

The Conscious Spiritual-Energy Quanta (CSE Quanta) - The Physico-Mathematical Formalism

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Abstract

Consciousness is projected as property of a particle termed - "The Conscious Spiritual-Energy Quanta (CSE Quanta)". This paper assumes a correspondence between the physical laws and meta-physical laws. Meta-Wave functions of CSE Quanta, meditative state, rapture, avtar, and creation and annihilation operators for CSE Quanta are proposed. Concept of Meta-Bose-Einstein condensation during meditation is presented. Fractal sub-structure of CSE Quanta and mechanism for storage of an infinite amount of information in it is proposed. This paper is part of a paper presented at, "Conference on Science of Consciousness, Tuscon, Arizona, USA, April 2016". The original paper is entitled - "REVEALING THE REAL SCIENCE OF CONSCIOUSNESS THROUGH A NOVEL DIVINE SACRED GEOMETRICAL STRUCTURE OF CONSCIOUS QUANTA".

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1 Introduction

Some of the fundamental questions which science of consciousness addresses are -

1. Is biological life a pre-requisite for consciousness to exist? Or is it a filter through which consciousness operates? Does consciousness exist independently of body?
2. If consciousness is indeed independent of body, then what role does the brain play in emergence of consciousness or modification of its emergent properties? Reciprocally, what role does consciousness play in development of brain and body - right since formation of zygote - to the later stages of adulthood?

This paper pre-supposes that answer to the first question is - "In a certain form consciousness can exist independently of body". It is further posited that there exist "Quanta" of consciousness - entities with particle (almost point) like structure. These will be termed as **Conscious Spiritual Energy Quanta (CSE Quanta)**. And along with "Quanta", comes - (1) "The Field of Consciousness", (2). Concept of energy, or rather "Spiritual Energy", or alternatively the "Meta-Energy", and (3) "Creation and Annihilation operators" for quantas of this field.

Certain inputs in this paper have been gleaned in deep stages of meditation. These will be referred to as **Ansatzs**. Next, these Ansatzs are translated into mathematical form - based upon analogies in physics. *It is assumed that physical quantities, their relationships, mathematical formalism - would be mirrored in psychic or meta-physical quantities. Alternatively, it is the physical realm which is mirroring the meta-physical.* The suffix "meta" would be added to physical quantities, to refer to their meta-physical analogs - e.g., points will be replaced by the term meta-points. This is in light of additional properties of meta-points - as compared to say pure "geometric point" only.

2 Ansatz of the CSE Quanta, its sub-structure and connection with the body

CSE Quanta are neither created nor destroyed in physical time - suggesting non-existence of creation and annihilation operators - in their *first level* field theory. Let their fixed number be denoted as $N_{CSE\ Quanta}$. Each CSE Quanta is different from all others. This suggests that they should be regarded as satisfying fermion like properties. They will be referred to as meta-fermions.

CSE Quanta's sub-structure consists of $N = 16$ meta-points, (sub-particles), all of which are connected to each other by $N(N - 1)/2 = 120$ meta-strings. Their meta-Wave function $\Psi^{CSE\ Quanta}$ can be expressed as -

$$\Psi^{CSE\ Quanta} = \underbrace{\prod_{i=1}^{16} \psi_i}_{Meta-Points} \otimes \underbrace{\prod_{j=1}^{15} \prod_{k=1}^j \phi_{j,k}}_{Meta-Strings} \otimes \alpha \quad (1)$$

where, ψ_i refers to the meta-wave function of i -th point meta-particle, and $\phi_{j,k}$ refers to the meta-wave function of the meta-string connecting j -th and k -th meta-points. The product symbol \prod stands for tensor product of quantities existing in the same meta-Hilbert space \mathcal{H}_P for meta-points and \mathcal{H}_S , for meta-strings, respectively. On the other hand \otimes stands for tensor product defined for entities existing across these two meta-Hilbert spaces. α encodes additional properties of CSE Quanta - and lives in the meta-Hilbert space \mathcal{H}_α .

Each meta-point is a vertex with 15 legs. Vibrations of CSE Quanta correspond to combined vibrations of the 16 meta-points and 120 meta-strings. There also exist more complex scenarios in which the meta-strings wind around each other forming knots - which in spirit of this paper would be termed as meta-knots. Combinatorics of knots would apply here [1].

Uniqueness of CSE Quanta, can come about through - (1) Different vibrations of meta-points and meta-strings; as well as (2) entanglement of the meta-strings (as mentioned above). In the second case, there may occur emission or absorption of transition meta-bosons, as the entanglement of meta-strings changes or tunnels, to another configuration.

