

# Consciousness: A Non-reductive Study Based on a Non-coding RNA Gene

Sirajul Husain

## ABSTRACT

We ascribe the insurmountable problems posed by central issues in cognitive neuroscience as to how a physical brain engenders meaning and how meaning is represented, to the conventional reductionist approach to consciousness. While neurobiology is ontologically necessary for processing multisensory information, it is not epistemologically sufficient to engender meaning in a conscious experience, as well as, representation of meaning, before it is expressed linguistically. We postulate a field of epistemic faculty of consciousness to emerge nonreductively by virtue of a non-coding RNA gene (human accelerated region 1F, HAR1F) found to be responsible for development of cerebral cortex, to regulate two cognitive functions simultaneously: One, to integrate multisensory information as a source of meaning based on the assumption that each sensory input carries a specific semantic potential; and two, to represent meaning in a semantically coextensive fashion, independent of a natural language. A unified cognitive field equation of consciousness is formulated to mathematically describe emergence of meaning and its representation. A principle of meaning-energy equivalence is derived as a basis of exploration of mind, free will, and self.

**Key Words:** Non-coding RNA gene; Human accelerated region 1; HAR1F; consciousness; universal field; quantum-consciousness; neurocatalysis; energy equivalence

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## Introduction

Cognitive neuroscience has empirically specified the neurobiological processors and substrates involved in cognition (Gazzaniga, 2000), in particular, in the integration of multisensory

information (Cuppini *et al.*, 2010; Stein, 2000; Ghazanfar and Schroeder, 2006). Yet the core issues as to how neurobiological processing involved in integration of multisensory information engenders meaning in a conscious experience; and how meaning is represented in the brain before verbalizing it linguistically, have remained a formidable challenge. As analyzed by Crick and Koch, "An important problem neglected by neuroscientists is the problem of meaning. The problem of meaning and how it arises is more difficult, since there is, as yet, not even an outline formulation of this problem in neural terms" (Crick and Koch, 1998).

**Corresponding author:** Sirajul Husain, Ph.D. Alumnus, Case Western Reserve University

**Address:** Interdisciplinary Research and Development Council, 400 S. Harrison Rd., Sterling, VA 20164, USA

**Phone:** + 440-223-2246

**Fax:** + 571-926-8706

**e-mail** ✉ sxh99@case.edu

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We have determined that the impasse in cognitive neuroscience with respect to meaning and its representation arises primarily from a lack of a theory of consciousness, which is the ontological foundation of cognition. The mystery of consciousness is that it is not known how a physical brain gives rise to a conscious experience, for example, how the 'blueness' of a blue sky, or 'feeling' of amazement at the huge canopy, the sky, is experienced by a physical brain. Einstein, like Plato, recognizes that "there is a gulf, 'logically unbridgeable', which separates the world of sensory experiences from the realm of concepts and conceptual relations which constitute propositions" (Lenzen, 1949). Consciousness becomes far more challenging to explain how a thought itself reflexively gives rise to a higher cognitive concept by the physical brain, as is observed by the Nobel Laureate Eric Kandel, "One of the last frontiers of science, perhaps its ultimate challenge is to understand the biological basis of mentation." (Kandel, 1985).

We ascribe the insurmountable problem of meaning arising in a physical brain to the conventional approach to reduce subjective consciousness to objective neuroscience. Irreducibility of consciousness to brain physiology is evident from the fact that "brain scans cannot read the mind, (that is, meaning, *paraphrasing is ours*), as these abilities will never reach the ultimate point of a priori mind-reading capability." (Shah and Urkia, 2007). We are in agreement with the philosopher David Chalmers (1996) who epistemologically concludes, "No explanation given wholly in physical terms can ever account for emergence of a conscious experience." Also, Francis Crick and Christoph Koch (1998), seem to rule out reductionist approach to consciousness, as they observe,

"Neuroscientists are apt to assume reductively if they can see that a neuron's firing is roughly correlated with some aspect of the visual scene, such as an oriented line, then that firing must be part of the neural correlate of the seen line. They assume that because they, as outside observers, are conscious of the correlation, the firing must be part of the neural correlate of consciousness (NCC). The explanation of consciousness is one of the major unsolved problems of modern science. After several thousand years of speculation, it would be very gratifying to find an answer to it."

