

Quantum Interpretation of Vedic theory of Mind: an Epistemological Path and Objective Reduction of Thoughts

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This brief paper argues about a possible quantum interpretation of Vedic Theory of Mind. Chitta, Manas, Buddhi and Ahamkara, in our quantum approach will be considered respectively as: common ground, quantum superpositions, observer (quantum collapsing) and measurement outcomes eigenvalues, Povm. We suggest that through the continue interactions between these four components, we are able to understand the formation of Ahamkara (Ego). Chitta (by vrittis) is linked to Manas via entanglement. The unsolved problem is the nature of Buddhi component and his right collocation in this process. Moreover, we argue that our approach can be supported by Zeilinger's interpretations of quantum mechanics. Finally, we will speculate about possible analogy between Chitta and Bohm's Holomovement.

Keywords: Vedic theory of Mind, quantum superposition, Zeilinger interpretation, Chitta, Holomovement

I. INTRODUCTION

The Samkhya is the oldest school of Hindu Philosophy, for it is the first attempt to harmonize the philosophy of the Vedas through reason. The Samkhya teaches that the phenomenal universe is considered as a dynamic order, an **eternal process of unfolding/enfolding**, without beginning or end. All has evolved out of an Uncaused cause which is not consistent with a rational solution. The Samkhya leaves the Uncaused cause undefined as being impossible to be conceived by the intellect. This absolute is beyond time, space and thought, it is without difference, attribute and form. True evolution, according to Samkhya system, does not exist in the phenomenal world, but only in the chain of causation from the cosmic substance (prakrti) to the gross elements (mahabhutas). According Kak's[1] work the Sankhya and the Yoga systems take the **mind** as consisting of five components:

- 1 Chitta
- 2 Manas
- 3 Buddhi
- 4 Ahamkara
- 5 *Paramatman → Atman → Purush ↔ Prakriti → Brahma → Jivatman

Manas is the **lower mind** which collects sense impressions. Ahankara (the **individual Ego**, which feels itself to be a distinct, separate entity) is the sense of I-ness that associates some perceptions to a subjective and personal

experience. Once sensory impressions have been related to I-ness by ahankara, their evaluation and resulting decisions are arrived at by **buddhi, the intellect. Chitta is the memory bank of the mind.** These memories constitute the foundation on which the rest of the mind operates. But chitta is not merely a passive instrument. The organization of the new impressions throws up instinctual or primitive urges which creates different emotional states. This mental complex surrounds the innermost aspect of consciousness, which is called atman, the self, or Brahman. In our approach, we will analyze first four entities in detail. **The set of entities in fifth component of mind is beyond the scope of current article.** However, concisely, our hypothesis is that entities **Paramatman is assimilable with the Bohm's Implicate Order** [2]. This is because this entity is in enfolded form and is the fundamental sub-quantum dual-aspect unified field; it pervades all Atmans and Prakriti. In the fifth component (Paramatman → Atman → Purush ↔ Prakriti → Brahma → Jivatman), the arrow → indicates that the entity on its right side is 'derivable' from that on its left side and ↔ refers to bi-directional interaction. Furthermore, Paramatman is 'quantized' in to Atmans, each of which pervades Prakriti. The entity Atman when it is in excited state with energy is called Purush, which when interacts with un-manifested (un-evolved) Prakriti (vacuum) is called Brahma, which, in turn is when embodied (after co-evolution and co-development) in an individual, is called Jivatman [3]. However, this type of successive step-by-step derivation seems to be metaphysical-view dependent and appears to be designed for 'dualism from eastern perspective' (Dvait Vedanta) and/or neutral monism (Advaita Vedanta). To make Vedic theory of mind (VTOM) 'independent of' or 'not committed to' any metaphysical-view, we might need a minor modification as follows: (Paramatman → ParamPurush/MahaPurush