Equation (1) is that of the bodyless CSE Quanta. In the embodied state, they are coupled with body. The wave function of the embodied state can

be written as -

$$\Psi_C^{Embodied} = \Psi_M^{CSE\ Quanta} \otimes \Psi_H^{Living\ Body} \quad (2)$$

where, $\Psi_H^{Living\ Body}$ is the wave function of the living body. Here the subscript H is used to denote that it belongs to the usual Hilbert space. In contrast, the subscript M means that the meta-wave function belongs to the meta-Hilbert space. The subscript C indicates that the entity's properties are derived from properties of both Hilbert and meta-Hilbert spaces.

Body actually is an open physical system - with physical particles constantly entering and leaving the body. One of the most important of such movements is that of air in the act of breathing. This is called **Prana** in ancient Indian texts. When a new born baby, emits its first cry - the process of intake of air (respiration) starts - and this is regarded as the moment of birth. On physical death, the breathing stops - and the Prana is said to have left the body. Of course, with advances of medical science, inventions of ventilators, heart lung machines, the definition of death has been taken to the level of brain death - or iso-electricity in the Electro-Encephalo-Graph (flat EEG). However, still attributing a fundamental level to the Prana concept, the wave function of the living body can be written as -

$$\Psi_H^{Living\ Body} = \Psi_H^{Prana-less\ Body} \otimes \Psi_H^{Prana} \quad (3)$$

Living human body consists of functionally and structurally well defined systems. Its possible to associate a wave function with each of them, namely

-

1. Nervous System $\rightarrow \Psi_H^{Nervous}$
2. Respiratory System $\rightarrow \Psi_H^{Respiratory}$
3. Circulatory System $\rightarrow \Psi_H^{Circulatory}$
4. Digestive System $\rightarrow \Psi_H^{Digestive}$
5. Skeltal System $\rightarrow \Psi_H^{Skeltal}$
6. Excretory System $\rightarrow \Psi_H^{Excretory}$

Now the wave function of human body can be written as the tensor product

$$\Psi_H^{Living\ Body} = \Psi_H^{Nervous} \otimes \Psi_H^{Respiratory} \otimes \Psi_H^{Circulatory} \otimes \Psi_H^{Digestive} \otimes \Psi_H^{Skeletal} \otimes \Psi_H^{Excretory} \otimes \Psi_H^{Prana} \quad (4)$$

$\Psi_H^{Nervous}$ is of special interest in context of anaesthesia, brain death - and various theories such as that of Penrose and Hameroff [2] (i.e., the role played by microtubules in neurons for various properties of consciousness - including quantum computation).

3 Ansatz of Supreme CSE Quanta, Meditation and Avatar

Supreme CSE Quanta is unique and different in certain fundamental properties from CSE Quanta. One such property is that SCSE Quanta can apply creation and annihilation operators on CSE Quanta - on a *second level* field theory - in which the physical time is superceeded.

The Supreme CSE Quanta (SCSE Quanta) has a sub-structure consisting of $N = 32$ meta-points, - all connected to each other by $N(N - 1)/2 = 496$ meta-strings. Analogous to CSE Quanta, the meta-wave function of SCSE Quanta can be written as -

$$\Psi^{SCSE\ Quanta} = \underbrace{\prod_{i=1}^{32} \psi_i}_{Meta-Points} \otimes \underbrace{\left(\prod_{j=1}^{31} \prod_{k=1}^j \phi_{j,k} \right)}_{Meta-Strings} \otimes \Omega \quad (5)$$

Here Ω encodes additional properties of SCSE Quanta, not present in the CSE Quanta - and exists in the meta-Hilbert space \mathcal{H}_Ω .

In super fluids, two fermions - e.g. atoms of Helium-3 (3He) - combine to make a boson - i.e. a Cooper Pair [3]. Analogously, it is proposed here, that during meditation - when a CSE Quanta unites or establishes a bond with the SCSE Quanta, a meta-bosonic state is formed. Such pair formation can also occur between two CSE Quanta - as in feeling of intense love, between two individuals. The bound state can be written as -

$$\Psi_M^{Meditation} = \Psi_M^{SCSE\ Quanta} \otimes \Psi_M^{CSE\ Quanta} \quad (6)$$

