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Article

Solution of The Yang-Mills Conjecture From The Quantum Information Transport Equations for Emergence of “Vyaktham” From “Avyaktham” on The Surface of A Topologically Invariant 2D Poincare Sphere

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Abstract: The Yang-Mills conjecture addresses the fundamental nature of the strong force, one of the four fundamental forces in nature, responsible for binding quarks together to form protons, neutrons, and other hadrons. It was proposed in the early 1950s, the Yang-Mills suggests a mathematical framework for describing the behaviours of gauge fields, which are the carriers of fundamental forces. In particular, it focuses on non-abelian gauge theories, where the gauge fields themselves interact with each other. The non-abelian aspect refers to the fact that the order of operations matters when combining these gauge transformations, leading to a more intricate structure compared to abelian theories. This conjecture posits the existence and significance of certain mathematical structures, known as Yang-Mills fields, which play a crucial role in the formulation of the Standard Model of particle physics. The Standard Model describes the electromagnetic, weak, and strong nuclear forces, as well as the elementary particles that constitute matter. Despite its foundational importance, proving the Yang-Mills conjecture has proven to be a formidable challenge. The conjecture is intimately connected to the concept of mass gap, which refers to the idea that the particles involved in the strong force interactions exhibit mass, in contrast to the photon in electromagnetism, which is massless. The successful resolution of the Yang-Mills conjecture is expected to deepen our understanding of the nature of particle physics and may provide insights into the unification of fundamental forces. In this regard we hereby provide solutions to solve Yang-Mills conjecture using the method of Self Information Entanglement and Quantum Information Transport Equations to elucidate the origin of Universe from Unperceivable Information called “Avyaktham” through the emergence of perceivable information “Vyaktham”. For the first time in the world we provided an empirically verifiable solution to the origin of emergence and existence of Universe based on the methods to predict the emergence using working model of clinical Ayurveda. It is computed that the value of mass gap mentioned in Yang-Mills conjecture is around $m_{YM} = m_{bit} \approx 1.06 \times 10^{-41} \text{kg}$.

Keywords: Yang-Mills mass gap; gunam; quantum information transport; Ayurveda; Samkhyam; emergence

1. Introduction

In the Ayurvedic Systems of Medicine diseases are considered as the emergence in a complex system called as human body due to Dosha Dushya Samurchanam^{1,2}. Human body is made up of systems biological components which are naturally emerged quantum biological systems with the inherent ability to perform quantum information transportation between the rest of the universe and its own quantum information network channels in the body³. Using methods called roga nidhana we are able to predict the emergence and identified the chord of chaos and able to control it by adding or removing specific quantum information to the human body through quantum matters with loaded information known as “Gunas” in quantum matter. Its arrangement over the surface of topologically invariant 2D Poincare Sphere is called as Dravyam. Dravyam is processed to get its optimal quantum information delivery using various methods mentioned in Ayurveda. Thus a working model of quantum information transport can be empirically verified and revalidated using phenomenological methods used in Ayurvedic clinical practice. Various methods like Mantra Vaadha, Daivavyapasraya chikitsa and other methods based on Jyotishya Shastra are also used to perform quantum information exchange process between human body and Gunas of Pancha Maha Bhutas to topple down the undesirable emergence events in human body to provide cure^{1,2}. In Ayurveda the matter is represented as arrangement of quantum matter holding corresponding quantum information and this arrangement of quantum matter happens on the surface of a topologically invariant 2D Poincare sphere such that all the geometrodynamics and topological operations are topologically invariant^{4,5}. We can also consider this system as a canonical ensemble of quantum matter holding its corresponding quantum information states and the total system is information invariant under any condition⁶. In this regard we provided the rest mass of quantum matter based on the transport equation derived from the equations for pure quantum states exists in “Avyaktham”. The axioms and ontological framework for emergent complex system model of the universe is adapted from our previously reported work to provide the solution to the Yang-Mills Conjecture as follows^{7,8}.

