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# Origin of Emergence of Perceivable Reality “Vyaktham” from Unperceivable Information “Avyaktham” with Axiomatic Definitions Based on the Philosophy of Bharatheeya Knowledge Systems: A Never-Ending Cyclic Loop of Information Transport over a Topologic

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Posted Date: 4 January 2024

doi: 10.20944/preprints202401.0207.v1

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Article

# Origin of Emergence of Perceivable Reality “Vyaktham” from Unperceivable Information “Avyaktham” with Axiomatic Definitions Based on the Philosophy of Bharatheeya Knowledge Systems: A Never-Ending Cyclic Loop of Information Transport over a Topologically Invariant Two Dimensional Poincare Sphere

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**Abstract:** For the first time in the world, we provide a phenomenologically verifiable proof for the validation of origin of universe and perceivable reality from the unperceivable information based on Ayurveda. We also provide axiomatic definitions for the terminologies used to provide the theoretical framework for the same based on Bharatheeya Knowledge Systems. The presented manuscript provides a correlation between quantum information transport and emergence of gunam “Laghu” and gunam “Guru”. We identified that this point of emergence can be considered as the origin point in the continuous process of generation of Perceivable Reality “Vyaktham” from Unperceivable Information “Avyaktham”. In this context we can consider the unperceivable information in “Avyaktham” as dark matter. So, we must develop methods like gunascopy or informationscopy to understand the types of information imbibed in in the quantum matter of a dravyam to understand its real physico-chemical-biological and information state of the matter. This is possible through the assessment of Dravya Guna aspects and panchabhootha tatwas of the dravyas. We strongly believe that this work will pave a road towards exploring the new frontiers of reality and universe through human cognition.

**Keywords:** quantum information; emergence; complex system; gunam; Ayurveda; phenomenology

## 1. Introduction

In modernity science caused the separation of mind and body and provided more value to mind than the body. Due to this the modern human beings now only have the capacity for impaired cognition. The literates learn from words and illiterates learn from worlds. The first one is mere a process of mere accumulation of information and the second one is the natural cognition. Even though science is a human construct it lost its experiential cognition part and become only a product of mind<sup>1</sup>. The big limitation of the current humanity is that the modern mind cannot comprehend the non-computational aspects of existential knowledge. Which leads to the process of partially

cognizing the phenomenological frames works of complex systems like universe, life, and its emergence. The current empirical approach followed by all the top-notch research laboratories across the globe are miserably failing in solving and understanding the foundational problems by adding more technical data to the available bigdata and make it more complex to understand, comprehend and even process the derived data with proper correlation. If we convert all the processes in this universe with its functional behaviours it will not be computable using even with the most advanced quantum computers. The methods followed by the practitioners of current conventional science is not matured enough to understand the complex systems and its emergence in its full meaning. So even after such massive technology incubation conventional science become stand still with lot of conjectures and conundrums. As a result of this the current standard physics is flooded by various problems. These problems are fundamentally connected with the philosophy of science and theories represented as reductionism, materialism, determinism, and locality. Thermodynamics, special relativity, and general relativity are also standing on questionable postulates and definitions. In thermodynamics second law in its recent form and the assumption about fixed arrow of thermodynamical time can be questions since it is hard to understand biological evolution in this framework. Clearly, the relationship between the geometric time of physics and experienced time is poorly understood. In general relativity the beautiful symmetries of special relativity are in principle lost and by Noether's theorem this also means the loss of classical conservation laws, even the definitions of energy and momentum are in principle lost. In quantum physics the basic problem is that the non-determinism of quantum measurement theory conflicts with the determinism of Schrödinger equation. Standard model is believed to summarize the recent understanding of physics. The attempts to extrapolate physics beyond standard model are based on naive length scale reductionism and have products Grand Unified Theories (GUTs), supersymmetric gauge theories (SUSYs). The attempts to include gravitation under same theoretical umbrella with electroweak and strong interactions has led to super-string models and M-theory. These programs have not been successful, and the recent dead-end culminating in the landscape problem of super string theories and M-theory could have its origins in the basic ontological assumptions about the nature of space-time and quantum.