In the present study, we aim to explore nonreductive approaches to study consciousness

as a basis for solving the key problems in cognitive neuroscience as to how meaning is engendered in a conscious experience and how it is represented before it is verbalized.

### **Non-reductive Approach to Consciousness**

In view of irreducibility of conscious experiences to brain physiology, we make a departure from the conventional reductionist approach to consciousness by postulating existence of a novel society of non-coding genes, which we call *ontic-genes* in this study, in general, to be responsible for emergence of consciousness as a foundation of cognition (Husain, 2004). Here, 'ontic' is used in the sense of 'real'. A monumental discovery of a non-coding RNA gene (human accelerated region 1 or highly accelerated region 1, HAR1F), with forty eight more expected (Pollard *et al.*, 2006), seems to fulfill our prediction as above. HAR1F denotes 'human accelerated region one forward'. We postulate that the non-coding RNA gene (HAR1F), in terms of its physical as well as metaphysical traits, must be nonreductively responsible for the emergence of consciousness.

### **Physical Traits of Ontic-genes**

The neuroscientist Salama explains,

"Unlike most known genes, HAR1F does not encode instructions for making a protein to carry out its function. Researchers are discovering a growing number of such 'non-coding' genes, many of which produce functional RNA molecules. HAR1F appears to be a novel type of RNA gene and is found to be active in special nerve cells, called Cajal-Retzius neurons, that appear early in embryonic development and play a critical role in the formation of the layered structure of the human cerebral cortex."

Also, HAR1F is co-expressed with reelin, a product of Cajal-Retzius neurons, which is of fundamental importance in specifying the six-layer structure of the human cerebral cortex. The physical aspect of the non-coding RNA gene (HAR1F) is manifest in its role in the development of cerebral cortex, which is the center of integration of multisensory information in concert with other parts of the brain, in particular, the mid-brain superior colliculus.

### **Metaphysical trait of ontic-genes**

A neonate is known to be born with one hundred billion neurons and a typical brain neuron will have connections with at least one thousand



other neurons, leading to one hundred trillion connections. In addition to neurons, there are other important brain cells, the glia, which are far more numerous than neurons. We postulate that the cerebral cortex, being richly endowed with two thirds of neuronal mass, containing almost three-quarters of all synapses, non-reductively gives rise to a potential regulatory field of consciousness emanating from the complex regulatory network of non-coding RNA genes, on the analogy of a magnetic field that is known to arise around a wire carrying electric current through it. Plausibility of the potential regulatory field of consciousness is supported by Einstein's assertion that, "Up to the present time no one has found any method of avoiding the inertial system other than by way of the field theory" (Jammer, 1954). Inertial system and its relevance in cognitive science, is explained later in this study.

Since the phenomenon of consciousness itself does not cause changes in the behavior of living creatures (Pockett, 2004), we postulate a novel field of epistemic faculty of consciousness, as a cognitive force, emerging by the interaction of the potential regulatory field of consciousness, as above, and the cosmologically emergent universal field of quantum-consciousness, on the analogy of emergence of electromagnetic force by the interaction of electrical and magnetic fields acting perpendicular to each other. The universal field of quantum-consciousness was originally defined by us to explain the hitherto unsolved mystery of non-local instantaneous, seemingly '*conscious*', correlation between a pair of entangled photons over arbitrary distances, by virtue of the well-known trait of unity of consciousness (Husain, 2010).