2. Information and Mass in the Unperceivable Pure Quantum State “Avyaktham”

Consider Avyaktham which is defined as the coherently super positioned quantum state which is self-information entangled with its own emergent quantum state called Vyaktham such that, both the quantum states can mutually and spontaneously exchange the quantum information gained or lost during the phenomenon of emergence of Vyaktham to its corresponding original state. Due to this self-information entanglement of Avyaktham with Vyaktham no information will be available about both the systems and both will become unperceivable.

Let ΔH be the quantum of Kanadhan wave function represented as a point ΔP on a topologically invariant 2D Poincare sphere P such that the 2D Poincare sphere P is reduced in to the centre of the circle on a plane, and the centre of this circle would correspond to the state of fully coherent superposition of all quantum states exists on the sphere $P^{4,5,7}$. Since $S=S_{max}$ at this state $\Delta I = \Delta M = 0$, If the expectation value of the emergence of Kshethram remains unchanged ($\Delta I = \Delta M = 0$), then from the perspective of the perceivable Kshethram E , no information about the system can be gained. This is state of a quantum system is defined as avyaktham.

3. Information and Mass in the Unperceivable Emergent State “Vyaktham” Emerged from its Original Pure Quantum State of Unperceivable “Avyaktham”.

Now consider a quantum system initially in state $|\psi_{A1}\rangle$. Suppose its state changes to $|\psi'_{A1}\rangle$ due to Self-Information Entanglement. In the self-information entanglement process the information ΔI is lost from the superposition state $|\psi_{A0}\rangle$ Avyaktham is simultaneously gained and fed back to the superposition state $|\psi_{A0}\rangle$ Avyaktham from its own emergent quantum state Vyaktham and $|\psi_{V0}\rangle$. As a result of self-information entanglement process the emergent Kshethram is simultaneously created, maintained, and destroyed and due to that no perceivable information about Kshethram will be available from the perspective of the perceivable Kshethram E (its own perspective). These types of Vyaktham are defined as unperceivable vyaktham existing in the unperceivable Avyaktham⁷.

If we compute the expectation value of an Emergence called Kshethram E before and after the change, the difference can be computed as,

$$\Delta I = \langle \psi'_{A1} | E | \psi'_{A1} \rangle - \langle \psi_{A1} | E | \psi_{A1} \rangle$$

The ΔI represent how the information about the emergence of Kshethram E changes due to the change in the quantum state.

This difference in information ΔI is perceived as the "information" gained or lost due to the change in the state is equal to, the mass gap proposed in the Yang-Mills conjecture.

If the expectation value remains unchanged ($\Delta I = 0$), then from the perspective of the perceivable Kshethram E, no information about the system's emergence has been gained.

On the other hand, if ΔI is significant, we have gained some information about the system's emergence or Kshethram's Emergence by noting how the perception of Kshethram E are expected to change.

Perceiving how the expected information of emergence known as Kshethram (quantified by expectation values) change as the state evolves gives us information about the nature and effects of the processes causing the emergence of Kshethram.

Now, in Avyaktham there is no time and space exist. All the material and energy in the universe will be converted into information entangled with its corresponding quantum states which all exists together as a superposition quantum state called Avyaktham. Thus information of the quantum states become unperceivable due to increase in entropy which reaches maximum at absolute temperature 0K and Entropy S_{Max} . Due to this absolute temperature at maximum entropy in Avyaktham the expectation values of all the quantum states in Avyaktham are equal. So, the expectation value of superposition quantum state $|\psi_{A0}\rangle$ can be calculated as sum of the probabilities of expectation values of constituent quantum states $|\psi_{Ai}\rangle$, where $i = (1...n)$ i.e.;

$$|\psi_{A0}\rangle = \alpha|\psi_{A1}\rangle + \beta|\psi_{A2}\rangle + \gamma|\psi_{A3}\rangle + \delta|\psi_{A4}\rangle + \dots + \infty n|\psi_{Ai0}\rangle$$

Since, $|\alpha|^2 = |\beta|^2 = |\gamma|^2 = |\delta|^2 = \dots = |\infty|^2 = \infty$.

The probability of measuring the system in coherent superposition state $|\psi_{A0}\rangle$ is

$$|\alpha|^2 + |\beta|^2 + |\gamma|^2 + |\delta|^2 + \dots + |\infty|^2 = \infty$$

which means that the probability of measuring the system cannot be done or probability cannot be determined. Which means the Kshethram called as perceivable reality don't exist, but the quantum states exist. This can be interpreted as the unperceivable information self-entangled with corresponding superposition quantum states existing in Avyaktham.