Even though theories like TGS, MEI and AT are evolved to fill these knowledge gap of science, still it lacks an empirical validation either through experimental frame works or phenomenological frame works.<sup>2,3,4</sup> Also the foundation equations on which these theories are built is also questionable. The philosophers developed these theories used excellent assumptions and initial conditions which are fundamentally derived out of a reductionist view resulted out of human cognition. For example, in TGD model the transcendentals are outside of computationalism and Matti consider that it is also beyond cognition<sup>2</sup>. Due to the limitation of TGD model the noncomputational aspects can't be accommodated in this model and due to this it became more vulnerable in the scenarios like developing an experimental test model of universe as a complex system using this theory. Also, TGD fails to propose any experimental model to evaluate and verify it, which means testing TGD in the context of perceivable universe falls under the nomenclature of Gedanken experiments. In a similar fashion MEI theory and negentropy concepts are theoretically looks very promising but in reality the theoretical framework consider the information as mere bits doesn't address the fundamental issues involving noncomputational aspects of the real time problems like functional emergence as a derivative of information dynamics. The MEI theory also doesn't provide any clear mechanism or experimental model to test the transformation of information to mass or energy. Also, it fails to demonstrate the process of how the intrinsic information providing the fundamental characteristics of elementary particles is stored as a fixed, quantifiable and computable value in its elementary particle with non-zero rest mass<sup>4</sup>. The assembly theory stands very parallel to the process of formation of matter defined in the philosophy of ayurveda. According to assembly theory the concept of object is finite, is distinguishable, persists over time and is breakable such that the set of constraints to construct it from elementary building blocks is quantifiable<sup>3</sup>. But the divisibility of fundamental unit of matter is against the standard model of existing science. Also, assembly theory recognizes the smallest unit of matter is typically defined by the limits of observational measurements, this

formalism makes it more rigorous to understand in terms of phenomenological frame works or real-life experimentations. The universal concept to treat objects as anything that can be broken and built put forward by assembly theory is not applicable in predicting the origin of emergence. Even though assembly theory can naturally account for how the emergent objects are produced by evolution and selection it fails to define the origin of building blocks which are the foundations to emergence of objects in assembly pool. All these models are considering information as the basic aspect of the model complex systems and its emergence. But these theories are halfway done and open up more complex arenas which are difficult to cognize and not possible to experimentally verify. In this scenario for the first time in the world we develop and extrapolate the standard philosophy of Ayurveda as a model for experimentally verifiable complex system and its associated emergent phenomena<sup>5</sup>.

## **2. Ayurvedic Systems of Medicine: An experimentally verifiable model of complex system and emergence**

The indigenous people lived in the geographic domain called Bharatham developed knowledge systems named as Vedas through accumulation and consolidation of experiential knowledge. These outcomes of natural cognition happened over a period of lakhs of years are periodically consolidated after finetuning based on the philosophical frameworks available during those time periods correspondingly. These naturally cognized knowledge systems are transferred to generations through orations designed in a specific and systematic way. After a long period, this oral knowledge transition is reduced into written scripts later known as Vedas. The Vedas are the key pillars of Bharatheeya Knowledge Systems, originated and evolved along with the humanity lived in the geographic space of Bharatham. Ayurveda is defined as the knowledge of life, and it is an upaveda of one Veda called Atharvaveda. The currently available form of Ayurveda is a whole system medicine consolidated by Dhanvantari II (10960 BCE) who was a descendant of Ayu and disciple of Bharadwaj<sup>5</sup>. Contrary to the reductionist methodology of the current science, Ayurveda is rooted in the totality approach where all factors and elements of the universe and biological system are relevant in providing solutions to the wellbeing and sustainable health of the system.

The frame work of Ayurveda is based on the gunas, panchaboothas, three doshas and shadrasas can be correlated to the phenomenological approach in understanding human health through macroscopic level of body, organ, tissues ; mesoscale level of cells , organelles and proteins; nanoscale and atto scale levels of biomolecules, motifs and the quantum matter scale of information or guna driven interactions in the systems<sup>6</sup>. This phenomenological method can be used as a model to understand the complex system and its emergence<sup>6</sup>.

## **3. Axiomatic Definitions**

### *3.1. Axiomatic definition of Complex systems*

Axiom 1: A system is a nonempty ensemble AV of interconnected entities, and their interconnections, which together form an integrated whole exhibiting distinctive behaviour or meaning from those of its individual components.