In the present study, we define the universal field of quantum-consciousness as an informational field to be pervaded by quantum-conscious signals, termed *nourons*, capable of instantaneous communication as a basis of the well-known spontaneous unity of consciousness. The term *nouron* is formed from *nous*, Greek for mind. The field of epistemic faculty of consciousness acquires *nourons* imparted to it by the universal field of quantum-consciousness in a manner that *nourons* get spontaneously transduced into a novel system of cognitive signals, *nousons*, in the neurobiological environment of the brain. The term *nouson* comprises of *nous*, Greek for mind, and *son*, French for sound. The field of epistemic faculty of

consciousness manifests the metaphysical aspect of the ontic-genes.

### **Rationale for Epistemic Faculty of Consciousness**

A rationale for the non-reductive non-coding based epistemic faculty of consciousness on the cerebral cortex seems to arrive from Johnson's study on cognition, as he maintains, "However, it is important to bear in mind that coding genes do not code for functional components of cognition in any direct sense. Since brain structure is not directly 'coded for' in genes, but rather is the product of complex self-organizing interactive processes, then providing causal accounts of cognitive changes purely in terms of (coding, *addition is ours*) gene action are certain to be inadequate" (Johnson, 1997). Further, contrary to Rolston's finding (1999), which was presumably arrived at in the context of coding genes, that "resourcefulness lies in the epistemic content conserved, developed, and thrown forward to make biological resources out of the physicochemical sources", we postulate, the "epistemic content" must ensue by virtue of the regulatory role of non-coding genes in the development of cerebral cortex to make epistemic resources out of neurobiological sources, in particular, the RNA gene (HAR1F).

### **How meaning arises in a conscious experience**

Whereas neurobiology is ontologically necessary for integration of multisensory information (Stein & Meredith, 1993), we note, it is epistemologically not sufficient to engender meaning and for representation of meaning in a conscious experience. We postulate that neurobiology essentially plays an important catalytic role, as a neurocatalyst, in the integration of multisensory information for engendering meaning and its representation, regulated by the field of epistemic faculty of consciousness. A catalyst, in general, is a substance that is known to facilitate a process, but the substance itself does not become part of the outcome, since it remains intact, after the process is complete. We maintain that neurocatalysis is plausible as there is no evidence yet of a neural correlate of consciousness, as is empirically confirmed by Orpwood (2007) that,

"There is clearly no specific area of the cerebral cortex that underpins consciousness. No ablation studies or brain injury work has ever given any indication that this might be so. It



would appear that consciousness is most likely to be the result of some generalized activity within the cortex.”

We maintain that meaning arrives in a conscious experience by the neurocatalytic integration of multisensory information regulated by the field of epistemic faculty of consciousness, based on our postulate that each sensory modality carries a specific semantic potential. Emergence of meaning from integration of multisensory information seems to be in accord with Einstein’s epistemology, as reported by Lenzen, “Although Einstein recognizes the spontaneity of thought; he agrees with Kant that all thought acquires material content (that is, meaning, *paraphrasing is ours*) only through its relationship to sensory experiences.” (Lenzen, 1949). Convergence of meaning in a noumenal concept from multisensory input seems to follow from Kant’s (1965) assertion, that “we do not perceive the qualities of objects as divided or separated, for example, we don’t experience the color and the shape of a rose at different times”, but rather as a spontaneous unified cognitive event, as a noumenal concept, by virtue of the well-known trait of unity of consciousness, essentially independent of a natural language. According to Kant, Noumenon is the ultimate reality, or “thing-in-itself”, which can be conceived by thought, but cannot be perceived, in (physical, *addition is ours*) experience. We postulate that Kant’s transcendental unity, teleologically, may constitute an essential attribute of the proposed field of epistemic faculty of consciousness, in terms of spontaneity of nousons, the transduced states of neurons, as defined above.