4. Emergence of Perceivable Vyaktham from Unperceivable Avyaktham:

Now, Consider two constituent quantum systems Q_{A1} and Q_{A2} , of the superposition quantum state $|\psi_{A0}\rangle$ Avyaktham, such that the corresponding quantum states of Q_{A1} and Q_{A2} are represented as $|\psi_{A1}\rangle$ and $|\psi_{A2}\rangle$. Since the system is existing in the maximum entropy condition S_{max} , the state Avyaktham $|\psi_{A0}\rangle$ is existing as the superposition of all the available quantum states in the system Avyaktham such that quantum state $|\psi_{A0}\rangle$ is represented as the coherent superposition of various basis states then,

$$|\psi_{A0}\rangle = |\psi_{A1}\rangle + |\psi_{A2}\rangle + |\psi_{A3}\rangle + \dots + |\psi_{An}\rangle$$

with corresponding coefficients $\alpha, \beta, \gamma, \delta, \dots, \infty$ since at S_{max} all the information in the superposition state of Avyaktham are self-information entangled to its corresponding constituent quantum states so that all the constituent quantum states of the superposition quantum state $|\psi_{A0}\rangle$ will have equal probabilities and expectation values which are equal to the expectation value of the superposition quantum state $|\psi_{A0}\rangle$ and it can be written as ,

$$\langle \psi_{A0} | E | \psi_{A0} \rangle = \langle \psi_{A1} | E | \psi_{A1} \rangle + \langle \psi_{A2} | E | \psi_{A2} \rangle + \langle \psi_{A3} | E | \psi_{A3} \rangle + \dots + \langle \psi_{An} | E | \psi_{An} \rangle$$

Since, $|\psi_{A1}\rangle = |\psi_{A2}\rangle = |\psi_{A3}\rangle = \dots = |\psi_{An}\rangle$ and $|\alpha|^2 = |\beta|^2 = |\gamma|^2 = |\delta|^2 = \dots = |\infty|^2 = \infty$,

The equation for expectation value for superposition quantum state called Avyaktham can also be written as $\langle \psi_{A0} | E | \psi_{A0} \rangle = \langle \psi_{A1} | E | \psi_{A1} \rangle = \langle \psi_{A2} | E | \psi_{A2} \rangle = \langle \psi_{A3} | E | \psi_{A3} \rangle = \dots = \langle \psi_{An} | E | \psi_{An} \rangle$

Now, consider two constituent quantum systems Q_{A1} and Q_{A2} of superposition quantum states $|\psi_{A0}\rangle$ Avyaktham represented as quantum states $|\psi_{A1}\rangle$ and $|\psi_{A2}\rangle$ which are self-information entangled with its own emergent states represented as $|\psi_{v1}\rangle$ and $|\psi_{v2}\rangle$ then the information gained or lost due to the process of emergence can be written as ;

$$\Delta I_1 = \Delta M_1 = \langle \psi_{v1} | E | \psi_{v1} \rangle - \langle \psi_{A1} | E | \psi_{A1} \rangle \text{ and } \Delta I_2 = \Delta M_2 = \langle \psi_{v2} | E | \psi_{v2} \rangle - \langle \psi_{A2} | E | \psi_{A2} \rangle$$

But at maximum entropy S_{\max} , due to self-information entanglement phenomenon the above equation can be written as;

$$\Delta I_1 = \Delta M_1 = \langle \psi_{v1} | E | \psi_{v1} \rangle - \langle \psi_{A1} | E | \psi_{A1} \rangle = \Delta I_2 = \Delta M_2 = \langle \psi_{v2} | E | \psi_{v2} \rangle - \langle \psi_{A2} | E | \psi_{A2} \rangle = 0$$

But due to the entanglement of information between the quantum systems Q_{A1} and Q_{A2} the quantum information will be transported from Q_{A1} to Q_{A2} ;

So the information ΔI available in the state $|\psi_{A1}\rangle$ will be transported to the quantum state $|\psi_{A2}\rangle$ and vice versa.

