relationships between Energy and Matter and the asymmetric interactions between Time and Space is now more fundamental than ever.

Therefore, a more comprehensive understanding of the nature and function of Time, as envisioned in this model, could provide new perspectives on issues such as the origin and [10]flatness of the Universe,[11]galaxy rotation, [12]cosmic expansion, [13]matter-antimatter puzzles, and the [14]Hubble tension.

THE LATENT REALM AND THE PATENT REALM.....

The Universe exists as a seamless continuum with no definitive beginning or end, lacking boundaries between its antecedent condition and its inception, and between its existence and its eventual transformation. This model rejects concepts like Multiverses or cyclic repetitions and replaces them with a simple and continuous energy cycle that has been discreetly divided into the two realms noted above.

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[10] Flatness of the Universe. Refers to the overall flatness or curvature of space which determines whether the Universe will expand infinitely, or become flat, or ultimately collapse into itself. https://en.wikipedia.org/wiki/Flatness_problem

[11] Rotation Velocity of Galaxies. Refers to the inconsistency in the anticipated circular velocities of star systems across the diameter of spiral galaxies. https://en.wikipedia.org/wiki/Galaxy_rotation_curve

[12] Cosmic Expansion. Refers to the rate by which Space is expanding at an exponential rate. This was observed as the spectral red shift of the outer most galaxies. This is an indication that the Universe is negatively curved. https://en.wikipedia.org/wiki/Expansion_of_the_universe

[13] Matter-antimatter Puzzle. (Byron Asymmetry). Refers to the theory that Matter and Antimatter emerged in equal numbers, however, our Universe is principally composed of Matter particles. The question arises, where is all the Antimatter? https://en.wikipedia.org/wiki/Baryon_asymmetry

[14] Hubble Tension. Refers to the present measurement of the expansion rate of the universe significantly exceeds the predictions. https://en.wikipedia.org/wiki/Hubble_bubble_(astronomy)

The transition from the Latent realm to the Patent realm occurs through a gradient of energy levels. This energy spectrum originates as a Temporal disturbance within [15]asymptotic interactions of the Latent realm, transitioning into a dynamic state and emerging as the Patent realm. See Sk-1.

The Temporal disturbance that initiates this transition, creates a temporal bubble of Space, where the Time and Space fields interact and expand, forming the spacetime fabric. This expanding [16]cavitational bubble contains energy that forms all particles and interactions as observed in the Patent realm.

If we consider that our Universe is differentiated, explicit, dynamic, physical, systemic, and constantly evolving; defined by uncertainty, probability, diversity, and entropy-driven complexity. Then the antecedent conditions within the Latent realm must be analogous, static, implicit, potential, intangible, asymptotic, and governed by certainty, continuity, stasis, and negentropy.

In summary, the Latent realm is orderly, symmetric, and undifferentiated, while the Patent realm is chaotic, asymmetric, and differentiated. Therefore, it is the dynamic manifestation of Time that distinguishes the two realms, since it possesses a variable energy flow that ranges from values approximating zero, as in the fluctuations of the Latent realm, to values greater than zero, as in energy and matter in the Patent realm. See SK-2.

[17]THE TEMPORAL CAVITY……

"[18]Picture a vast, tranquil ocean that extends endlessly, representing the asymptotic latent energy of the Latent realm, a state so calm and infinite that it seems unchanging. As you hover over this ocean, you notice tiny almost imperceptible ripples that appear sporadically. These ripples are like the fluctuating values of the asymptotic function as it approaches zero, minute yet powerful, and accumulating their effects through the emergence of the Time field.

Imagine these tiny ripples, each representing an infinitesimal disturbance, gradually converging towards a single point. As they near this point, their collective energy amplifies, creating a powerful whirlpool. This whirlpool is the temporal cavity, a dynamic disruption born from the cumulative impact of all those minute fluctuations.

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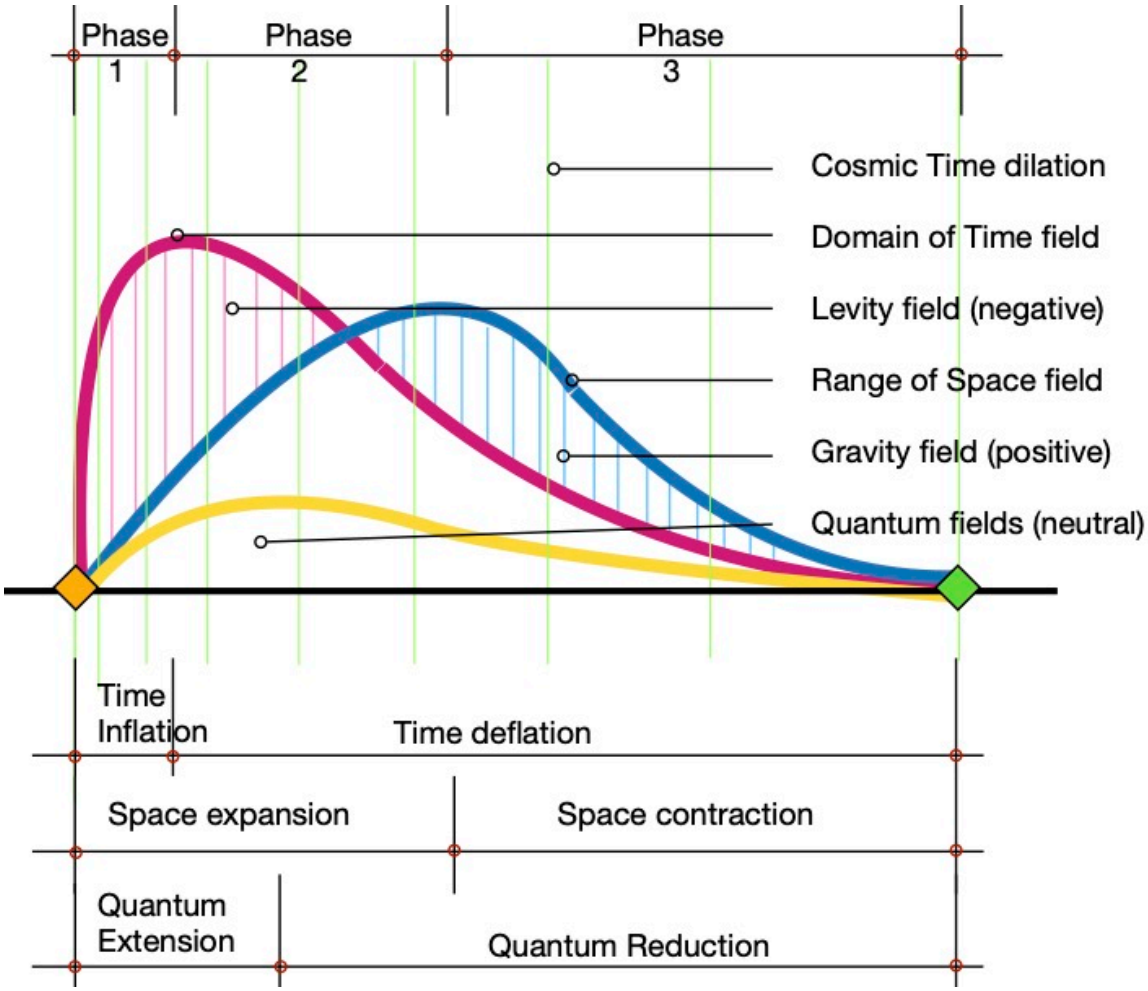
[15] Asymptotic. Refers to a phenomenon that shows quick transitions and other incongruities resulting from approximations of energy values. K. O. Friedrichs. https://www.ams.org/journals/bull/1955-61-06/S0002-9904-1955-09976-2/S0002-9904-1955-09976-2.pdf

[16] Cavitation Bubble. https://arxiv.org/pdf/2010.13310

[17] Temporal cavity. Refers to the Cavitational bubble created by a disturbance within the Latent realm and is manifested by the inflation of the Time field and the expansion of Space, resulting in the beginning of the cosmos.