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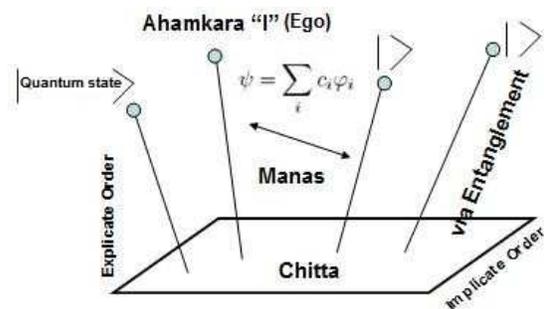
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↔Prakriti→ParamBrahma→Atman/Jivatman)). In other words, one can investigate if such modification will allow VTOM to be applicable to all views including materialism. For example, in the case of materialism, we have implicitly assumed that 'Paramatman → Param-Purush/MahaPurush' plays a role of say perturbation in Prakriti in string theory, which is then eventually capable of creating SEs including self (Atman/Jivatman) in humans and animals. In such modification, Paramatman when it is in excited state with energy can be called ParamPurush or MahaPurush, which when interacts with un-manifested (un-evolved) Prakriti (vacuum) is called ParamBrahma. Then, long after Big Bang or Big Bounce (perhaps during Cambrian evolutionary explosion about 540 millions years ago [4,5] the mental aspect of ParamBrahma is 'quantized'¹ in to Atmans (also called Jivatmans) by the process of co-evolution, co-development, sensori-motor tuning, and embodiment in an individual. Jivatman is also called self or subjective experience of subject [6]. Unfolding or Explicate Order starts when MahaPurush/Purush and Prakriti interact with each other (or 'Prakriti is infused/joined with Purush') and ParamBrahma/Brahma starts 'creation' at the onset of classical Big Bang or quantum Big bounce; for further detail see [7]. Eventually, after a long period of co-evolution and co-development, Brahma is embodied in an individual subject, which is then called Jivatman. The embodied entity Jivatman interacts with entities Chitta, Manas, Buddhi, and Ahamkara (the topic of current article). Furthermore, in previous article [29], the empirical data of samadhi state was interpreted in terms of various metaphysical views and science, especially with respect to the dual-aspect dual-mode optimal framework. In addition, it was argued that there is a need for a new Veda in Vedic science (perhaps, it can be called "Vigyan Veda"), which is close to science (=Vigyan), such as neuroscience and quantum physics. The Vigyan Veda tries to remove "the inconsistencies and speculative hypotheses related to consciousness research from Vedic science that includes ancient four Vedas (Rigveda, Yajurveda, Samaveda, and Atharvaveda) " [29]. In [31] subjective experiences (SEs) are derived from a protoexperience and three gunas (qualities: Sattva, Rajas, and Tamas guna) of Vedic science in the dual-aspect-dualmode framework with hypothesis H₂ [13]. The current article can be considered another chapter of Vigyan Veda.

¹. Here, the term 'quantized' is used metaphorically and needs unpacking because it could be different from say the 'quantization' of materialistic classical electromagnetic field in to quantum electrodynamics to change the description of a physical system from classical to quantum-mechanical.

Vedic theory of Mind	Quantum Representation
Chitta	Common Ground (via entanglement to Manas)
Manas	Quantum Superposition (vrittis from Chitta)
Buddhi	Observer (collapse ψ)
Ahamkara "I"	Measurement result

FIG.1: Table of correspondences (see DetailsPag.8, Fig.5)



- Chitta as common ground.**
- Chitta is assimilable with Holomovement.**
- Chitta is linked via entanglement to Manas.**
- Manas as quantum superposition.**
- Ahamkara "I" as quantum measurement process.**
- Buddhi as observer.**

FIG. 2: Our pathway

II. OUR PATHWAY

In order to support our main thesis, we have drawn two pictures. On the basis of the tables 1 and 2 (see respectively Fig.1 and Fig 5, pag.8), we have drawn FIG 2. As we see, the role of Chitta is fundamental, it is the common ground. We suggest that Chitta is linked