Then the quantum state $|\psi_{A2}\rangle$ existing nearest to the quantum state $|\psi_{A1}\rangle$ will gain the lost information from the state $|\psi_{A1}\rangle$ and will transform into a new state represented as $|\psi_{A2G}\rangle$ and the state $|\psi_{A1}\rangle$ which lost the information will transform into a new state represented as $|\psi_{A1L}\rangle$. Due to this the self-information entanglement phenomenon happening in the systems $|\psi_{A1}\rangle$ and $|\psi_{A2}\rangle$ will be destroyed. The superposition state $|\psi_{A0}\rangle$ will be perturbed due to the creation of this imbalance in entropy and will transport the information corresponding to the states $|\psi_{A1L}\rangle$ and $|\psi_{A2G}\rangle$ to its emergent state $|\psi_{v0}\rangle$ thus the states $|\psi_{A1L}\rangle$ and $|\psi_{A2G}\rangle$ and its corresponding information will be made available in self-information entangled state of Avyaktham. As a result of this process the information emerged from $|\psi_{A0}\rangle$ Avyaktham will be made available for perception through the emergent state $|\psi_{v0}\rangle$ Avyaktham of the superposition state $|\psi_{A0}\rangle$ Avyaktham. The information corresponding to the emergence of Vyaktham from Avyaktham due to self-information entanglement is simultaneously fed back to the Avyaktham but the perturbations in Avyaktham will be transported into the boundaries of Avyaktham and added into an additional information to the Vyaktham. Thus the changes in the information density in $|\psi_{v0}\rangle$ Vyaktham will happen, and $|\psi_{v0}\rangle$ will be transformed into $|\psi_{v0}\rangle + |\psi_{v0(L,G)}\rangle$, but the $|\psi_{v0}\rangle$ component of the quantum states and corresponding information will be simultaneously created, maintained and destructed due to the self-information entanglement process which happens continuously as an information transport loop. So in the perspective of emergent phenomena only the information corresponding to the component of Vyaktham represented as $|\psi_{v0(L,G)}\rangle$ will be available for perception.

Since the original states $|\psi_{A1}\rangle$ and $|\psi_{A2}\rangle$ are no more available in the superposition state $|\psi_{A0}\rangle$ the information corresponding to the change in expectation values of $|\psi_{A1}\rangle$ and $|\psi_{A2}\rangle$ which transported in to the self-information entangled state $|\psi_{v0}\rangle$ as $|\psi_{v0(L,G)}\rangle$ will not undergo self-information entanglement with Avyaktham state $|\psi_{A0}\rangle$. So the emergent states $|\psi_{v0(L)}\rangle$ and $|\psi_{v0(G)}\rangle$ which are holding the information which caused the transformation of $|\psi_{A1}\rangle$ to $|\psi_{A1L}\rangle$ and $|\psi_{A2}\rangle$ to $|\psi_{A2G}\rangle$ can be written as the quantum states $|\psi_{v0(L)}\rangle$ and $|\psi_{v0(G)}\rangle$ with corresponding information added to the emergent state Vyaktham $|\psi_{v0}\rangle$ then, $|\psi_{v0(L)}\rangle = |\psi_{A1L}\rangle$ $|\psi_{v0(G)}\rangle = |\psi_{A2G}\rangle$; and the state $|\psi_{v0(L)}\rangle$ called as Laghu is the first quantum state emerged out of corresponding constituent quantum states of Avyaktham existing in superposition state $|\psi_{A0}\rangle$

$$\text{and } |\psi_{v0(L)}\rangle + |\psi_{v0(G)}\rangle = |\psi_{A1L}\rangle + |\psi_{A2G}\rangle ; \quad |\psi_{v0(L)}\rangle = |\psi_{A1L}\rangle ; \quad |\psi_{v0(G)}\rangle = |\psi_{A2G}\rangle$$

The quantum state holding the corresponding information of the transformed state $|\psi_{A2G}\rangle$ emerged from state $|\psi_{A2}\rangle$ by receiving or gaining the information ΔI lost from $|\psi_{A1}\rangle$ is called as Guru⁷.