[18] Metaphor of the formation of the Temporal Cavity.



SK-2 Emergence of Levity Gravity and Quantum Fields (NTS)

Thus, the disturbance (the whirlpool) is a product of all the values of the asymptotic function, where the closer these values reach zero, the more intense and concentrated their combined energy becomes, ultimately transforming the latent energy into a vibrant, evolving universe. This convergence of infinitesimal disturbances into a powerful, unified force illustrates how the inherent nature of the asymptotic function gives rise to a profound, transformative event."

Therefore, energy fluctuations within the Latent realm cause a temporal cavity, where Time inflates exponentially and Space expands linearly. As the Space field and the Time field interact within this bubble, they generate an expanding spacetime fabric that marks the transition between the Latent and the Patent realms.

The early Patent realm is characterized by a whitehole expansion, expelling and diverging energy and matter throughout spacetime. While the subsequent development of the Patent realm is characterized by blackhole contractions, attracting and collecting energy and matter throughout spacetime.

In summary, the Patent realm begins as a [19]cold interaction due to the early low-energy value of Time, reaching a maximum temperature at the peak of the exponential inflation phase of Time, and then slowly cooling until it nears a zero energy value while transitioning and returning to the Latent realm as it completes its universal energy cycle.

THE TIME AND SPACE FIELDS……..

Space determines the [20]domain of the Time field, facilitating energy distribution throughout spacetime, while Time controls the [21]range of the Space field by providing the necessary energy flow to all interactions across spacetime. Therefore, the Time field determines the momentum of energy throughout Space and the Space field provides the geometry for all interactions to occur.

Furthermore, the frequency of the Time function determines the energy flow rate of its inflation and deflation phases, while the frequency of the Space function defines the extent of its expansion and contraction phases. See SK-2.

Time is a fundamental property of energy. Without Time, energy would be static and there would be no Space, no Matter, and no interactions. Time determines the frequency and wavelength of the available energy within spacetime, while Space sustains the energy-momentum of elementary particles and their fundamental interactions.

Note. Since the frequency of the Time field changes throughout its inflationary and deflationary phases, the speed of light must vary according to the flow rate of Time. This model proposes a dynamic relationship between Space, Time, and Energy, indicating a complex interdependence and a greater degree of complexity than presently anticipated.

In summary, Time emerges from the Latent realm as a result of a temporal disturbance, causing a cavity of Space to form and expand. Therefore, Time and Space are the earliest and the primary energy fields of interaction across the fabric of spacetime.

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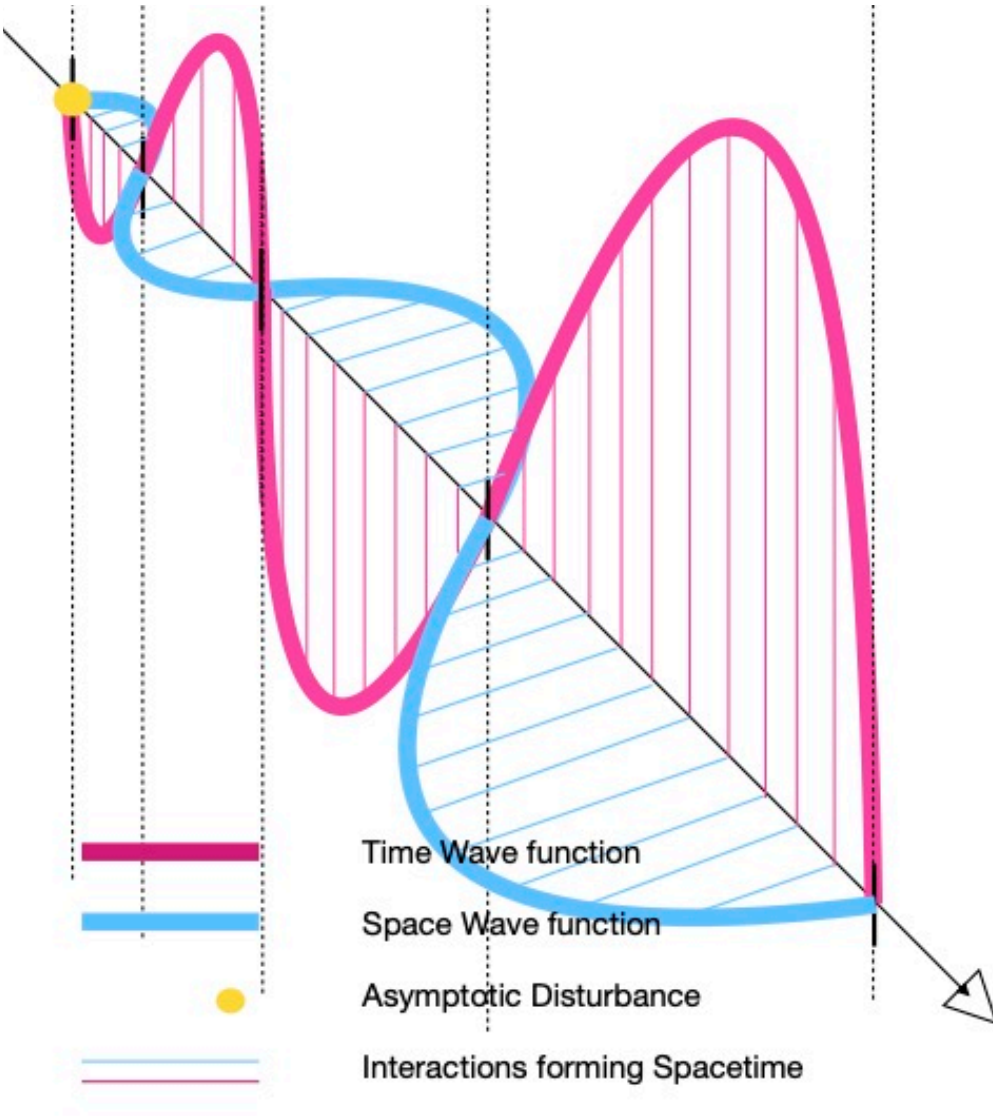
[19] Cold Interaction. Refers to a cold start to the universe implying that the universe began with a low entropy.

[20] Domain. Refers to a variable sphere of control as determined by the energy of Time.

[21] Range. Refers to the extent of influence between an upper and a lower energy limit of Space.



SK-3 The Time and Space Interaction. (NTS)

THE FABRIC OF SPACETIME……..

Spacetime emerges from the interaction between the asymmetry of the Time and Space fields. This fabric of energy functions like a compound wave, similar to electromagnetism, where the amplitudes of Time and Space continuously interact, seeking symmetry between their frequencies and wavelengths. It is this dynamic asymmetry caused by the different amplitudes of Time and Space that manifests all the complexities within the Patent realm.

The framework of the early spacetime fabric is manifested through a whitehole structure which is the consequence of the early dominance of the Levity field in spacetime. In contrast, during the subsequent development of spacetime, blackholes emerge in

increasing numbers and slowly begin to dominate spacetime causing the progressive dominance of the Gravity field. See SK-3.

These interactions between the Time and Space fields drive the formation of the three potential curvatures of Spacetime. Therefore, when the amplitude of the Time field is greater than that of the Space field, a potential Negative curvature forms. Conversely, a potential Positive curvature arises when the amplitude of the Space field is dominant, while a neutral or flat curvature occurs when both fields reach a relative equilibrium.

Note. The notion of the early Universe's rapid expansion due to Time's exponential inflation challenges conventional cosmic models since it suggests that the perceived cosmic expansion, resulting from the flow rate or velocity of Time, alters the measurements of the Universe's age and the distances between celestial objects.

In summary, spacetime is the fabric upon which energy and matter interact to form the Levity, Gravity and Quantum fields. It is, therefore, the asymmetric nature of the Spacetime fabric that determines the type, the location, the distribution and the scale of all interactions.