The lingual character of noumenal concepts is evident from the cognitive behavior of prelinguistic babies. Using 3-day old newborns, DeCasper and Pfeifer (1980) showed that neonates can effectively discriminate their mother’s voice in preference to other women’s voices by their sucking response on a nonnutritive nipple (either increasing or decreasing it), as well as, preferring to hear their mother’s voice over their father’s voice. Based on this finding we infer that neonates seem to acquire the epistemic faculty to consciously experience a ‘motherly-voice’, as categorically different from “non-motherly-voices”, and to simultaneously represent corresponding noumenal concepts, respectively, in some alingual form, obviously long before they learn to

speaking a language. This trait of formation of alingual noumenal concepts seems to be a normal cognitive habit of even adults with excellent linguistic skills, as is evident from Einstein’s cognitive behavior: “These thoughts did not come in any verbal formulation, as I rarely think in words at all. A thought comes, and I may try to express it in words afterward” (Hawking, 2002).

We characterize the process of integration of multisensory information into a unified noumenal concept as a point-syntax, in this study, as an alingual process of convergence in the brain, in contrast to the familiar “linear syntax” in linguistic communication. A neurobiological basis of point-syntax process seems to follow from a study by Stein, *et al.*, (2000), who report, “During early brain development, systems emerge that are capable of integrating information from different senses. These multisensory systems parallel the well-known primary projection systems in which information is segregated on a sense-by-sense basis. The midbrain superior colliculus (SC) is an excellent example of a multisensory system.” Linear syntax serves as an arbitrary artifact to express the meaning contained in a noumenal concept as a point-syntax. Linear syntax may comprise one or more linear linguistic phrases or statements, for example, the unified noumenal concept Rose, arrived at as a point-syntax, can be expanded or translated into a linear syntax statement, as a flower from “any shrub or climbing plant of the rosaceous genus *Rosa*, typically having prickly stems, compounded leaves, and fragrant flowers” (British Dictionary, 2015).

### **Representation of Meaning in the Brain**

Based on the fact that meaning arising from multisensory integration is central to adaptive human behavior by enabling one to experience a world of coherent perceptual categories, we maintain that the meaning in a noumenal concept must remain invariant in the brain, in particular, before it is represented in multiple linguistic expressions. We postulate that meaning in an alingual noumenal concept can remain epistemologically invariant only if it is secured by a semantically coextensive representation. Therefore, in order to maintain invariance of meaning in an alingual noumenal concept both generation of meaning and its representation must necessarily occur together simultaneously



in a manner that meaning and sign become identical to each other.

We postulate that the field of epistemic faculty of consciousness regulates two key cognitive functions occurring together simultaneously and spontaneously in the integration of multisensory information: One, to engender meaning in a noumenal concept, and two, to represent the nascent meaning in a semantically coextensive fashion by virtue of a novel neurosonemic field pervaded by nousons. The term 'sonemic', in neurosonemic, is derived from 'son', for sound in French. Semantically coextensive representation of alingual noumenal concepts, as neurosonemic concepts, seems to be in accord with Peirce's definition of semiotics as, "any form of activity, conduct, or process that involves signs, including the production of meaning. It includes the study of how meaning is constructed and understood" (Peirce, 1931).

### Semantic Relativity

Natural language is an ingenious artifact for representing alingual neurosonemic concepts as corresponding linguistic concepts, albeit arbitrary, in human communication. However, when the invariant meaning in a neurosonemic concept is described in a linguistic statement, the meaning may suffer a relativistic effect, as observed by Quine (1969) in his thesis on "ontological relativity". According to him:

"We cannot require theories to be fully interpreted, except in a relative sense, if anything is to count as a theory. In specifying a theory indeed we must fully specify, in our own words, what sentences are to comprise the theory, and what things are to be taken as values of the variables, and what things are to be taken as satisfying the predicate letters; insofar we do fully interpret the theory, relative to our own words and relative to our overall home theory which lies behind them. But this fixes the objects of the described theory only relative to those of the home theory; and these can, at will, be questioned in turn."