5. Perception of directly Unperceivable Avyaktham through the directly Perceivable Vyaktham:

The Avyaktham existing as the superposition state of all the existing quantum states present in the system will be in a state of self-information entanglement with its own Emergent state called Vyaktham. Due to the self-information entanglement the information in the emergent state vyaktham will not be perceivable in the perspective of emergent state. Now consider a phenomenon in which the constituent states Q_{A1} to Q_{A2} represented by quantum states $|\psi_{A1}\rangle$ and $|\psi_{A2}\rangle$ exchanges and information ΔI between them in such a way that due to the loss of the information the state $|\psi_{A1}\rangle$ become Laghu and $|\psi_{A2}\rangle$ become Guru⁷.

Now,

$\langle \psi_{A0} | E | \psi_{A0} \rangle - \Delta I = \langle \psi_{v0} | E | \psi_{v0} \rangle$ then due to Self-information entanglement the information ΔI lost from Avyaktham will be simultaneously pumped back from the emerged state Vyaktham to Avyaktham so that $\langle \psi_{v0} | E | \psi_{v0} \rangle - \Delta I = \langle \psi_{A0} | E | \psi_{A0} \rangle$, at maximum entropy S_{\max}

Due to the emergence of these gunas in Avyaktham the information simultaneously transported between the $|\psi_{A1}\rangle$ and $|\psi_{A2}\rangle$ with its own emergent states due to self-information entanglement which was presented as a component in the Emergent state $|\psi_{V0}\rangle$ Vyaktham of superposition state $|\psi_{A0}\rangle$ Avyaktham will not be able to simultaneously fed back to the Avyaktham from Vyaktham. Due to this, the emergent components of the state Vyaktham represented as $|\psi_{V0(L)}\rangle$ which is equal to the information in the transformed state $|\psi_{A1L}\rangle$ of constituent state $|\psi_{A1}\rangle$ of Superposition state Avyaktham $|\psi_{A0}\rangle$ and $|\psi_{V0(G)}\rangle$ which is equal to the information in the transformed state $|\psi_{A2G}\rangle$ of constituent state $|\psi_{A2}\rangle$ of Superposition state Avyaktham $|\psi_{A0}\rangle$ will not be simultaneously exchange between $|\psi_{A0}\rangle$ and $|\psi_{V0}\rangle$ so that the self-information entangled state equation of Avyaktham can be written as,

$\langle\psi_{A0}|E|\psi_{A0}\rangle +/- [\Delta I] = \langle\psi_{V0}|E|\psi_{V0}\rangle +/- [\Delta I]$ such that in the perspective of E no information will be available about Avyaktham and Vyaktham⁷.

then due to collapse of Self information entanglement of $|\psi_{A1}\rangle$ and $|\psi_{A2}\rangle$, the AV equation will be transformed as a transport equation for information from Avyaktham to Vyaktham which will be available for perception since it can't be fed back simultaneously to the Avyaktham why because the respective original states $|\psi_{A1}\rangle$ and $|\psi_{A2}\rangle$ of the emergent states $|\psi_{A1L}\rangle$ and $|\psi_{A2G}\rangle$ are no more available in the state Avyaktham $|\psi_{A0}\rangle$ which exists as the superposition of all the constituent states including $|\psi_{A1}\rangle$ and $|\psi_{A2}\rangle$.

So the information transport equation representing the collapse of Self information entanglement the constituent states of superposition state Avyaktham $|\psi_{A0}\rangle$ from which the perceivable information in the current universe emerged can be written as;

the state

$$\begin{aligned} &\langle\psi_{A0}|E|\psi_{A0}\rangle +/- [\Delta I] - [\langle\psi_{A1L}|E|\psi_{A1L}\rangle - \langle\psi_{A1}|E|\psi_{A1}\rangle] - [\langle\psi_{A2G}|E|\psi_{A2G}\rangle - \langle\psi_{A2}|E|\psi_{A2}\rangle] = \\ &\langle\psi_{V0}|E|\psi_{V0}\rangle +/- [\Delta I] + \langle\psi_{V0(L)}|E_L|\psi_{V0(L)}\rangle + \langle\psi_{V0(G)}|E_G|\psi_{V0(G)}\rangle = \\ &\langle\psi_{V0}|E|\psi_{V0}\rangle +/- [\Delta I] + [\Delta L] + [\Delta G] \end{aligned}$$