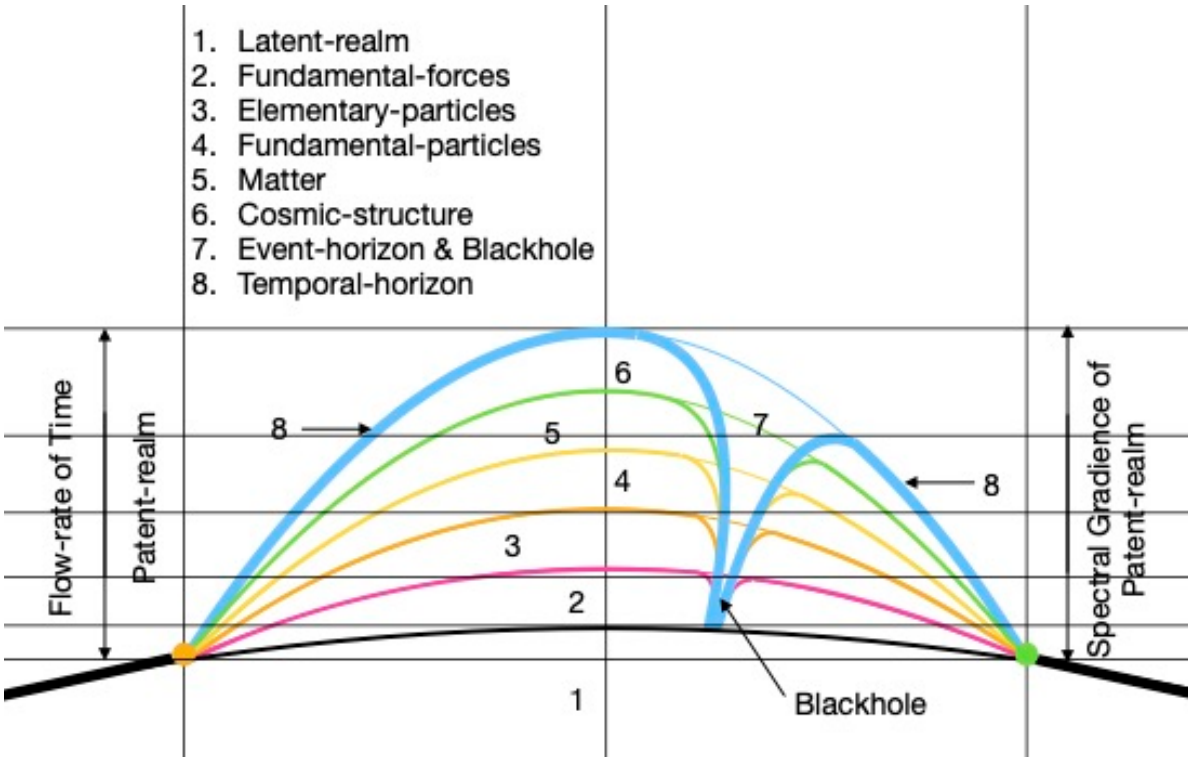
THE SPECTRAL GRADIENCE OF TIME……

The concept of Spectral gradience refers to a temporal phenomenon originating from cavitation events, leading to the creation of a spectrum of temporal energy values that correlate directly with the flow rate of time. This process can be described similarly to the growth of a tree, where the trunk’s concentric rings mimic the varying flow rates of time, expanding and contracting throughout space. See SK-4.

At the heart of these temporal rings lies the inception of the universe. Each ring represents different temporal velocities, marking distinct periods in the universe's history. The inner growth rings symbolize the ‘Past’, each representing a specific period within the spectral variance of time. These rings are like historical records, preserving the temporal velocities of different epochs.

The outermost layer, akin to the tree’s living phloem, symbolizes the ‘Present’ which is the temporal event we experience directly as ‘now’. This is the current, active layer where time flows at the rate we perceive. However, the future remains undefined and is represented by the potentiality beyond the outermost ring. It is not yet actualized and remains a field of possibilities.

The concept of the temporal horizon, analogous to the tree’s outer ring, signifies the edge of our current temporal reality. This horizon extends across the cosmos and intertwines with the event horizons of black holes and white holes.



SK-4. Spectral Varience of Time. (NTS)

The Temporal horizon is the boundary that marks the limit of our current temporal experience. Beyond this horizon, the flow rate of time and the associated energy values become speculative.

Beneath the temporal horizon lies an energy gradient of gradually diminishing energy values. This gradient results in some matter and energy phasing out of interaction at higher levels of the temporal horizon, becoming “invisible” yet retaining mass. Such matter can still interact with gravitational and levitational forces, despite being undetectable by conventional means.

This framework offers a new perspective on Dark matter and Dark energy, which have long puzzled physicists, where matter that exists within the spectral gradience as Dark matter, phases out as a detectable interaction while still exerting gravitational influence. This could explain the presence of unseen mass affecting galactic rotations and gravitational lensing. See SK-4.

Correspondingly, the range of energy values within the spectral gradience could contribute to the accelerating expansion of the universe as Dark energy, providing insights into the mysterious force seemingly driving the universal expansion.

The spectral gradience framework also provides explanations for other phenomena, such as elementary particles intermittently phasing in and out of detectable states due to variations in temporal energy values within the spectral gradience. As well Gravitational forces observed in areas devoid of visible matter might be due to the presence of matter within the spectral gradience, which interacts gravitationally but not electromagnetically.

In Summary, the Spectral gradient originates from the cavitation event, creating an increasing spectrum of temporal energy values as the universe expands, and a decreasing spectrum of temporal energy values as the universe contracts. Therefore, the Temporal Horizon is the edge of our current temporal reality, which is interconnected with the cosmic event horizon. This expanded concept of Spectral Gradience provides a comprehensive and coherent understanding of how temporal energy values vary and interact with matter and energy, offering a new perspective on some of the universe's most puzzling phenomena.

LEVITY, GRAVITY AND THE QUANTUM FIELDS……..

"[22]Imagine two mighty rivers flowing side by side, representing Time and Space. These rivers are not alike: the River of Time flows relentlessly rapidly and always moving, while the River of Space meanders more gently, spreading out in all directions. The River of Time is swift and narrow, while the River of Space is wide and calm.

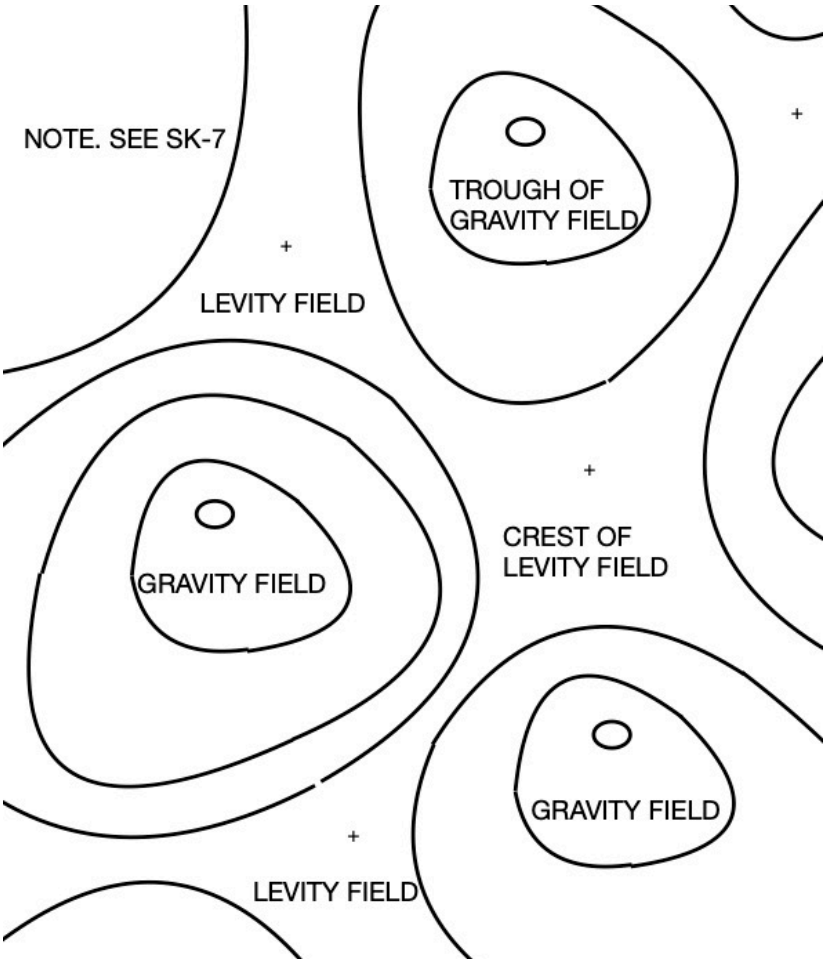
These rivers intersect and intertwine at a certain place along their courses, creating whirlpools and eddies where their waters mix. These interactions represent the dynamic interplay between Time and Space. In these swirling confluences, the energy of the rushing River of Time meets the expansive currents of the River of Space, giving birth to new and extraordinary phenomena.