Axiom 2: It is defined that a system is said to be complex if there is a bidirectional non-separability between the information carried by the parts and the information provided by the whole. Then, not only the information carried by the whole is determined by the constituent parts, but also the information of the parts is determined by the whole due to the interactions as transformers of the nature of the interacting objects and of the whole formed by them.

### *3.2. Axiomatic definition of Emergence*

Axiom 1: Emergence is a phenomena or generation of information happens due to the existence or formation of information or collective behaviours of the individual parts of the system.

### 3.3. Axiomatic definition of Phenomenology

Axiom 1: Any experiential knowledge can be meta cognized based on the frame of events or phenomena exists in a specific time and space. The process of capturing these events or phenomena as either static or dynamic frame and meta cognizing the complete information of that framework to understand its perceiver aspects is called phenomenology.

### 3.4. Axiomatic Definition of Quantum Information

Axiom 1: Let  $\Delta P$  be the Kanadhan wave function represented as a point  $\Delta P$  on a topologically invariant 2D Poincare sphere  $P$  such that the 2D Poincare sphere  $P$  can be visualized as a circle on a plane, and the centre of this circle would correspond to the state of fully coherent superposition state of all the quantum states exist in the system such that at  $P = \Delta P = \Delta H$  where  $H$  is a Hilbert Space, also consider  $E$  as self-adjoint operator on  $\Delta P$  representing a yes/no question<sup>7,8</sup>. Then, A quantum state  $\psi$  existing on topologically invariant 2D Poincare sphere  $P$  is completely characterized by the set of answers of all possible yes/no questions called Kshethram . That is, by the expectation values of all self-adjoint operators on  $P$ . Mathematically  $\psi$  is determined by  $\langle \psi | E | \psi \rangle$  for all  $E$ , where Kshethram  $E$  ranges over all self-adjoint operators on  $H$  represented as a point on  $P$ .

Information as a Difference in Expectation Values:

Axiom 2:

Now, consider a quantum system initially in state  $|\psi_{A1}\rangle$ . Suppose its state changes to  $|\psi'_{A1}\rangle$  due to Self-Information Entanglement. 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  $\Delta I$  represent how the information about the emergence of Kshethram  $E$  changes due to the change in the quantum state.

This difference in information  $\Delta I$  is perceived as the "information" gained or lost due to the change in the state.

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  $\Delta I$  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.

Consider the Kanadhan operator is an infinite-dimensional nonlinear operator that acts on functions of the information state. The Kanadhan operator can be represented by  $K_i$  where  $i$  is the information. For a function  $g$  on the state space, the Kanadhan operator emerges it over information according to:

$$K_i g(x) = g(f_i(x))$$

Here,  $f_i$  is the emergence operator or emergence map associated with the emerging system existing on topologically invariant 2D Poincare sphere. The expectation value of a function  $g$  with respect to a probability measure  $\mu$  is given by:

$$E_\mu[g] = \int g(x) d\mu(x)$$

Now, if we have two functions  $g$  and  $h$  on the state space on topologically invariant 2D Poincare sphere surface, the sum of their expectation values is:

$$E_\mu[g+h] = \int (g(x)+h(x)) d\mu(x)$$

we can express this in terms of Kanadhan operators, as:

$$E_{\mu}[g+h]=\int(Kig(x)+Uth(x)) d\mu(x)$$

This is a general expression for the sum of expectation values of Kanadhan functions over a probability measure  $\mu$ . The specific form of the integral and the emergence operator depends on the details of the dynamical system called Kshethram under consideration.

### 3.5. Axiomatic definition of Avyaktham

Axiom 1: Avyaktham 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.

Axiom 2: Let  $\Delta H$  be the quantum of Kanadhan wave function represented as a point  $\Delta P$  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  $P^{7,8}$ . 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.

### 3.6. Axiomatic definition of Vyaktham

Axiom 1: The state  $|\psi_{v0}\rangle$  Vyaktham is defined as the quantum state emerged from the superposition quantum state Avyaktham represented as  $|\psi_{A0}\rangle$ , through the process of self-information entanglement between the states  $|\psi_{A0}\rangle$  and  $|\psi_{v0}\rangle$ .

In the self-information entanglement process the information  $\Delta I$  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 Avyaktham.

### 3.7. Emergence of Unperceivable Vyaktham from Unperceivable Avyaktham:

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.;

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

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 can't 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.