Due to the transport of information Gunam Laghu and Gunam Guru in the corresponding emergent states $|\psi_{V0L}\rangle$ and $|\psi_{A2G}\rangle$, from the Superposition state Avyaktham $|\psi_{A0}\rangle$ to Emergence state Vyaktham $|\psi_{V0}\rangle$ which is always in self-information entanglement with the superposition state Avyaktham the emergent state Vyaktham $|\psi_{V0}\rangle$ which was simultaneously created, maintained and destroyed will be modified as,

$$\begin{aligned} &|\psi_{V0}\rangle + |\psi_{V0(L)}\rangle + |\psi_{V0(G)}\rangle \\ &\text{Since } |\psi_{A1(L)}\rangle = |\psi_{V0(G)}\rangle \text{ and } |\psi_{A2(G)}\rangle = |\psi_{V0(L)}\rangle \\ &|\psi_{V0}\rangle + |\psi_{V0(L)}\rangle += |\psi_{V0}\rangle + |\psi_{A1(L)}\rangle + |\psi_{A2(G)}\rangle \end{aligned}$$

Since the perceivable information of the state $|\psi_{V0(L)}\rangle$ as the expectation value $\langle\psi_{V0(L)}|E_L|\psi_{V0(L)}\rangle$ was emerged in Vyaktham due to the emergence of the unperceivable constituent state $|\psi_{A2(G)}\rangle$ containing unperceivable information as the expectation value $\langle\psi_{A2G}|E|\psi_{A2G}\rangle$ in Avyaktham as the result of gain in information ΔI from the state $|\psi_{A1}\rangle$ with expectation value $\langle\psi_{A1}|E|\psi_{A1}\rangle$, it is defined in Ayurveda as "Aadhya Bhootham Aakasham". Similarly the emergence of state $|\psi_{V0(G)}\rangle$ as the expectation value $\langle\psi_{V0(G)}|E_G|\psi_{V0(G)}\rangle$ was emerged in Vyaktham due to the emergence of the unperceivable constituent state $|\psi_{A1(L)}\rangle$ containing unperceivable information as the expectation value $\langle\psi_{A1L}|E|\psi_{A1L}\rangle$ in Avyaktham as the result of lose in information ΔI from the state $|\psi_{A2}\rangle$ with expectation value $\langle\psi_{A2}|E|\psi_{A2}\rangle$, it is defined in Ayurveda as "Aadhya Pathana Karanam Guru"⁷. From which all the gunas are derived and leads to the formation of Pancha Maha Bhutas (PMBs) and Dravyas^{1,2}.

The Gunam called as Laghu and Guru originated through the process of emergence of Vyaktham from Avyaktham is the minimum amount of mass required for a quantum matter of any dravyam. So it is proved that any perceivable matter existing in the universe must have a mass equal to the quantum information stored in the quantum matter of Gunam "Laghu" and "Guru". Hence the Yang Mill mass gap is proved to be the equivalent of mass of the information bound in the pure quantum states in unperceivable "Avyaktham" or that of "Laghu" or "Guru". The detailed proof is given below based on the formalism adopted from Samkhya Philosophy and by applying the correction to the axiological and ontological context of "Zero" and "Infinity"⁹.

6. Redefining number Zero (0) and infinity (∞) as a logical operator to correct its ontological and axiological context based on "Nyaya" and "Sankhya" philosophy