The interactions of Levity and Gravity arise from these whirlpools, much like how the churning waters create currents that either pull objects down into the depths or push them upward toward the surface. These currents are the manifestations of Gravity, which pulls matter together, and Levity, an expansive force that pushes matter apart.

Within these turbulent zones, tiny, intricate patterns form in the water; delicate ripples and shimmering waves that dance and flicker. These are the Quantum fields, the fundamental underpinnings of matter and energy, born from the chaotic yet structured interaction of Time and Space. Just as the interplay of water currents can create complex, emergent patterns, the interaction of Time and Space gives rise to the Quantum fields that govern the formation and behaviour of particles at the smallest scales."

The interplay between the type of curvatures in the fabric of Spacetime determines which field, Gravity or Levity, will dominate in shaping the properties of the fundamental

[22] Metaphor of the formation of Levity, Gravity and the Quantum fields.

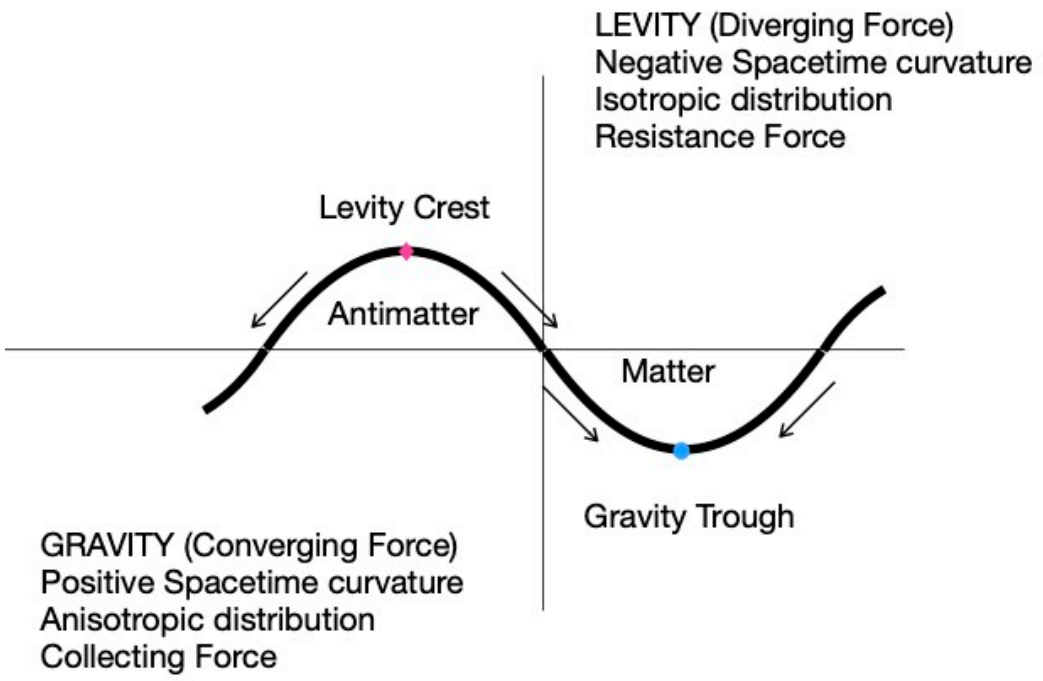


SK-5 Structure of Levitational and Gravitational Isobars in Spacetime (NTS)

interactions and elementary particles. In other words, a Levity field arises when the fabric of Spacetime exhibits a potential negative curvature, leading to divergent interactions among energy and particles. Conversely, a positive curvature gives rise to a Gravity field, fostering convergent interactions of energy and matter (see SK-2).

Contrary to common assumptions, Levity and Gravity are not opposing interactions that cancel each other out. Rather, they complement and support each other into a continuous field of potential energy that flows from a Levity field to a Gravity field. This dynamic manifestation dictates the direction and momentum of matter and energy throughout Spacetime, structuring the cosmic web, shaping galaxies, and energizing the movement of matter and energy across the Universe.

Note. The dynamics between Gravity and Levity resemble the isobar patterns (See SK-5) seen on a weather map, where low and high-pressure systems correspond to troughs of Gravity and crests of Levity, influencing the distribution patterns of matter and energy



SK-6 Section thru Isobar Pattern (NTS)

densities as witnessed by the structure of the Cosmic Web across Spacetime (see SK-6). Furthermore, Time flows at a faster rate within a Levity field and at a slower rate within a gravitational field, suggesting that the speed of light and the measurement of distances across the universe are more complex and difficult to measure than currently assumed.

The varying curvatures of spacetime lead to the manifestation of gravity and Levity as relatively weak interactions on small scales, while on cosmic scales, these interactions are very much stronger because there is a greater amount of mass distributed throughout the universe. Therefore, Levity and Gravity are potential fields that curve the spacetime fabric in the presence of energy and matter.

Furthermore, observations of the [23]CMB indicate that matter and energy converge across the Universe indicating localized gravitational fields which are observed as positive lensing effects, while observations of vast empty spaces indicate expansive levitational fields and are observed as negative lensing effects.

Hence, the CMB data indicates that temperature variations, such as cold and hot spots, can be of two types. The first causes cold spots in the CMB when light travels through evolving levitational potentials, such as those associated with large-scale voids, where they experience a blueshift. The second causes hot spots in the CMB where light passes

[23] CMB. Cosmic Microwave Background radiation.

through evolving gravitational wells, such as clusters of galaxies where they tend to redshift in the CMB light.

As previously mentioned, when Spacetime reaches a relative equilibrium (or symmetry) between the Time and Space fields, a neutral curvature emerges, giving rise to quantum fields and quantum dynamics. Here, elementary particles and fundamental interactions emerge, impacting the structure of Matter and the behaviour of Spacetime fabric (see SK-2).

Therefore, elementary particles formed within the approximate neutral plane of the Time and Space interactions, emerge with minimal spin, charge and mass. However, as they form further away from the neutral plane, they begin to acquire more mass, more charge, and more spin. Therefore, Elementary particles that are formed along the neutral plane of the Time and Space fields are less interactive than the Elementary particles that are formed further away from the neutral plane. Furthermore, as Particles form either under the influence of a more dominant Time or Space field, Antimatter or Matter particles correspondingly arise.

Note. Since Levity is a repulsive interaction acting at a cosmic scale, it contributes to the observed accelerated expansion of the universe, a phenomenon currently attributed to dark energy. The need for a mysterious and unknown form of energy to explain cosmic expansion could be replaced by the effects of a repulsive interaction like Levity.

Similarly, since Levity exhibits repulsive properties and interacts with the gravitational dynamics within galaxies and galaxy clusters, it suggests that Levity could also be the source of the hypothesized and yet undiscovered Dark matter. (see SK-6).