Also, Unger (1984), in his thesis of "philosophical relativity" observes, "A crucial aspect of a philosophical problem may depend on the meaning of, or on the semantic conditions formulated", when it is expressed linguistically. In the present study, we term both the 'ontological relativity' and the 'philosophical relativity', due to Quine and Unger, respectively, as well as, relativity observed in translation from

one language into another, as semantic relativity. By semantic relativity we mean ambiguity or inadequacy that may arise in conveying the invariant meaning pertaining to a neurosonemic concept, due to arbitrary character of a natural language.

### Origin of Semantic Relativity

We maintain that in the linearization of a point-syntax pertaining to a neurosonemic concept into a corresponding arbitrary linear syntax in linguistic communication, semantic relativity arises due to the arbitrary linear syntax and arbitrary linear phonological representation of concepts, to convey meaning with respect to a given natural language. We postulate, conveying of meaning in a neurosonemic concept in terms of arbitrary linear syntax in linguistic communication constitutes "absolute sense" (sense is used here as meaning), and its representation using an arbitrary phonological scheme constitutes "absolute sound". We postulate "absolute sense" and "absolute sound" together constitute an inertial linguistic system since it is essentially based on Euclidean logic. Euclidean logic is referred to when conclusions are drawn directly from a logical extension of what is given in the immediate sense experience.

Contrary to the point-syntax comprising a semantically coextensive neurosonemic representation of meaning, its corresponding linear syntax comprising of arbitrary phonological representation of words in a sentence is formed based on logical extension of the immediate sense experience of *sequential* auditory perception, as well as, on *sequential* vocalization, following Euclidean logic. We postulate, translation of a point-syntax into a linear syntax based on the inertial system of sequential auditory perception and sequential vocalization is the cause of semantic relativity.

### Sensesound Continuum

In order to account for semantic relativity due to inertial linguistic system, we postulate a non-Euclidean, four-dimensional curved space, termed, sensesound continuum, comprising of auditory, visual, somatosensory modalities, and sound. The term, somatosensory is assumed to combine tactile, taste, and smell senses into a single modality. Inclusion of sound as the fourth dimension on the sensesound follows Eisenberg's findings (1976) that, "Human responsiveness to



sound begins in the third trimester of life and by birth reaches sophisticated levels, especially with respect to speech.”

It is important to note that the term “sense” in the sensesound does not mean sensation or sense experience, but essentially as a proposition for measurement. Similarly, “sound”, far from being a sensuously phenomenal property, basically constitutes a proposition for measurement. We use the term ‘measurement’, in a qualitative sense in the context of consciousness and cognition, in agreement with Searle’s assertion that consciousness is both “qualitative and subjective” (Bennett *et al.*, 2007), as well as, with Roger Penrose’s (1990) characterization of consciousness as non-algorithmic. Fundamentally, the “sense” and “sound” must be denied physical objectivity on the epistemological rigor as ‘time’ and ‘space’ are denied physical objectivity in Einstein’s theory of relativity. This is also affirmed by Cassirer (1953) that time and space, (and hence, sense and sound. *Addition is ours*) are not things in the sense of ‘naïve realism’, but “pure concepts and forms of measurement.” It is in this respect, the sense and sound escape semantic relativity not only with respect to various linguistic frames of reference but also with respect to all observers from the stand-point of a single linguistic frame of reference. Contrary to Max Planck’s dictum that ‘what can be measured exists’, pertaining to the physical universe, we affirm that consciousness, being the ontological foundation for ‘measurement’ of the entirety of physical phenomena, in general, *exists*, but it is itself not measurable, except indirectly. For example, a conscious experience of pain is commonly measured in terms of its subjectively felt intensity on an arbitrary scale of one to ten.