Zero is invented by practitioners of Bharatheeya Knowledge Systems based on the Philosophy of Sankhya Sutra⁹. In Sankhya Sutra numbers or Sankhya is considered as rupam. According to Sankhya Philosophy Gunam or its permutations or combinations emerged as rupam can be perceived and represented as "Sankhya" or number thus identified as an equivalent to a countable entity¹⁰. This was represented as the language of logic known as "Ganitham". "Ganitham" is equivalent to the conventional term "Mathematics" used in modernity. According to Sankhya philosophy the Ganitham is defined as the discussion or "Bhashya" of "Yukthi" or operational logic. Which means Ganitham is the language of logic or "Yukthi Bhashyam"¹⁰. In this Sankhya philosophical perspective, the zero (0) is used to represent the absence of gunam, similarly infinity (∞) is used to represent the unperceivable gunam or information bound in the pure quantum states in Avyaktham existing in the condition of maximum entropy $S=S_{Max}$. In this context we apply the correction to western misrepresentation of the ontological context of zero and reset it to its original ontological and axiological context of Sankhya Philosophy. Hence the process of equating the value of zero (0), only to mathematical operations without considering its ontological context gunam is illogical. This illogical representation of truth or information led to the misrepresentation of Zero(0) of Nyaya Philosophy as just a number or value by the practitioners of conventional science. The tarka sangraha and yukthi bhasha also provide the same notion of ontological context to the usage of Zero¹⁰. So in Bharatheeya Knowledge System based frame work we assign zero as a logical operator used for transformation operations carried on the surface of a topologically invariant 2D Poincare Sphere holding a canonical ensemble system which is information invariant and represent the absence of guna or rupam. Now consider a mathematical equation which represents the fundamental operations and the set of these fundamental operations are the subsets of the universal set comprised of all the information invariant or topologically invariant operations, then zero can be considered as the absence of that Gunam or Information or quantum matter or physical component. In such conditions Multiplication of any number or term with zero will yield the same number or term since zero represent the absence of the corresponding component. So, we can just remove that component from the equation and process the mathematical or logical operations of the remaining terms. Similarly, the infinity operator can be kept aside from all the operations and can be used in the result of the mathematical operation in the logical context. Thus, the component with value infinity (∞) can be considered as unperceivable or noncomputational and remaining operations can be completed based on the logical operation of that particular gunam or information which is assigned with the value (∞).

7. Yang-Mills Mass Gap

Now we identified that the mass equivalent of information in the pure quantum states in Avyaktham is equal to the rest mass of quantum particle or quantum matter at absolute zero. We computed the value of this mass according to the Sankhya Sutra philosophy in which number zero represent the rupam or entity that can be counted. This provide a formalism that temperature zero can be equated to a operational condition that no "Tikshna" Gunam or "Agni" or temperature which is the conventional misrepresentation of the Gunam Tikshna or Agni Bhuta is existing in the Bharatheeya Knowledge Systems⁷. In this regard we cannot mathematically use the conventional operation of "Zero" such that multiplying a number with zero will give an algebraic value. Applying this Nyaya or logic the rest mass of the quantum particle at speed of light can be calculated as follows,

Based on the Launder principle and mass-energy-information equivalence (MEIE) principle by Melvin M^{11,12}. Vopson the mass of a bit of information m_{bit} is computed by the formula (1) given below,

$$m_{bit}=(K_b \times T \times \ln(2)) / (c^2)$$

at absolute temperature $T=0$ Kelvin applying the zero as a operator to represent the absence of temperature we can re write the equation as ,

$$m_{bit}=(K_b \times \ln(2)) / (c^2)$$

here m_{bit} is the rest mass of the quantum particle i in its pure quantum states at the speed of flight of the quantum matter of light at $c = 299792458 \text{ m/s} \approx 3 \times 10^8 \text{ m/s}$

k_b is the Boltzmann constant, $k_b = 1.380649 \times 10^{-23} \text{ J/K}$

Then $m_{bit} = (\ln(2) \times 1.380649 \times 10^{-23}) / (3 \times 10^8)^2$, since zero is assigned as the operator of guna value zero means no Tikshna guna or Agni Bhuta exists. So it is irrelevant in the mathematical or topological operations on the surface of topologically invariant 2D Poincare Sphere.

So m_{bit} can be computed by removing the temperature component from the MEIE equation as, $(9.5699296 \times 10^{-24}) / (3 \times 10^8)^2$

now $m_{YM} = m_{bit} \approx 1.06 \times 10^{-41} \text{ kg}$ at $T=0\text{K}$

Thus the rest mass of a particle flying with a speed of light or near to that have a positive mass which is equivalent to or more than $m_{YM} = m_{bit} \approx 1.06 \times 10^{-41} \text{ kg}$.