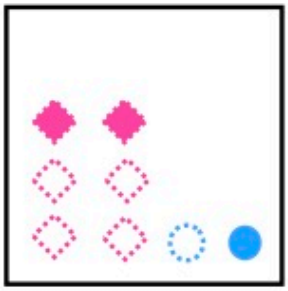
In summary, Levity and Gravity manifest wherever and whenever mass and energy are present in their respective fields within spacetime. Levity, Gravity, and the Quantum fields are secondary energy fields that interact across the fabric of spacetime, arising from the asymmetric interactions of the Time and Space functions. This same asymmetry is also responsible for the formation and asymmetric distribution of matter and antimatter throughout the universe.

ANTIMATTER AND MATTER……..

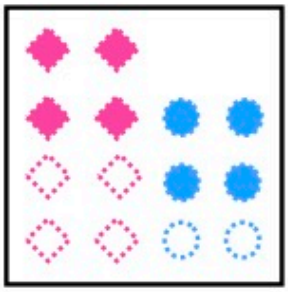
"[24]Imagine an enchanted forest with two sequential seasons: the season of Shadow and the season of Light. In the season of Shadow, newly formed seeds are dispersed by a levity wind which blows them into the darkness and are unable to root, representing the formation of Antimatter.

In the season of Light, freshly produced seeds are gathered by the gravity wind which pulls them downward onto the brightly lit soil where they vigorously root, symbolizing the

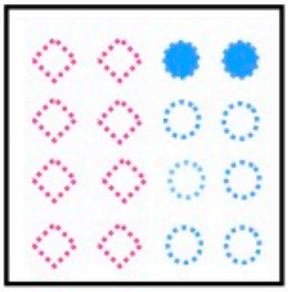
[24] Metaphor of baryogenesis.



1. Dominance of Levity field. Since more Antimatter particles emerge during this period, and since all particles cannot interact with each other due to the isotropic distribution by levity, most antimatter particles vanish into a lower energy levels of the Spectral-variance due to the lack of interactions between each other.



2. Towards the Parity of Levity and Gravity fields. As gravity increases, more Matter particles than Antimatter emerge, causing the annihilation of many Matter/Antimatter pairs, resulting in Matter starting to outnumber Antimatter.



3. Dominance of Gravity field. As gravity dominates, its attractive interaction causes the few remaining Matter/Antimatter pairs to annihilate eachother, while the remaining Matter particles who have earlier lost their pair, interact with each other through gravity to grow in complexity and entropy.

Antimatter particle

Annihilate Antimatter particle

Matter particle

Annihilated Matter particle

SK-7. The Asymmetry between Matter-Antimatter particles. (NTS)

creation of Matter.

During the transition between the seasons of Shadow and Light, neither the antimatter nor the matter seeds can sprout properly and die, however, as the season of Light begins to dominate more matter seeds will be produced and sprout because of the favourable conditions.

In this enchanted forest, the interplay between the season of Light and the season of Shadows determines the forest's composition. Matter remains and evolves, forming a rich, enduring world, while Antimatter vanishes through the absence of relevant interactions."

The distinctions between Matter and Antimatter particles stem from the circumstances of their formation [25](baryogenesis), specifically whether they form within the influence of a levity field or a gravity field. When Time interacts within a levity field, it establishes a potential negative spacetime curvature, leading to the creation of Antimatter particles. Conversely, when Space interacts within a gravity field, it establishes a potential positive spacetime curvature, giving rise to Matter particles (see SK-7). Therefore there is a natural affinity between Levity and Antimatter, Gravity and Matter.

When the Time field dominates, a levity field emerges from the negative spacetime curvature, causing the quantum fields to form Antimatter particles. Similarly, in regions where the Space field predominates, a gravity field arises from the positive spacetime curvature, and Matter particles emerge from the quantum fields.

Both Matter and Antimatter particles possess mass. Since there is no "anti-mass" to prompt fields to anti-gravitate or anti-levitate, then, the interactions associated with Mass within a levity field will diverge Matter and Antimatter equally, while within a gravity field, they both will converge equally. In other words, both Levity and Gravity influence Matter and Antimatter in the same manner, where Levity repels Matter in the same manner as it repels Antimatter and so on with Gravity.

The asymmetry of baryogenesis, as it was developed during the early expansion, the Levity field was dominant and Antimatter particles formed from the quantum fields where they were dispersed isotropically across spacetime at an extremely rapid rate, and where the vast majority vanish due to their inability to interact with each other within a Levity field.

As Gravity strengthens and Levity weakens, both Matter and Antimatter particles are produced and slowly begin to converge, annihilate each other and disperse as energy in spacetime. (see SK-7).

However, as the gravity field continues to strengthen, new Matter particles continue to emerge and interact with each other. Therefore Gravity prevents Matter particles from

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[25] Baryogenesis. Is the physical process that is hypothesized to have taken place during the early universe to produce baryonic asymmetry. See Wikipedia - https://en.wikipedia.org/wiki/Baryogenesis

decaying due to their attraction, unlike Antimatter particles within the levity field. Thus, more Matter remains interacting in spacetime while most Antimatter vanishes as energy.

In summary, Matter and Antimatter are the tertiary energy fields of interaction across the fabric of spacetime. Therefore, the asymmetry between Matter and Antimatter is determined by the interactions between the Levity and Gravity fields, what remains as Matter undergoes an evolutionary process which forms atoms, molecules, celestial body structures, and eventually, Life.

WHITEHOLES AND BLACKHOLES……..

"[26]Imagine the universe as a vast, cosmic ocean, with Whiteholes and Blackholes serving as the ocean's dynamic tides, each playing a crucial role in the grand cycle of cosmic energy and matter.

In the early dawn of this cosmic ocean, a powerful wave (Whitehole) surges forth, releasing a burst of energy and matter into the vast expanse. This wave, born from the intense temporal cavitation of the Time field, spreads outward, dispersing energy much like how a breaking wave spreads water droplets across the shore. The energy and matter carried by this wave create intricate patterns and structures as they spread, transforming the smooth surface of the ocean into a dynamic and diverse seascape.

As time flows, the ocean's tide begins to shift, and the once-dominant energy of the Whitehole's wave disperses into the expanse. Meanwhile, on the far horizon, another type of whirlpool (Blackholes)begins to take shape. This whirlpool, emerging from the spatial distortion of the Space field, pulls energy and matter inward, converging them towards a central point. As matter spirals into the Blackhole's core, it breaks down into its most fundamental components, much like debris being sucked into the depths of a whirlpool.

In this grand ocean, the interplay between Whiteholes and Blackholes is a continuous dance. Whiteholes, with their outward surge, infuse the universe with energy and complexity, spreading matter far and wide. In contrast, Blackholes, with their inward pull, gather this dispersed matter, breaking it down and returning it to the latent realm in a state of ordered simplicity.

Thus, the cosmic ocean's tides, driven by the interactions of Time and Space, symbolize the eternal cycle of the universe, where Whiteholes disperses energy, creating the diverse and intricate structures of the cosmos, while Blackholes gathers and transforms this energy, returning it to the latent depths from whence it came. This cycle ensures the universe's continuous evolution, maintaining the balance between order and chaos, complexity and simplicity, and expansion and contraction."