Now, consider two quantum systems in Avyaktham  $Q_{A0}$  and  $Q_{V0}$ , such that the corresponding quantum states are represented as  $|\psi_{A0}\rangle$  and  $|\psi_{V0}\rangle$ . Since the system is existing in the maximum entropy condition  $S_{max}$ , the state  $|\psi_{A0}\rangle$  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  $|\psi_{Ai0}\rangle$  with corresponding coefficients  $\alpha, \beta, \gamma, \delta, \dots, n$  i.e; at  $S_{max}$  the probability is  $|\alpha|^2 = |\beta|^2 = |\gamma|^2 = |\delta|^2 = \dots = |n|^2 = \infty$ . Also, the state  $|\psi_{V0}\rangle$  is defined as the quantum state Vyaktham emerged from  $|\psi_{A0}\rangle$  the superposition quantum state, through the process of self-information entanglement between the states  $|\psi_{A0}\rangle$  and  $|\psi_{V0}\rangle$ . In the self-information entanglement process the information  $\Delta I$  is lost from the superposition state  $|\psi_{A0}\rangle$  Avyaktham and as a result, the state  $|\psi_{A0}\rangle$  Avyaktham is transformed into an emergent state of  $|\psi_{A0}\rangle$  Avyaktham represented as  $|\psi_{V0}\rangle$  Vyaktham.

In a self-information entangled system the information lost from state  $|\psi_{A0}\rangle$  Avyaktham is simultaneously fed back to the system  $|\psi_{A0}\rangle$  Avyaktham from the emergent state  $|\psi_{V0}\rangle$  Vyaktham, such that the emergent state known as Vyaktham is simultaneously generated and destroyed due to the continuous and simultaneous quantum information transport mutually happening between  $|\psi_{A0}\rangle$  Avyaktham and its emergent state  $|\psi_{V0}\rangle$  Vyaktham. As a result, the change in expectation values of the superposition quantum state  $|\psi_{A0}\rangle$  Avyaktham due to self-information entanglement phenomenon can be computed as,

$$\Delta I = \langle \psi_{V0} | E | \psi_{V0} \rangle - \langle \psi_{A0} | E | \psi_{A0} \rangle = 0 \text{ at } S_{Max}$$

since  $\Delta I = \Delta M$  at  $S_{max}$  and  $S = S_{max}$  at  $0 K$ ,  $\Delta I = \Delta M = 0$  at  $0 K$  and  $S_{max}$

this difference  $\Delta I$  is seen as the "information" or  $\Delta M$  mass gained or lost due to the change in the states. If the expectation value remains unchanged ( $\Delta I = \Delta M = 0$ ), then from the perspective of the perceivable Kshethram  $E$ , no information about the system has been gained. Due to this even though the states  $|\psi_{A0}\rangle$  Avyaktham and its emergent state  $|\psi_{V0}\rangle$  Vyaktham are existing in Avyaktham, both will become unperceivable. This phenomenon is called as unperceivability of the superposition quantum state  $|\psi_{A0}\rangle$  Avyaktham and the quantum emergent state of  $|\psi_{A0}\rangle$  called as Vyaktham ( $|\psi_{V0}\rangle$ ) due to information invariance.

### 3.8. Emergence of Perceivable Vyaktham from Unperceivable Avyaktham:

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 ;

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

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

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

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  $\Delta I$  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  $|\psi_{V0}\rangle$  Vyaktham 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  $\Delta I$  lost from  $|\psi_{A1}\rangle$  is called as Guru.

### 3.9. Perception of directly Unperceivable Avyaktham through the 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  $\Delta I$  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 Guru.

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  $\Delta I$  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 Vyaktham.

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,

$$|\psi_{V0}\rangle + |\psi_{V0(L)}\rangle + |\psi_{V0(G)}\rangle$$

Since  $|\psi_{A1(L)}\rangle = |\psi_{V0(G)}\rangle$  and  $|\psi_{A2(G)}\rangle = |\psi_{V0(L)}\rangle$

$$|\psi_{V0}\rangle + |\psi_{V0(L)}\rangle + |\psi_{V0}\rangle + |\psi_{A1(L)}\rangle + |\psi_{A2(G)}\rangle$$

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  $\Delta I$  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  $\langle \psi_{V0(G)} | E_L | \psi_{V0(G)} \rangle$  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  $\Delta I$  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"<sup>5</sup>.