This mass can be considered as the mass of the quantum matter formed due to the conversion of matter into quantum matter due to the acceleration of mass m at the speed near to light. We hereby provided the solution to the Yang-Mills mass gap as mass equivalent to or more than $m_{YM} \approx 1.06 \times 10^{-41} \text{ kg}$ (The information exchanged between the two nearby quantum states in Avyaktham)

When the information in the pure quantum states become unperceivable then the above equation can be reconsidered as given below,

when $c=0$ at $T=0$, by applying original ontological and axiological values of the term Zero(0) we can rewrite the equation $m_{bit} = (k_b \times T \times \ln(2)) / (c^2)$ as $m_{bit} = (k_b \times \ln(2))$,

Then $m_{YMA} = 9.536 \times 10^{-24} \text{ kg}$ at $T=0\text{K}, C=0$ (mass associate in pure quantum states in Avyaktham)

By considering the value of temperature as $T=2.73\text{K}$, which is computed from the temperature of the cosmic microwave background then m_{YMCB} can be computed as given below,

$m_{YMCB} = (k_b \times T \times \ln(2)) / (c^2)$ then,

$m_{YMCB} = 2.91 \times 10^{-40} \text{ Kg}$ (can be assigned to mass holded in the quantum states of Gunam "Laghu"). This mass is in the close range of mass calculated by "Mr.Edward Bormashenko" using methods provided in Landauer principle. He identified it as the estimation of the minimal mass of the particle allowing the recording/erasure of information within the surrounding medium at temperature T at 2.73K . But failed to accommodate the original axiological aspect of "Zero".

We computed the mass of Quantum matter corresponding to Gunam "Lagu" using the equation $m_{YML} = (9.536 \times 10^{-24} - 1.06 \times 10^{-41}) \text{ Kg}$. In a similar method the mass of the Quantum matter corresponding to Gunam "Guru" can be computed by the equation

$$m_{YMG} = (9.536 \times 10^{-24} + 1.06 \times 10^{-41}).$$

For the first time in the world we hereby confirmed that the quantum particle travelling at a speed near to or equal to the speed of light will have a positive rest mass and is equal to the Yang-Mills positive rest mass $m_{YM} = m_{bit} \approx 1.06 \times 10^{-41} \text{ kg}$. Hence the Yang-Mills existence and mass gap problem is solved.

8. Conclusion

We derived the Yang-Mills's mass gap $m_{YM} = m_{bit} \approx 1.06 \times 10^{-41} \text{ kg}$ from the Quantum Information Transport equation by applying the Nyaya or logic provided in Sankhya school of philosophy available in the Bharatheeya Knowledge Systems. Sankhya philosophy deals with the Samkhya or number which is originally developed based on the rupam or the one which can be counted. This is mentioned as one of the gunas in Paradi gunas of the quantum matter of manas. Thus, after the invention of "zero" or sunyam and "infinity", we hereby revisit and reset its philosophy to its original ontological and axiological context based on the philosophy of Gunam. The actual synthesis of "sunyam" or zero can be identified from the context of representing the abhavam of a gunam and numbers 1 to 9 to represent 9 types of gunas emerged with respect to the first perceivable Gunam "Laghu" originated due to the process of emergence of perceivable information "Vykhtham" from unperceivable information "Avyaktham". Conventional science misused or

misrepresented these Samkhya formalism for other numerical representations and placed it in an entirely different axiological and ontological context. This misappropriation caused a lot of dogma in the later stage of development of conventional science and its philosophical derivatives. In this regard we provided a new approach to use the language of logic for better understanding of the unperceivable information in “Avyaktham” through the perceivable information in “Vyaktham”. We strongly believe that this work will provide new strategies and methods to understand the emergence of complex systems and scientific aspects of the origin of natural cognition and biological roots of consciousness¹⁵.

Competing interests: The authors declare no competing interests. The data provided in this manuscript and theoretical and experimental correlation of origin of universe and emergence with epistemological, ontological and axiological aspects of Bharatheeya Knowledge Systems is done only due to the academic interest and purpose of reinstating the research in the domain of Bharatheeya Knowledge Systems. The time frames mentioned in the phenomenological frame works has to be further revalidated using astro archeological surveys and data analysis.

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