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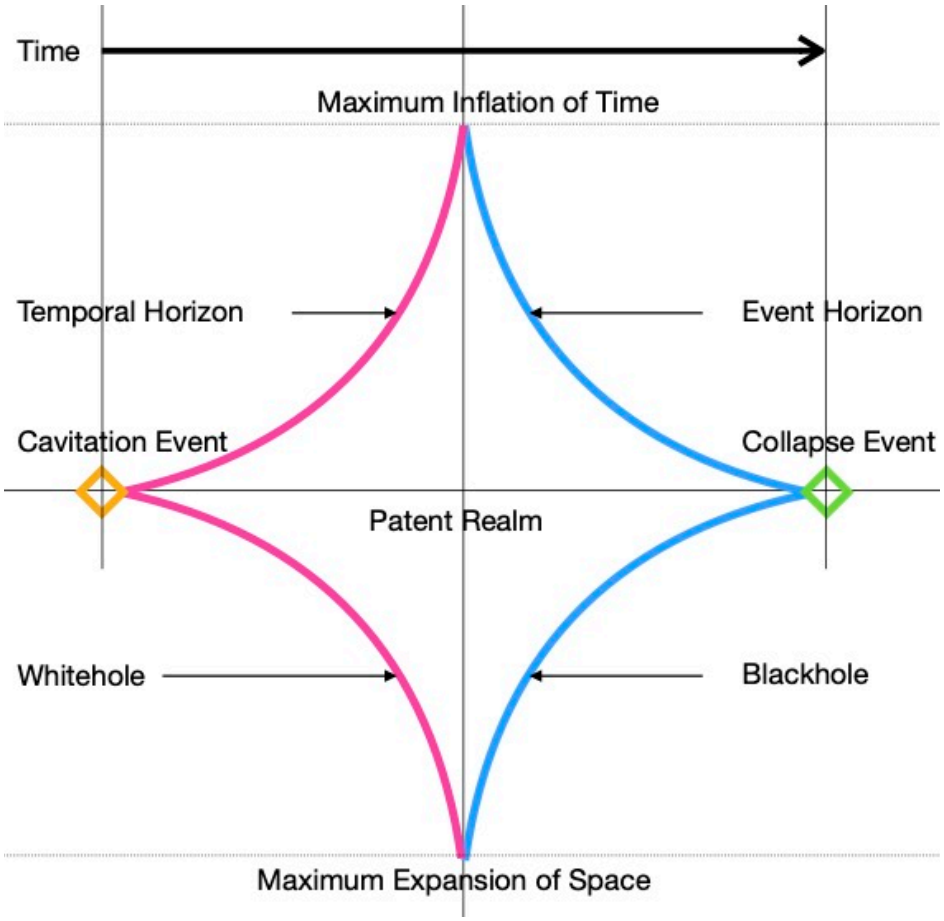
[26] Metaphor for the function of whiteholes and blackholes in the universe.



SK-8. Continuum between Temporal Horizon and Event Horizon (NTS)

Whiteholes and Blackholes are contrasting structures shaping the universe's evolution. Whiteholes release energy from the Latent realm into the Patent realm, while Blackholes absorb energy and matter from the Patent realm and release it back to the Latent realm as latent energy. See SK-8.

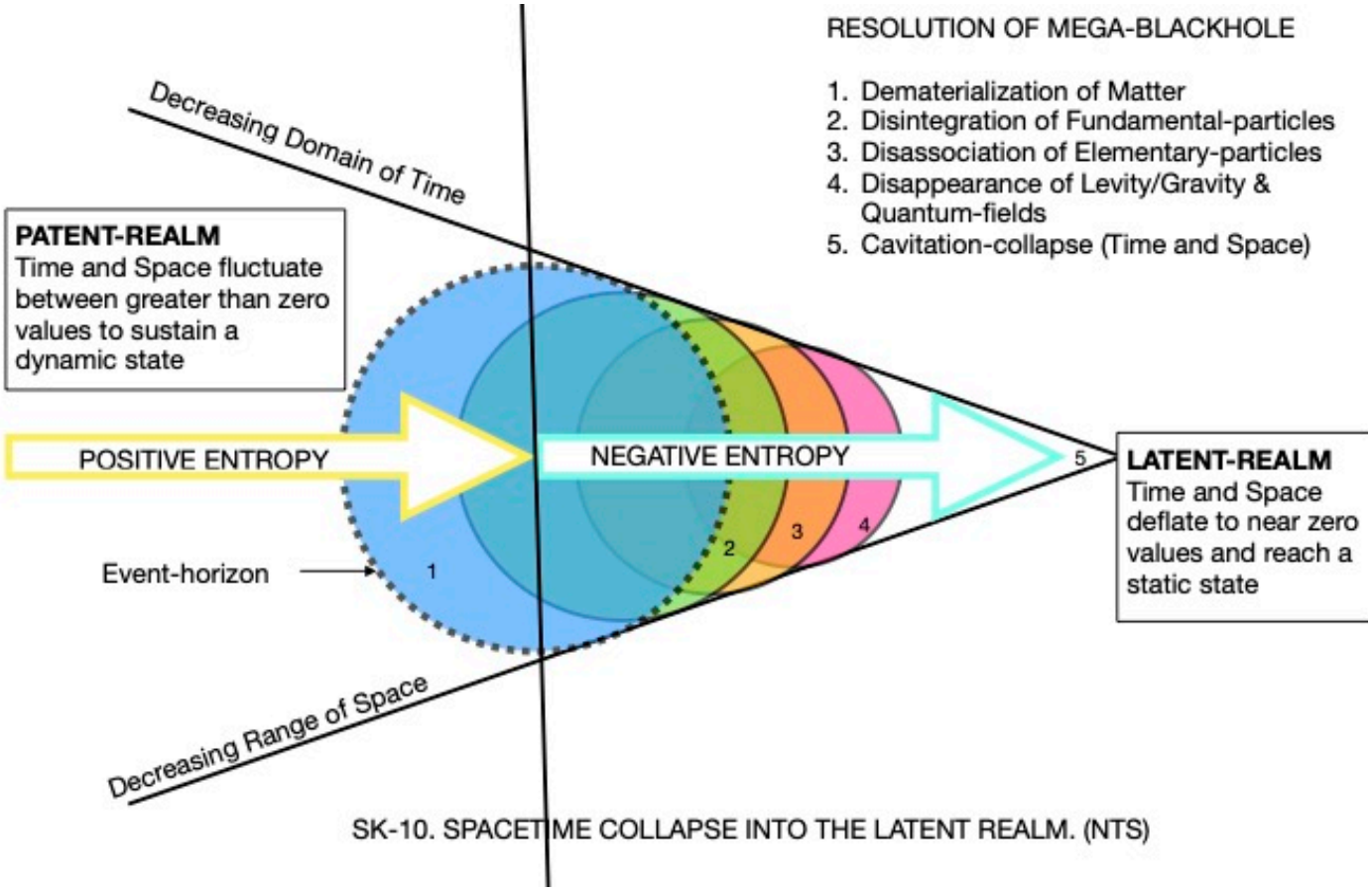
Whiteholes result from intense levitational interactions and the dominance of the Time field during the early universe. They disperse energy and matter isotropically past the Temporal horizon, which prevents their return to the interior of the whitehole. (see SK-8).

Conversely, Blackholes form from intense gravitational interactions and great concentrations of mass, dominated by the Space field. They generate an Event horizon beyond which matter and energy cannot escape. As matter approaches the core of a Blackhole, it breaks down into elementary particles and fundamental interactions, and eventually converting into latent energy when Time approaches a near-zero values and the Spatial cavitational bubble collapses.

As Time deflates and Space contracts rapidly within a Blackhole, the quantum fields weaken, reversing entropy into negentropy. This process transforms disorder into order and complexity into simplicity. Contrary to conventional beliefs, Gravity does not reach an infinite value at a Blackhole's core, nor does a Blackhole evaporate into spacetime, rather it disintegrates into energy which transitions into the Latent realm. (see SK-9).

Therefore, the role of the Whitehole is to disperse Energy and matter throughout spacetime as Time inflates in an instantaneous moment, while the role of Blackholes is to converge Energy and Matter as Time slowly deflates and transforms matter into static energy which eventually is released in the Latent realm. The cycle of attenuating the energy disturbance from the Latent realm and rendering its dynamic nature back into its potential energy state is now completed.