We characterize a lingual neurosonemic concept when it is expressed linguistically as a phenomenal concept, in this study. We postulate that the whole of cognitive reality, comprising description of physical and metaphysical aspects of human experience may be regarded as constituting a field of phenomenal consciousness whose components depend on the four sensesound parameters, the auditory, visual, somatosensory, and sound, on the sensesound. According to the relativity physics, if the laws of the field of phenomenal consciousness are, in general, covariant, that is, are not dependent on a particular choice of a linguistic coordinate system, then introduction of an independent,

arbitrary, absolute inertial linguistic frame, will no longer be necessary. That which constitutes the spatial character of cognitive reality is then simply the four dimensionality of the sensesound. Based on William James’ assertion (1981) that consciousness as a process is continuous, we extrapolate that there is no “empty” space on the field of sensesound, that is, there is no space without a field.

### Unified Cognitive Field of Consciousness

Whereas a field has no empty space, we note, it is not homogenous either. Just as a strictly homogenous magnetic or electrostatic field is never encountered in reality, the density of the sensesound depends on the distribution of phenomenal concepts. Further, in accordance with Riemann’s assertion that, “The basis of metrical determination must be sought outside the manifold in the binding forces which act on it” (Weber, 1953), we apply the unified cognitive force, comprising of the semantic and neurosonemic forces, as discussed above, to act simultaneously in generating meaning, as well as, in semantically coextensive representation of meaning, regulated by the field of epistemic faculty of consciousness, with the stipulation that the field of epistemic faculty of consciousness is covariant with the sensesound continuum such that the geometry of the eventual curvature of the sensesound is a measure of semantic invariance of an emerging neurosonemic concept, to be later expressed in its corresponding linguistic concept. We denote the field of epistemic faculty of consciousness by a fundamental Riemannian second order symmetrical tensor,  $g_{\mu\nu}$ , such that the eventual Riemannian sensesound curvature denotes an invariant metric of emergent meaning, where  $\mu$  and  $\nu$  are components, to be summed over 1 to 4. Riemannian fundamental tensor (D’Abro, 1950) is known to be an invariant metric that exists independent of a specific reference frame. Einstein employed  $g_{\mu\nu}$  to denote the gravitational field in the theory of relativity (Bergman, 1976). A tensor is known to be a generalization of a vector which is a mathematical entity specified with respect to a given coordinate system and which can also be transformed to other coordinate systems.

In order to carry through general relativity of all ‘coordinate systems’, pertaining to various linguistic frames of reference, that is, a general



application of relativity to kinematically equivalent linguistic descriptions of semantic invariance in a neurosonemic concept, the field of epistemic faculty of consciousness must be correspondingly specified for every inertial linguistic system. Here, the inertial systems themselves are not equivalent, but every linguistic coordinate system together with its corresponding field of epistemic faculty of consciousness is equivalent to any other linguistic coordinate system together with its corresponding field of epistemic faculty of consciousness. Each of these covariant descriptions is then an admissible description of invariant meaning in a neurosonemic concept, ready to emerge as a corresponding phenomenal concept on the sensesound.

We postulate a novel fundamental second order symmetrical tensor,  $H_{\mu\nu}$  termed cognitive-emotive tensor, to denote the consciousness arising from the totality of phenomenal concepts on the sensesound, as a combination of the tensor of the field of epistemic faculty of consciousness,  $g_{\mu\nu}$ , and the neurosonemic field to be denoted by another second order symmetrical tensor,  $S_{\mu\nu}$ . Here,  $S_{\mu\nu}$  tensor is related at every point of the sensesound continuum to the  $H_{\mu\nu}$  tensor, as formulated in the following unified cognitive field equation of consciousness:

$$S_{\mu\nu} + Sg_{\mu\nu} = kH_{\mu\nu} \quad (1)$$

where the Riemannian tensor  $g_{\mu\nu}$  denotes the field of epistemic faculty of consciousness, and  $\mu$  and  $\nu$  are components, to be summed over 1 to 4;  $k$  is a universal constant of the phenomenal consciousness. We assume  $k$  to be unity, for simplicity.  $S$  represents the scalar of Riemannian curvature of the tensor  $S_{\mu\nu}$ , and is given as  $S = g^{\mu\nu} S_{\mu\nu}$ . The left-hand side of the equation-1 depends on the symmetrical tensor of epistemic faculty of consciousness,  $g_{\mu\nu}$ . On the right-hand side, the tensor  $H_{\mu\nu}$  denotes cognitive-emotive energy responsible for consciousness arising from meaning in phenomenal concepts on the sensesound.