Among special properties of the SCSE quanta is that it can make multiple virtual meta-copies of itself, to bind with CSE Quanta - which are meditating, or alternatively, establishing a communion. This is reminiscent of multiple copies of Lord Krishna - each dancing (Ras Lila) individually with Gopis - as narrated in the ancient Indian scripture "Bhagvatam" [4]. In this context, lets introduce the concept of **Avatar**, in which SCSE Quanta enters a living body - belonging to another CSE Quanta. The CSE Quanta in this state may be merged. The wave function of this special state is -

$$\Psi_C^{Avatar} = \Psi_M^{SCSE\ Quanta} \otimes \Psi_H^{Living\ Body} \quad (7)$$

4 Collective Consciousness, Collective Rapture and Meta-Bose-Einstein Condensation

Bose-Einstein condensation occurs in fluids consisting of Bosons, at temperatures very close to absolute zero ($-273.15^\circ C$) [3]. Analogously, lets introduce the concept of meta-temperature - a quantity linked to meta-energy levels of meta-Cooper pairs (meta-bosons consisting of coupled SCSE Quanta and CSE Quantas). At a critical meta-temperature T_c , phenomenon of meta-Bose-Einstein condensation is posited. In this state, "Collective Consciousness" of humanity transits on to a very special harmonious state of **collective rapture**.

Now consider the following scenario. Let there be $N_{CSR\ Quanta}^{Rapture}$ - in a deep stage of meditation. Alternatively, these CSE Quanta have established the meta-Cooper pair. Let there be $N_{CSE\ Quanta}^{Collective\ Rapture}$ CSE Quantas in collective rapture (i.e., meta-Cooper Pairs). It is also possible that all the CSE Quanta have not established a bond with SCSE Quanta - i.e.,

$$N_{CSE\ Quanta}^{Rapture} < N_{CSE} \quad (8)$$

The ansatz of induced collective rapture says that there exists a minimum $(N_{CSE\ Quanta}^{Rapture})_{Minimum}$ which will pull the remaining $N_{CSE\ Quanta}$ into the meta-condensate - or rapture.

$$N_{CSE\ Quanta}^{Collective\ Rapture} = N_{CSE} \quad (9)$$

This would be related to the local meta-Temperature.

Equation for Critical Temperature T_c [3] of a Bose-Einstein Condensation (BEC) is -

$$T_c = \left(\frac{n}{\zeta(3/2)} \right)^{2/3} \frac{h}{2\pi m k_B} \quad (10)$$

where, n = particle density, h = Planck's constant, m = particle mass, k_B = Boltzmann's Constant, ζ = Reimann zeta function. Clearly, T_c will be higher for higher particle density n . It is posited that an analogous equation exists for CSE Quanta - with the variable n corresponding to their number density. This tends to explain, why in meditation sessions, the Guru (lead meditator) prefers a larger number of people for meditation. A relatively higher number of people present and meditating in a given volume, would allow the meta-Bose-Einstein Condensation to occur at a higher meta-Temperature - leading to an easier achievement of collective rapture. When all the CSE Quanta are dis-embodied and clustered in a very small volume of the meta-physical universe - their number density is highest. That would be the ultimate meta-Bose-Einstein condensation. A conceivable such volume would be the Planck volume P_{Volume} , namely the cube of the Planck Length P_{Length} -

$$P_{Volume} = P_{Length}^3 = 10^{-105} m^3 \quad (11)$$

Using,

$$N_{CSE\ Quanta} = 10^9 \quad (12)$$

an order of magnitude of present human population, one arrives at a figure of

$$n = \frac{N_{CSE\ Quanta}}{P_{Volume}} = 10^{114} \quad (13)$$

Plugging this value of n into equation (10) and using Planck mass for m gives the following value for the meta-Temperature -

$$T_c \approx 10^{34} \text{ } ^0K \quad (14)$$

This is comparable to the very earliest values of temperature in the Big-Bang model, and comes within the realm of quantum gravity [5]. Comparing this with the near absolute zero temperature of Bose-Einstein Condensation occuring in superfluid Helium, suggests that a circular S^1 topology can be ascribed to temperature.