Note: There is no evaporation of massive Blackholes, and there is no slow loss of mass



SK-9. Spacetime Collapse. NTS

through radiation. Instead, Blackholes lose mass since their mass reduces the flow rate of Time and causes Space to collapse when approximating zero. As matter dematerializes

into its elementary particles, it reaches near-zero asymptotic values and becomes latent energy.

Note. The [27]Cosmic energy cycle is differentiated in the following manner. The first level of differentiation is the manifestation of Time and Space, the second level is manifested by Levity, Gravity and the Quantum fields, and the third level of differentiation is the manifestation of Matter and Life. Any further levels of differentiation is a matter of speculation but it is, nevertheless, an intriguing idea to speculate where the continuing evolution of this energy cycle might lead, as the universe continues to change.

Note. As pure speculation, other asymptotic disturbances, with different amplitudes, may well be emerging from the Latent realm to form new energy cycles with their own particular properties.

In summary. The emergence of these levitational and gravitational structures are the quaternary energy fields of interaction across the fabric of spacetime. The Whitehole is a cosmic structure directly related and influenced by the Levity fields, while a Blackhole is a cosmic structure directly related and influenced by the Gravity fields.

SUMMARY……

The Cavitational Model of Cosmology offers a comprehensive framework to understand fundamental aspects of the Universe, emphasizing the roles of Time and Space. This paper explores the Latent and Patent realms, the manifestation of the temporal cavity, Time-Space fields, Spacetime fabric, and phenomena like gravity, quantum fields, and blackholes.

Our comprehension of reality, physical or metaphysical, relies on the subjective perceptions of the human mind. However, to understand the dynamic universe, mathematical proofs indicative, verifiable, and constructive are necessary. Challenges in cosmology, like gravity, dark matter, and dark energy, prompt a redefinition of Time, Space, Energy, and Matter.

The key challenges in cosmology, including Gravity, Dark Matter, and Dark Energy, can potentially be resolved through a deeper understanding of the roles of Time and Space in the Universe's establishment and evolution.

The Universe's essence transcends definite beginnings or ends, with a seamless continuum from pre-Big Bang conditions. The transition from the Latent to the Patent realm occurs through a gradient of energy, marking the latent energy's potential state to the dynamic manifestation in the Patent realm.

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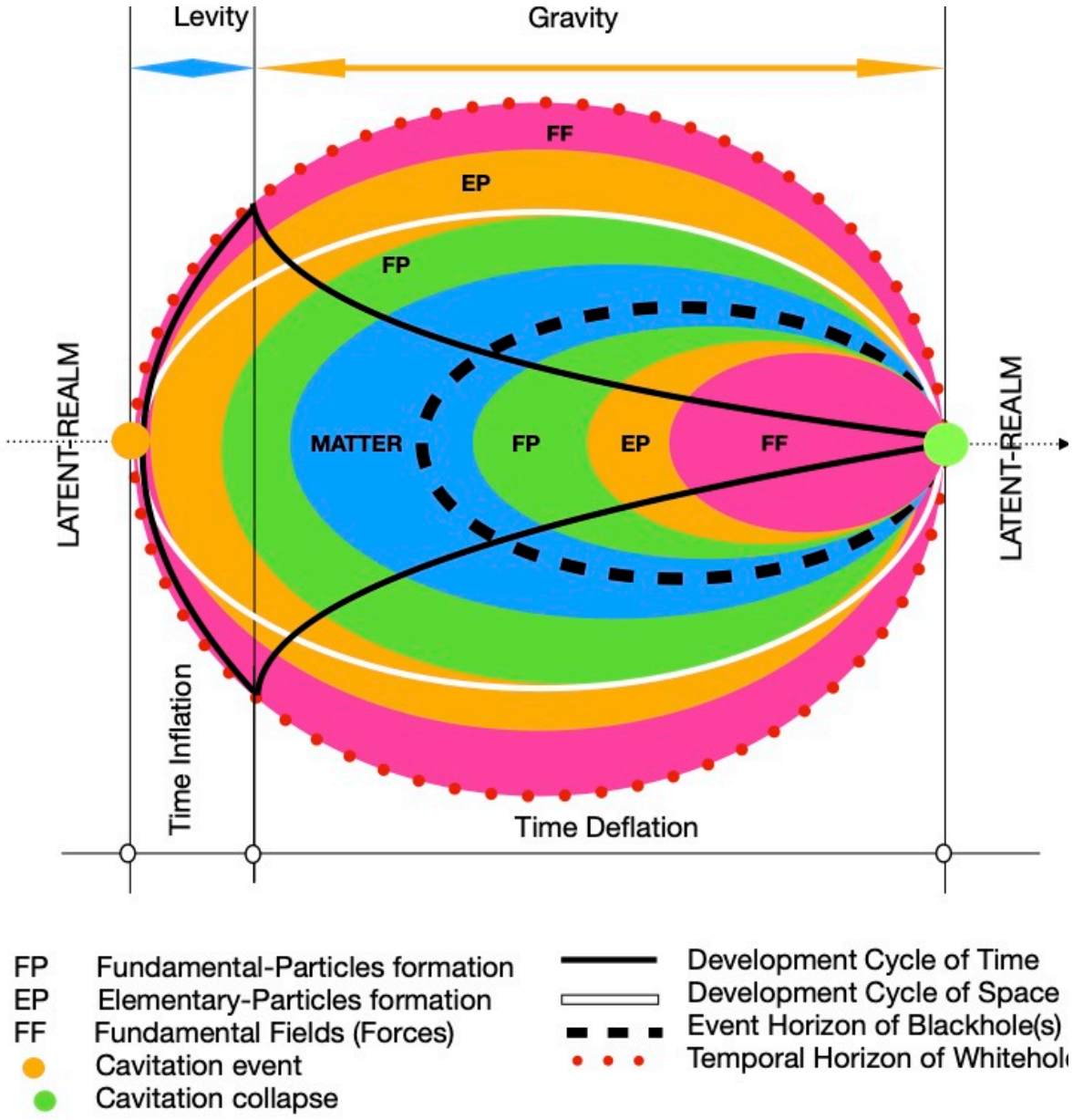
[27] The Cosmic Energy Cycle. Refers to the cycle of energy that originates in the Latent realm as a fluctuation causing a temporal disturbance. This disturbance emerges as the Patent realm, where Time and Space undergo a dynamic process of expansion and contraction. The energy disturbance is gradually rendered to a latent state and reintegrated into the Latent realm.



SK-10. Conceptual Sketch of a Dynamic Universe (NTS)

Energy fluctuations in the Latent realm lead to the rapid transition between the Latent and Patent realms, forming a bubble of Time where Space and Time energize and interact, akin to a Whitehole.

Time and Space fields interact, controlling energy flow across Spacetime. Variations in these fields potentially influence the speed of light, challenging its assumed constancy.

Spacetime emerges from the interactions of the Time and Space fields, exhibiting curvatures that influence the Universe's expansion, measurements and age, challenging conventional cosmic models.

Time's behaviour, related to frequency and wavelength, forms a spectral gradience, influencing the state of Matter within the Universe.

Levity and gravity are not opposing forces but complement each other, shaping cosmic interactions at different scales and potentially explaining observed phenomena like dark energy, dark matter, rotational velocities of galaxies, matter and energy distributions within the Cosmic web.

Matter interacts with both the Levity and Gravity fields causing matter to either disperse evenly throughout spacetime or conglomerate into structures of matter.

Differences between Matter and Antimatter stem from the conditions of their formation, such as the levitational and gravitational dominance during their creation.

Whiteholes disperse energy, while Blackholes absorb it, marking them contrasting forces in the evolution of the Universe.

The Cavitational Model could revolutionize our understanding of Time, Space, Energy, and Matter, but empirical validation is essential to elevate it from theory to accepted cosmological understanding.

DISCUSSION……

The Cavitational Model of Cosmology proposes a reinterpretation of the universe’s origin, structure, and evolution. If this model were to be integrated into our current understanding of cosmology, it would bring about significant consequences and implications.