via entanglement with Manas. Manas is represented by quantum superpositions of phase-entangled thought-waves arising from Chitta. According to this view, **the Ahamkara is built time by time through Buddhi's choices (i.e., collapse)**. According to [8], "Notice how the stream of thoughts, [emotions, images, and impressions] comes from somewhere, and then recedes back into that same place. This place is Chitta. [...] Ahamkara is the sense of "I-am-ness," the individual Ego, which feels itself to be a distinct, separate entity. It provides identity to our functioning, but Ahamkara also creates our feelings of separation, pain, and alienation as well. Ahamkara is the strong wave that declares "I am". Ego can have negative energy (such as in aversion) or positive energy (such as Sankalp shakti or energy of determination) [8]. **Concisely, Chitta is continuously emitting Vrittis (are thought waves in vedic tradition) towards Manas who acts on them.** This process leads to the superposition of phase-entangled thought-waves and subjective experiences (SEs) embedded in neural-networks via developmental neural Darwinism and sensorimotor interaction and tuning [5, 9–13] as Manas. To sum up, we have:

- 1 Chitta (the ground)
- 2 Vrittis arise from Chitta (via entanglement)
- 3 Manas act on them by Buddhi's choice (collapse)
- 4 Ahamkara is built as quantum measurement outcomes.

The Waves of vrittis (that arise from Chitta) is an information from outer world, we will see that this information is **the same concept** utilized in Zeilinger's interpretation of quantum mechanics. In the last section, we will see that the ground (Chitta) is assimilable to Bohm's Holomovement which has no space-time structure (our previous work).

III. QUANTUM SUPERPOSITION OF THOUGHT WAVES AND SE(S) AS MANAS.

As we know, in the standard interpretation of quantum mechanics, the essential difference of quantum mechanical concept of reality from usual classical

² According to [9] "Nature provides seven groups of self-protective energies (rakshaseeya saktiyan: RS) to protect an individual system: desire (kama), anger (krodha), ego (mada), greed (lobha), attachment (moha), jealousy (eershya), and selfish-love (swarthmay prem). Each of these has both positive and negative aspects. Positive aspects are useful and lead to individual progress, whereas negative aspect lead to suffering and war when two or more people interact as in a family, a society, a nation, or a world. Negative aspects must be sublimated (converted) into compassion, humility, and love to minimize suffering and war and to maximize happiness and peace." Thus, one could argue that Ahamkara can be unpacked in to 7 RS.

reality is that in quantum mechanics the properties of material systems, as they are observed in a measurement, may not exist **before** the observation (measurement process). In the context of Vedic theory of Mind³ means that **without Buddhi component Chitta is not perceived**. We show a simple example of quantum superposition. To see how this plays out in real physics, consider the quantum superposition:

$$\psi = \sum_i c_i \phi_i$$

in case of simple quantum superposition of two eigenstates ϕ_1, ϕ_2 , we find the following state of the particle before the measurement: $\psi = c_1\phi_1 + c_2\phi_2$, this superposition of states is localized correspondingly in in A_1 and A_2 . According to reduction postulate the system having been previously in the state ψ goes over into one of the states ϕ_1 and ϕ_2 , with the corresponding probabilities $|c_1|^2$ and $|c_2|^2$. Thus, before the measurement we do not know where this particle is located; it could be at A_1, A_2 , or both. This postulate corresponds to what is observed in real measurements, the reduction postulate is accepted as the basis for the quantum-mechanical calculations. In our approach, **the Ahamkara component of Vedic theory of Mind is represented by eigenvalues (or Povm)**⁴. For example, 'I experience redness of red-rose'.

IV. ZEILINGER'S INTERPRETATION OF QUANTUM MECHANICS: REALITY AS INFORMATION

Recently, with the development of quantum information theory, several scientists have given to the information a fundamental role in the description of the Nature. Quantum information theory has led to new way to look at the foundations of QM, including a greater emphasis on possible role of subjective probability [15] in QM. Several works claims that the quantum mechanics can be viewed as an information theory. These works states that the description of physical systems in terms of information and information processing, is the only way to describe physical system. For instance, according Bub's words [16]:

I argue that quantum mechanics is fundamentally a theory about the representation and manipulation of information, not a theory about the mechanics of nonclassical waves or particles. The notion of quantum information is to be understood as a new physical primitive.

³ In this article, the term 'theory of Mind' includes theories of 'my own mind' and 'others mind'.