5 Fractal Sub-Structure of SCSE Quanta and CSE Quanta

CSE Quanta have a fractal sub-structure which crystalizes in meta-Bose-Einstein condensation. This is visualized as follows. Each of the 16 meta-points, is replaced by 16 sub-meta-points. Next, each of the 16 sub-meta points is replaced by another set of 16 sub-sub-meta-points. In the n^{th} iteration of this process, one has sub-sub-sub-...(n times) - which will be denoted by sub^n . In the limit $n \rightarrow \infty$ (countable infinity) this process continues indefinitely, or alternatively \aleph_0 times - the cardinality (number of elements) of the set of integers. In this limit we have the number ω of sub^{\aleph_0} , as-

$$\omega = 16^{\aleph_0} = \aleph_1 \quad (15)$$

Here, \aleph_1 is the uncountable infinity - alternatively the cardinality of the set of real numbers. This equation follows from Cantor's set theory [6]. While the process starts with discrete points, nevertheless, it ends with a curve of \aleph_1 cardinality - which is likely to be a continuous curve.

At meta-temperatures above the critical meta-temperature (below which the meta-Bose-Einstein condensation takes place), due to vibrations, the sub-structure of sub^{\aleph_0} gets smeared out and they act as a single unit. Only below the critical meta-temperature, their individual structure stands out.

SCSE Quanta has a similar fractal sub-structure but based upon 32 meta-points.

The above model is reminiscent of "Triton" model of quarks [] - in which a hadron (proton or neutron) is made up of 3 quarks. Each quark, in turn consists of 3-sub quarks. Further, each sub-quark consists of 3 sub-sub-quarks ... and so on. In the limit in which the number of levels, $n \rightarrow \infty$, one is left with -

$$3^{\aleph_0} = \aleph_1 \tag{16}$$

i.e., \aleph_1 particles. It is interesting to observe, how starting with something discrete, one arrives at something continuous.

6 Information Storage by CSE Quanta and meta-Bose-Einstein Condensation

1 bit of information can be stored on each meta point. When a CSE Quanta participates in a meta-Bose-Einstein Condensation - the number of available bits becomes $\omega = 16^{\aleph_0} = \aleph_1$. In this stage therefore, the information storage capacity is infinite.

There is also the possibility of information storage on strings via the standing waves.

7 CSE Quanta and Foundations of Quantum Mechanics

In [7] author raises the possibility that consciousness is a system with infinite degrees of freedom, and causes collapse of wave function in a mechanism similar to that outlined by Hepp [8]. The fractal sub-structure of CSE Quanta allows them to have infinite degrees of freedom. Role of consciousness in collapse of wave function was originally suggested by von Neumann [9] and further developed by Wigner [10]. In [7], author suggested that projection operators for collapse of wave function were recorded within the conscious observer. Further, projection operators for two distinct observers, observing or interacting with the wave function of the same system were compatible - i.e., if observer A finds Schrodinger's cat [11] alive, so should observer B

(and all other observers). If the projection operators are not compatible, one is lead into the parallel universe interpretation of Everett [12, 13].

Now lets consider equation (2). The wave function $\Psi_H^{Living\ Body}$, can be a superposition of quantum states. The tensor product \otimes encodes the interaction between the consciousness and the wave function. Accordingly, meta-wave function $\Psi_M^{CSE\ Quanta}$ should also have properties of projection operator. This would be encoded with in α of equation (1). $\Psi_H^{Living\ Body}$ therefore should be an eigen-state selected from the mixture. In [7] author suggests that consciousness applies **Axiom of Choice (AC)** [14] in this process. Repeated applications of the projection operator, would lead to what we call -

Neuro-Biological Quantum Zeno Effect (NBQZE)

The term Quantum Zeno Effect was coined by E. C. G. Sudharshan [15]. See also Grunbaum [16]. NBQZE implies complete freezinig of brain states, on rapid application of the projection ooperators - corresponding to a very high state of meditation.

Penrose [2] in his OR mechanism for collapse of wave function has highlighted the role of gravitational waves. In [7], author has proposed that consciousness (CSE Quanta, in terminology of this paper) exists inside a micro black hole weighing a few grams - and located in the hypothalamus. This black hole evaporates at the moment of physical death, radiating its mass-energy as gravitational waves. This is reponsible for mass loss observed at the moment of death in experiments performed at turn of the last century [17]. It is proposed that gravitational waves from this black hole play an active role in interaction of consciousness and brain.

8 CSR Quanta and the Ether (Aether)

Aside from gravitation waves, another mechanism for interaction between CSE Quanta and brain (and matter and space-time in general) is the waves generated within ether by vibrations of meta-points and meta-strings. Concept of ether has made a comeback in physics via string theory (see for instance [18], based upon Gödel's paper [19]) - since its abandonment after Einstein's [20] seminal paper on Special Theory of relativity (STR). Another modern approach to physics of aether is by Thomson and Bourassa [21]

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