Reconceptualization of Time. - The model suggests Time’s role in the transition between realms and as a crucial factor in the emergence and dynamics of Space. If proven, this would redefine how we perceive and measure Time and Space.

Dynamic Space. - The proposal of Time’s inflation and deflation affecting the speed of light challenges the assumption of a constant speed of light, impacting fundamental physical theories such as the measurement of space distances, variable velocities of matter, etc.

Dynamic Spacetime formation. - The idea that Spacetime arises from interactions between Time and Space fields offers an alternate explanation for the universe’s curvature and expansion, potentially altering our understanding of cosmic inflation.

Relating Spacetime Curvature to Fundamental Interactions. - Associating gravity and levity with spacetime curvature alters our comprehension of these interactions, suggesting they interact differently from conventional theories.

Role of Levity. - The proposal that levity contributes to cosmic expansion challenges the need for dark energy, potentially altering our understanding of the universe's accelerated expansion. This will impact our understanding of the CMB, Inflation, Blackholes and Dark-holes, Baryogenesis, and the development and structure of the universe.,

Reinterpretation of Gravity. - The relationship between gravity and levity suggests a complementary interplay, which could change our understanding of gravitational interactions within galaxies and cosmic structures, reducing or eliminating the reliance on dark matter to explain these interactions.

Origin of Matter and Antimatter. - Linking their formation to the dominance of specific fields offers an intriguing perspective but diverges significantly from established theories. If proven, this would reshape our understanding of particle physics.

Evolution of Particles. - The model's narrative on the evolution of particles and their interactions within different fields would revolutionize our understanding of the universe's elemental makeup and its evolutionary path.

Alternate Blackhole Evolution. - The proposed fate of blackholes, dematerializing and transferring energy to the Latent realm, contrasts sharply with conventional theories of singularity and evaporation. If validated, this would redefine our understanding of blackhole mechanics.

End of the Universe. - The concept of the universe dissipating into a Latent realm through a mega-blackhole, as Time and Space approach zero, challenges existing ideas of cosmic fate and entropy.

EXPERIMENTS AND OBSERVATIONS……..

Cosmic Microwave Background. - Analyze CMB data for irregularities or patterns, such as the [28]'Integrated Sachs-Wolf Effect' (ISW) or [29]the Rees-Sciama Effect, that might support fluctuations in spacetime or variations in the speed of light.

Gravitational Wave Observatories. - Study gravitational wave data for anomalies or signatures indicating dynamic spacetime or interactions between gravity and levity fields.

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[28] ISW Effect - Gravitational potentials decay over time in an expanding universe, leading to a net gain in energy (blueshift) for CMB photons.

[29] The Rees-Sciama Effect is the reverse of the ISW where in non-linear structures, evolving gravitational potentials cause complex redshifts and blueshifts in CMB photons.

Cosmological Survey. - Conduct an extensive survey of large-scale structures in the universe to identify patterns that align with the model's predictions of gravitational and levitational effects.

Redshift and Cosmic Expansion. - Examine redshift data from distant galaxies to seek evidence of variations that could support altered concepts of cosmic expansion.

Particle Physics Experiments. - Probe particle interactions at high energies to detect patterns or behaviours aligning with the model's predictions of matter-antimatter creation within the influence of different fields.

Speed of Light Variations. - Design experiments to measure the speed of light under varying conditions or fields that could potentially indicate fluctuations proposed by the model.

Field Interactions. - Construct controlled environments to study interactions between fields similar to gravity and levity, seeking evidence of their influence on matter and energy.

Space-Time Fluctuations. - Experiment with controlled models to simulate fluctuations in Spacetime fabric and observe any resultant effects on energy or matter.

Mathematical Modelling. - Develop advanced mathematical models to simulate scenarios proposed by the model and compare their predictions against observed data.

Simulation Studies. - Utilize computational simulations to recreate early universe conditions and study the emergence of spacetime, fields, and particle interactions.

Advanced Telescopes and Detectors. - Develop or enhance observational instruments capable of detecting subtle variations in fields, spacetime, or cosmic structures.

Particle Accelerators. - Employ high-energy particle accelerators to simulate extreme conditions and test predictions regarding particle genesis and behaviour within different fields of spectral variances.

CONCLUSIONS……..……

The Nature of the Latent Realm. - Based on the principles espoused in this paper, there are an almost infinite number of other Patent realm-like universes that emerge from the Latent realm. These may have similar properties to our universe and they may also vary greatly and manifest significantly different principles and processes from the Patent Realm.

Nature of Time and Space. - A confirmation of the proposed model would fundamentally alter our perception of Time, presenting it as a dynamic interaction linked intricately with Space, challenging classical views.

Unified Understanding. - The model's integration of various fundamental elements (Time, Space, Energy, Matter) paves the way for a unified framework encompassing diverse phenomena in the Universe.

Dynamic Fields. - The existence and interplay of levity and gravity fields redefine our understanding of cosmic forces, potentially unifying them under a new theoretical framework.

Dark Energy/Matter. - If levity contributes significantly to cosmic expansion or affects gravitational dynamics, it revises or replaces the need for dark energy and dark matter explanations.

Origins of Particles. - Linking matter-antimatter creation to field dominance revolutionizes our understanding of particle genesis and interactions, reshaping particle physics.

Elemental Composition. - This model offers insights into the elemental makeup of the universe and how it evolves within different energy fields.

Blackhole Evolution. - Blackholes arise from a gravitational field. It dematerializes and returns energy to the Latent realm. It challenges the concept of singularities and reshapes our understanding of cosmic endings.

Whitehole Evolution. - Whiteholes arise from a levitational field. It materialize and distribute energy to the Patent realm. It supports the idea of an exponential inflation. Its evolution describes a process that begins with the formation of a bubble-like region of spacetime, expands by expelling matter and energy, stabilizes temporarily, and eventually collapses into the mega-blackhole which concludes the patent energy cycle.

Entropy and Order. - The proposed reversal of entropy via blackhole dematerialization suggests a cyclic nature, challenging traditional views of cosmic fate and disorder.

New Experiments. - Empirical validation could prompt new experiments seeking evidence for fluctuating space-time, dynamic fields, and altered gravitational effects.

Observational Signatures. - Observational searches for spacetime fluctuations, variations in the speed of light, and unique gravity/levity effects could prioritized.

Advanced Understanding. - A validated model would lead to technological innovations based on an advanced understanding of spacetime, energy, and cosmic forces.

Space exploration. - Revolutionary concepts would inspire new approaches to space travel, exploiting dynamic spacetime for propulsion and navigation.

Perception of Reality. - A confirmed model would challenge our perception of reality, underscoring the subjectivity of human perception and the malleability of fundamental cosmic principles and processes.

Cultural Shifts. - Such a transformative paradigm shift could impact cultural narratives, sparking new discussions about our place in the universe and the nature of existence.

Given the speculative and theoretical nature of the Cavitational Model, empirical validation is crucial to elevate it from a theoretical framework to an accepted cosmological theory. Therefore, a combination of observational, experimental and theoretical approaches, along with robust data analysis and peer scrutiny, is essential in proving or disproving this model.

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94.

POSTSCRIPT…….

I I am a professional architect, teacher, painter, composer of piano music, and writer of prose and poetry. My life is enriched by a wide range of interests, including physics, cosmology, biology, philosophy, astronomy, history, chemistry, anthropology, economics, and archaeology.

Over the past three decades, my fascination with cosmology has become a central focus. I have developed a broad understanding of the Universe, much like how I approach architecture: starting with an abstract vision and then transforming it into a concrete reality. I believe that these new concepts in cosmology follow a clear, sequential cause-and-effect pattern, where each idea naturally builds upon the previous one. However, I strive to avoid getting lost in details, recognizing that they only have meaning within the larger context.

In 2017, I began a deeper exploration of cosmology, concentrating on what I see as an often overlooked but crucial variable: the complexity of Time, its principles, structure, and significance.

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