### 3.10. Axiomatic Definition of Quantum Matter

Axiom 1: Quantum matter of a dravyam is defined as the confined systems composed of many interacting quantum states holding same type of quantum information distributed on surface of topologically invariant 2D Poincare sphere. The behaviour of this entire quantum matter is an emergent phenomenon due to the mutual interactions of the emergent behaviours of the constituent quantum states holding corresponding information by which the quantum matter is made up of.

Axiom 2: In quantum matter, the gunas of the entire system emerges from the topological dynamics of the quantum systems or quantum states on the surface of topologically invariant 2D Poincare sphere and interactions between quantum states and gunas are emerged during the assembly or orientation of quantum states or quantum matter on different levels of curvature of the surface of the 2D Poincare sphere. The curvature of the surface of 2D Poincare sphere also influence and generate change in intensity levels or density of quantum states of corresponding gunas.

### 3.11. Axiomatic definition of time named as "Kaal"

Axiom 1: The emergence of Gunam Laghu and Gunam Guru will happen in such a way that the corresponding quantum states  $|\psi_{V0(L)}\rangle$  and  $|\psi_{V0(G)}\rangle$  with respective information  $\Delta L$  and  $\Delta G$ , will occupy the topologically invariant 2D Poincare space on the surface of a 2D Poincare sphere in Eight Directions called Ashtha Diks. The rate of emergence of the quantum matter of a dravyam by the topological arrangement of corresponding quantum states with respective gunas are called as Kaal or time. Since 8 directions are there 8 types of gunas will emerge from the fundamental gunas called as Laghu and Guru. Thus 10 types of Gunas are emerged in Vyaktham due to the various permutation and combination of fundamental gunas Laghu and Guru in Ashtha diks<sup>5</sup>. Thus, the fundamental measure of mass of time can be calculated as the mass of the information occupied on an area of 2D Poincare sphere by the smallest quantity of Quantum matter of Dravya holding the Gunas Laghu and Guru<sup>5</sup>.

### 3.12. Axiomatic Definition of Gunam

Axiom 1: The topological distribution of quantum states loaded or associated or entangled with its corresponding information on the surface of 2D Poincare sphere is called as the quantum matter of that specific dravyam. The information due to which the change in degree of freedom of these quantum states happens and results in the specific topological distribution of quantum matter is called as its gunam. The interaction between these quantum matter and gunam will make them available as an entity which is perceivable by human beings called as dravyam. The gunam imbibed in the dravyam can perform a specific set of functional operations and transportation of information is called as its karmam.

Axiom 2: Gunam of a dravyam can be perceived by human beings through a fundamental process called as indriyarthas sannikarsham<sup>9,10</sup>

Axiom 3: Gunam can be defined as the information which can generate a change in degree of freedom of topologically confined quantum states distributed over the surface of topologically invariant 2D Poincare sphere. These topologically confined quantum states holding specific and unique type of information called as "Gunam" is defined as the quantum matter of its corresponding dravyam.

Axiom 4: The processes involved in human perception of dravyam can cause a change or transformation in its gunam.

Axiom 5: 41 types of gunas are existing in this humanly perceivable universe. This nomenclature is based on the 41 types of topological distributions of quantum matter holding corresponding information which caused the change in degree of freedom of respective quantum states. 41 types of topologically invariant emergence of quantum matter from its corresponding quantum states are possible due to the permutation and combination of the information exchange processes between the quantum states during the generation of human reality(perceivable Vyaktham). The generation of human reality can be mapped by its respective phenomenological frames of quantum matter and

gunas on the surface of 2D Poincare sphere called as Poincare surface frame of event or Poincare surface frame of phenomenon.

Axiom 6: Gunas can undergo permutation, combination and transformation which causes emergence of gunas which results in emergence of different type and classes of dravyas and karmas.

### 3.13. Axiomatic Definition of Matter named as Dravyam

Axiom 1: The interaction between these quantum matter and gunam will make them available as an entity which is perceivable by human beings called as dravyam.

### 3.14. Axiomatic Definition of Karmam

Axiom 1: The gunam imbibed in the dravyam can perform a specific set of functional operations or actions or generate outcomes called as its karmam.

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10. Tarka Samgraha with Dipika of Sri Annambhatta

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