⁴ POVM = Positive Operator Valued Measure: <http://en.wikipedia.org/wiki/POVM>

Concisely, the information is taken at ontic level. We are interested to illustrate Zeilinger's position as an evidence. His thesis is quite simple [17]:

"The discovery that individual events are irreducibly random is probably one of the most significant findings of the twentieth century, even for single particles, it is not always possible to assign definite measurement outcomes independently of and prior to the selection of specific measurement apparatus in the specific experiment. For this reason, the distinction between reality and our knowledge of reality, between reality and information, cannot be made".

All these approaches (called quantum theoretic description of physical systems) start in general from the assumption that we live in a world in which there are certain constraints on the acquisition, representation, and communication of information. According these approaches, the description of physical systems in terms of information and information processing, is complementary (or the only way) to the conventional description of physical system in terms of the laws of physics. The notion of quantum information is to be understood as a new physical primitive. The primitive role of the information seems to explain, according some authors, the deep nature of physical reality. In this framework, the description of a quantum state is a description of the **information possessed by the observer about the system.** According to Zeilinger and Brukner [17] the information⁵ is the most fundamental notion in quantum mechanics. Based on this observation they suggest new ideas for a foundational principle for quantum theory. They proposed, that the foundational principle for quantum theory may be identified through the assumption that the most elementary system **carries one bit of information only**. Therefore an elementary system can only give a definite answer in one specific measurement. The irreducible randomness of individual outcomes in other measurements and quantum complementarity are then necessary consequences. Moreover, they affirm that the objective randomness of the individual quantum event is a necessity of a description of the world in view of the significant influence the observer in quantum mechanics has. In other words, the quantum level can be considered as subjective because of **observer's choice**. Starting from these premises the Buddhi component assumes

⁵ According to [14] and [5, 10–13], information can have dualaspect: mental and material.

the role of observer, his choice⁶ causes the collapse, thus causes Ahamkara. Moreover, we suggest that Zeilinger's interpretation give us only an apparent randomness of measurement outcomes but only in the explicate order.

V. THE CENTRAL ROLE OF BUDDHI COMPONENT

The central role of Buddhi, is supported by Zeilinger's interpretation of quantum mechanics. The Buddhi component by his continue choices is able to build time by time the Ahamkara. In general, the five components of mind, namely, (i) Chitta, (ii) Manas, (iii) Buddhi, (iv) Ahamkara, and (v) Paramatman→Atman→Purush→Prakriti→Brahma→ Jivatman or Paramatman→ParamPurush/MahaPurush→Prakriti

→ ParamBrahma→ Atman/Jivatman' are not well defined in literature including Rig-Veda, and have overlapping meanings/attributes; and various Vedic scholars use these terms and their interactions differently. For example, see [8]. Chitta, Manas, Buddhi, and Ahamkara are not fundamental entities and lack inherent existence. Therefore, according to Nagarjuna, there is no causation (Buddhi does not cause Ahamkara and vice-versa) and they dependently co-arise [18–20], which is consistent with re-entry hypothesis [11, 22, 23]. In other words, they all interact with each other in re-entrant manner for having subjective experiences, thoughts, perception, and action. The Vedic theory of mind (VTOM) that includes yoga is an elegant framework because it appears to be independent of various metaphysical views. This means VTOM can be interpreted in terms of idealism (matter emerges from mind), dual-aspect (mind and matter are two aspects of the same entity), neutral-monism (~Advait Vedanta, mind and matter are derived from or reduced to a neutral entity), (substance) dualism (~Dvait Vedanta: mind and matter are on equal footing and independent of each other but interact with each other via a liaison[21, 24] perhaps via Manas), and materialism (mind emerges from matter). For example, the Fig. 3 shows one of the interpretations of Vedic theory of Mind: Ahamkara seems to acts as an efficient condition⁷ for Buddhi, but other conditions might be involved⁷. On the other hand, Fig. 4a shows

⁶ How the 'choice' or 'selection' is precisely and rigorously made is given in [10] using the dual-aspect-dual-mode optimal framework.