We note that the unified cognitive field equation of consciousness (1), pertaining to cognitive-emotive reality, seems to bear a remarkable isomorphic conformity to Einstein's

field equation of gravitation, pertaining to the physical reality (Einstein, 1956);

$$R_{\mu\nu} - \frac{1}{2}Rg_{\mu\nu} = -kT_{\mu\nu} \quad (2),$$

where the Riemannian tensor  $g_{\mu\nu}$  denotes the field of gravitation.

We affirm that equation-1 describes the cognitive kinematic effort exerted, in terms of neurosonemic concepts and their linguistic counterparts, as may be required in comprehending and formulating the laws governing physical reality denoted by Einstein's equation-2. The epistemological nexus between equations-1 and 2 seems to resolve the dilemma, as noted by Einstein,

"The very fact that the totality of our sense experiences is such that by means of thinking (operations with concepts, and the creation and use of definite functional relations between them, and the coordination of sense experiences to these concepts) it can be put in order, this fact is one which leaves us in awe, but which we shall never understand." (Einstein, 1950).

## Discussion

The crisis occurring presently in two major domains of knowledge, quantum physics and cognitive neuroscience, manifested by respective insurmountable anomalies as; nonlocal instantaneous correlation between a pair of entangled photons defies the speed of light according to the special theory of relativity, on one hand, and the dilemma of irreducibility of subjective consciousness to objective neuroscience, on the other, seem to warrant an imminent major paradigm shift in the conventional reductionist science. Reductionist approach, which is eminently suited to study the macroscopic and to a great extent the microscopic aspects of physical reality, is found to be inapplicable to explore the phenomena of consciousness, mind, and freewill, which are, paradoxically, the very means of conducting science.

Our postulates of cosmological origin of the universal field of quantum-consciousness on the spacetime, as well as, the field of epistemic faculty of consciousness on the sensesound in the brain, seem to lay foundation for a non-reductionist approach as a necessary and sufficient complement to the conventional



reductionist approach, thereby, enhancing the scope of modern science to study both physical and metaphysical aspects of reality. We contend that the universal field of quantum-consciousness, leading to emergence of the field of epistemic faculty of consciousness, thereby spanning the quantum physics, as well as, the metaphysics of consciousness, mind and freewill, constitutes the fifth force of nature (Husain, 2015) besides the four forces comprising the Standard Model, pending substantiation of neurons. A plausible evidence of quantum-conscious neurons, capable of instantaneous communication, seems to arrive from an experiment on teleportation that was conducted between two observation centers situated on De Palama and Tenerife, on the Canary Islands, respectively, separated by a distance of one hundred and forty four kilometers between them. A pair of photons was created from a single source; one of them was retained at Palama and the other photon was sent to Tenerife by a laser beam. A third experimental photon which was impinged upon the photon at Palama was observed to have reached the nonlocal entangled photon at the distant Tenerife, instantaneously (Ursin *et al.*, 2007). We affirm that the instantaneous teleportation of the third photon is effected by our postulate that the moment it comes into contact with the photon at Palama it gets transduced into a neuron, which is postulated to be capable of instantaneous communication, at a speed faster than that of light.

Nourons, pervading the universal field of quantum-consciousness may further be realizable in their role in cognitive neuroscience, in particular, in their transduced states as nousons, pervading the field of epistemic faculty of consciousness, which is postulated to be covariant with the sensesound. We propose to study nousons by exploring a "specific form of energy" that is known to arise in the integration of multisensory information (Stein, 2000): "Each of these senses has unique peripheral receptors capable of transducing a *specific form of energy* (italics added) into a neural code and a dedicated neural machinery in the central nervous system to represent and interpret these inputs." Whereas substantiation of nousons in their manifestation in the spontaneity of thought in cognitive neuroscience may affirm instantaneity of neurons in quantum mechanics, we foresee that nousons may be further transduced into phonons (Encarta

Dictionary, 2015), as the quantum of vibrational or acoustic energy which may be at the root of phonology, in linguistics, by studying the well-known role of FOXP2 gene, in phonology (Enard *et al.*, 2002).