⁷ "From an eastern perspective, Nagarjuna argued that the real causes should have powers as their essential properties and should have inherent existence, but causality does not have these attributes. Therefore, he proposes four 'conditions' (efficient, percept-object, immediate, and dominant conditions) instead of causality to explain phenomena in conventional reality: (i) an efficient condition explains the occurrence of successive events; (ii) an object is the percept-object condition for its perception; (iii) an immediate condition explains the various steps involved

space-time foam: rather it is the simplicial description of the relative invariant features of the holomovement that become the foam from which the continuous space-time is abstracted. Thus locality is no longer a primary concept but is also abstracted so that quantum non-local correlations could be explained as remnant of the basic

All five entities Chitta, Manas, Buddhi, Ahamkara, and 'Paramatman → Atman → Purush → Prakriti → Brahma

Jivatman → or 'Paramatman' → ParamPurush/ MahaPurush → Prakriti → ParamBrahma → Atman/

'Jivatman' are assimilable with Bohm's Implicate and Explicate order at various levels and the holomovement framework [2]. For example, the entities Paramatman → Atman → Purush → Prakriti can be considered equivalent to Bohm's enfolded Implicate Order, whereas Brahma, Jivatman, Chitta, Manas, Buddhi, and Ahamkara can be considered as unfolded Explicate Order at various levels. For example, Chitta is assimilable with the holomovement that does not have the structure of space-time; the holomovement (via entanglement) unfolds and enfolds via space-time; in the same way Chitta unfolds and enfolds (via entanglement) with Manas, which represent the Explicate Order of Vedic theory of Mind.

VII. CONCLUSION

To sum up, at sub-quantum fundamental level, **both Vedic theory of mind and Bohm's Implicate/Explicate Order can be interpreted as similar.** One could argue that the latter might be derived from the former to the some extent. Both are elegant frameworks because they can be interpreted as independent of metaphysical views, even though Bohm was clearly dual-aspect philosopher [10] and a great physicist. Furthermore, at quantum and classical level, Vedic theory of mind can be interpreted in terms of global workspace framework [25], neural Darwinism and reentrant processing [11, 22, 23], and of course the dualaspect dual-mode framework [5, 9–13]. One could argue that it would be the difficult to fit contemporary materialistic reductionistic neuroscience framework with non-reductionistic wholeness. However, the boundary between both frameworks might melt as consciousness and neuroscience researches progress, say, by extending materialism to physicalism (= materialism + SEs) via

[1] Kak S; Indian Physics: Outline of Early History, arXiv:physics/0310001v1. See also <http://www.infinityfoundation.com/mandala/tes/teskak-shistoryframeset.htm>

[2] Bohm, D. (1980) Wholeness and the Implicate Order (London, Routledge Kegan Paul)

dual-aspect dual-mode framework.

VIII. COMMENTARIES

According to Chandrasekar (personal communication in June 2010), "I find that your article on vedic theory of mind uses different understanding from Samkhya, Yoga, Buddhism and Advaita. I personally feel that this way of taking different standpoints is tricky and troublesome. For example, Samkhya talks only of Purusha and Prakriti (note: it does not talk of parabrahman). Advaita talks of Atman and Brahman. Buddhism denies permanence of soul. Hence I say that a combination of the understanding of these four philosophical schools might be tricky. Regarding Descartes I think therefor I am. Please be informed of the Existentialist, Soren Kierkegaard, who philosophized in the way you have projected this statement as I am therefore I think (Kierkegaard also refutes Descartes position with this statement to establish his existentialist position."

Response: We agree with Chandrasekar that there are differences between Samkhya, Yoga, Buddhism and Advaita and each of them has problems. Therefore, we follow the dual-aspect-dual-mode PE-SE framework[5, 10] that is optimal (which has the least number of problems) and is close to Trika-Kashmir-Shaivism, where Shiva is the mental aspect and Shakti is the physical aspect of the same entity[31].

A. Acknowledgments

RLPV was partly supported by VP-Research Foundation Trust and Vision Research Institute research Fund. Authors would like to thank anonymous reviewers for their critical comments, suggestions, and grammatical corrections and Arya Putra for personal communication. RLPV is also affiliated with Dristi Anusandhana Sanstana, A-60 Umed Park, Sola Road, Ahmedabad-61, Gujrat, India; Dristi Anusandhana Sanstana, c/o NiceTech Computer Education Institute, Pendra, Bilaspur, C.G. 495119, India; and Dristi Anusandhana Sanstana, Sai Niwas, East of Hanuman Mandir, Betiahata, Gorakhpur, U.P. 273001 India.