We foresee that the semantically coextensive neurosonemic representation of meaning may signify a fundamental principle of equivalence between cognitive-emotive energy,  $E$ , due to  $H_{\mu\nu}$  tensor in equation-1, and the corresponding neurosonemic energy of meaning,  $m$ , occurring at the spontaneous speed,  $S$ , of nousons on the sense sound, as:

$$E = mS^2 \quad (3)$$

If we assign the value of spontaneous speed 's' as unity, based on the unity of consciousness,  $E$  becomes equivalent to  $m$ , implying  $E$  and  $m$  are interconvertible, on the analogy of matter-energy inter-convertibility in Einstein's  $E = mc^2$ . We may find the meaning-energy equivalence to be in accord with the vision of the physicist David Bohm:

"I wish to bring out a new way of thinking, consistent with modern physics, that does not divide mind from matter, or subject from object. Meaning, which is simultaneously conceptual and physical, can serve as the link between the two realms. This link is indivisible." (Bohm, 1985).

Meaning-energy inter-convertibility, in equation [3], seems to explain the fundamental trait of human mind to not only think but also to think reflexively about what it is thinking, as is evident from human cognitive capacity to form higher cognitive concepts based on reflection on a nascent neurosonemic concept, termed primary concept, arising from a given sense experience. This reflexive thought process may be at the root of ontological and epistemological reasoning. We postulate that the next higher cognitive concept may be derived from an epistemological judgment of the primary concept, thereby, enriching the meaning  $m_1$  in a primary concept to  $m_2$ , which, in turn, may enrich the corresponding cognitive-emotive energy  $E_1$ , pertaining to the primary concept, to  $E_2$ , and so on. A general formula of meaning-energy equivalence, may be written as,  $E_i = m_i$ , where 'i' may take any value 1, 2, 3, and so on, corresponding to the levels of epistemological judgment.





A plausible substantiation of  $E = ms^2$  in the equation [3], seems to arrive from the cognitive kinematics of formation of a higher cognitive concept, for example, 'infinity', which is defined to have no physical correlate in the finite universe, although the notion of infinity is virtually arrived at based on the actual sense experience of physical objects with finite magnitudes. For example, from an observation that every object in the universe is finite and hence is measurable, the mind is known not only to inquire, epistemologically, whether there could be an entity which is immeasurable, but also to cognitively 'invent' the metaphysical concept of 'infinity', essentially independent of the actual sense experience, according to Einstein's epistemology: "the concepts which in thought and in our linguistic expressions logically are free creations of thought which cannot be derived inductively from sensory experiences." (Lenzen, 1949). Validity of 'infinity' is confirmed from the fact that in spite of its truly metaphysical nature, it is universally accepted as part and parcel of hard core science. Based on the cognitive kinematics of infinity, we are actively pursuing

exploration of a probable hypothesis of an unseen, uncaused creator/designer of the universe contrasting the hypothesis of chance as the origin of the universe.

We foresee that our on-going investigation into nousons, as involved in the evolution of neurosonemic concepts, may lead to understand the complexity of human mind, a most efficient, self-regulating and self-referential system known in nature, which is known to function with awesome efficiency at negative entropy, under highly attenuating situations, by means of its constant commerce with the external environment and the ever-growing repertoire of concepts in the memory.

Pending research on nousons in their role in the ongoing constant commerce between the brain and environment, resulting in a potential unified metacognitive field of mind, we concur with Edelman (1992), "Cartesian dualism is likely to be dispelled only when we understand the relationship between consciousness and physics."

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