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Vedic theory of mind	Classical physiology, psychology, and philosophy	Quantum Representation
<i>Chitta</i>	Active (working) memory; the storage area of countless latent impressions, experiences, wants, wishes, desires, attractions, and aversions (Bharati, 2009); 'global workspace of mind' (Baars, 1997)	Common Ground [working memory using quantum bits in MT-network (Hameroff, 2006), assimilable with Bohm's holomovement ¹ via entanglement)
<i>Manas</i>	Lower (or sensory-motor) mind which collects sense impressions; mind interacts with the external world and takes in sensory impressions and data through <i>Manas</i> (Bharati, 2009); sensory representations of external/internal stimuli via stimulus dependent feed forward signals	Quantum Superposition of thoughts and subjective experiences (SEs) (vrittis = phase-entangled thought-waves and embedded SEs in neural-networks and arising from <i>Chitta</i>)
<i>Buddhi</i>	Intellect, attention: cognitive feedback signals. " <i>Buddhi</i> has the capacity to decide, judge, [know], and make cognitive discriminations and differentiations" (Bharati, 2009).	Observer makes choices via quantum collapse of superposed thoughts/SEs (Ψ) into a single thought/SE, say in MT-network hyper-neuron/neural-network
<i>Ahamkara</i> "I"	Ego. It is 'I-maker' (Bharati, 2009). It is 'I' or (western self). It is the false self = the true self covered with a covering, which is trigunatita i.e. of the nature of <i>sattva</i> , <i>rajas</i> and <i>tamas gunas</i> (Saraswati, 2009). It is the 'I-ness' associated to SEs. It is the 'self' (SE of subject). Its neural correlates are cortical midline structure and other self-related neural-network (Northoff & Bermpohl, 2004; Northoff et al., 2006).	<i>Ahamkara</i> is built as the outcome of quantum measurement process
<i>Paramatman</i> → <i>Atman</i> → <i>Purush</i> ↔ <i>Prakriti</i> ↔ <i>Brahma</i> → <i>Jivatman</i> OR <i>Paramatman</i> → <i>ParamPurush</i> / <i>MahaPurush</i> ↔ <i>Prakriti</i> → <i>ParamBrahma</i> → <i>Atman/Jivatman</i>	They are pure consciousness ² experienced in <i>samadhi</i> state via 'direct perception'. <i>Paramatman</i> is the unified field; this basic unity may include Jung's theory of collective unconscious, the <i>unus mundus</i> ³ . <i>Atman/ Purusha/ Brahman/ Jivatman</i> is the true 'Self' or 'Soul' (Bharati, 2009), which is the liberated 'I' that is usually covered with ignorance by ego- <i>Ahamkara</i> .	' <i>Paramatman</i> → <i>Atman</i> → <i>Purush</i> ↔ <i>Prakriti</i> ' or ' <i>Paramatman</i> → <i>ParamPurush/MahaPurush</i> ↔ <i>Prakriti</i> ' can be considered as Bohm's Implicate order (Bohm, 1980); whereas <i>Brahman</i> , <i>Jivatman</i> , <i>Chitta</i> , <i>Manas</i> , <i>Buddhi</i> , and <i>Ahamkara</i> can be considered as explicate order at various level.

FIG. 5: Table of correspondences in details:

(1) See also [10] for Bohm's Implicate/Explicate order and holomovement.

(2) There are many meanings (or aspects) attributed to the term 'consciousness', such as 'pure consciousness', 'subjective experiences', (multidimensional) physical/neurobiological processes, and so on. Further details are given in [26]. See also [27, 28]. For the interpretation of empirical data of *samadhi* state, see [29]. (3) "Unus mundus, lit. "One world", is a term which refers to the concept of an underlying unified reality from which everything emerges and returns to" (<http://en.wikipedia.org/wiki/Unus.mundus>).