



Review Article

The quantum universe: philosophical foundations and oriental medicine

Menas C. Kafatos*, Keun-Hang Yang

Center of Excellence in Earth Systems Modeling and Observations (CEESMO), Schmid College of Science and Technology, Chapman University, Orange, CA, USA

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ABSTRACT

The existence of universal principles in both science and medicine implies that one can explore their common applicability. Here we explore what we have learned from quantum mechanics, phenomena such as entanglement and nonlocality, the role of participation of the observer, and how these may apply to oriental medicine. The universal principles of integrated polarity, recursion, and creative interactivity apply to all levels of existence and all human activities, including healing and medicine. This review examines the possibility that what we have learned from quantum mechanics may provide clues to better understand the operational principles of oriental medicine in an integrated way. Common to both is the assertion that Consciousness is at the foundation of the universe and the inner core of all human beings. This view goes beyond both science and medicine and has strong philosophical foundations in Western philosophy as well as monistic systems of the East.

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1. Introduction to mind and quantum mechanical reality

The nature of being is beyond science. However, being is the most fundamental aspect of our existence and experience. We take being as given, yet in healing and medicine, one has to address the entire being as an entity.¹ Although western medicine has in the recent past accepted the idea of integrative medicine, it still regards to a large extent the human organism as a biochemistry-driven entity at best and as a machine with parts at worst. Whereas in the East, oriental

medicine systems, whether Chinese, Korean, or Indian, go beyond the parts and the processes and also examine the human as an integrated whole, often reflecting and being part of the universe itself.

In examining the human as a whole, one comes up immediately with the issue of the mind, and in the larger sense consciousness and how it fits a “physical” existence. What consciousness is can only be directly experienced. However, “how” (rather than “what is”) consciousness operates can be put into a framework. An increasingly accepted view is that “universal Consciousness is the foundation of the universe and as such the universe itself is steeped in Consciousness”

* Corresponding author. Center of Excellence in Earth Systems Modeling and Observations (CEESMO), Schmid College of Science and Technology, Chapman University, 1 University Drive, Orange, CA 92866, USA.

E-mail addresses: kafatos@chapman.edu, menas@kafatos.com (M.C. Kafatos).

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(where the capital C refers to universal, rather than individual, consciousness).² This holistic approach is at the heart of oriental medicine and as such, quantum physics and oriental medicine may have much more in common than one would first imagine.

To proceed, we should achieve some consensus on terminology related to consciousness. Most workers in brain science and mind/consciousness fields identify consciousness with neuro processes in the brain, i.e., they presume that consciousness is a derivative of neurophysical processes. Current brain science examines how the brain, through synaptic plasticity, is related to memory and learning. The idea that memory is stored in the brain through physical alterations goes back at least as far as Plato. In the 20th century, two guiding theories were developed: Richard Semon's theory of memory and Donald Hebb's synaptic plasticity theory. In the 1st decade of the 20th century, Richard Semon put forward a theory of memory that anticipated numerous recent developments in memory research.³

Hebbian theory proposes an explanation for the adaptation of neurons in the brain during the learning process. It describes a basic mechanism for synaptic plasticity, where an increase in synaptic efficacy arises from the presynaptic cell's repeated and persistent stimulation of the postsynaptic cell. According to Hebb, learning is not simply something that is impressed upon a passive brain, but a process where the cellular structure of the brain is permanently modified. Many studies have shown the structure and physiology of neuronal circuits, but we still only have a very limited understanding of how behavioral learning is implemented at the network level.^{4,5}

Serotonin 5-HT receptors (5-HT) are widely distributed in the central and peripheral nervous systems and essential for learning and cognition. Recent studies show that the serotonin (5-HT) system plays a modulatory role in cognitive processes, particularly in learning and memory.⁶ Kondo et al⁷ suggest that the 5-HT_{3A} receptor could be a key molecule regulating fear memory processes and a potential therapeutic target for fear disorders.

Studies in inhibition of 5-HT₃ receptors show its physiological roles in the modulation of nociception, the cause of nausea and vomiting.⁸ Yang et al⁹ have shown that 5-HT₃ receptor antagonists are effective therapeutic agents for the treatment of chemotherapy-induced nausea and vomiting.

The field of interpersonal neurobiology¹⁰ goes further, as it extends the concept of the mind beyond the physical brain.

Modern quantum mechanics (QM) has placed a central role for the mind in physics. In fact, many physicists and most founders of QM regard this theory more as a guidepost of how the mind interacts with Nature. Great physicists like Niels Bohr,^{11,12} Max Planck,¹³ Werner Heisenberg,¹³ Wolfgang Pauli,¹³ Erwin Schrödinger,¹⁴ Sir Arthur Eddington,¹³ Sir James Jeans,¹³ von Neumann,¹⁵ and others assigned the role of observations and measurement as central. The standard von Neumann¹⁵ interpretation of orthodox quantum theory is that a quantum system evolves deterministically through unitary time evolution of the quantum state. However, this evolution is interrupted upon measurement and a particular value of the system emerges, given by theoretical quantum probability. What specific value will emerge though, quantum theory

cannot predict. Observational choices in the laboratory determine the context of what is to be observed, and as Richard Feynman and John A. Wheeler held, without observation, quantum systems do not even have any properties. As Wheeler¹⁶ stated, “no phenomenon is a phenomenon until it is an observed phenomenon”. Modern quantum field theory^{17,18} is the most successful theory of modern science and it extended standard von Neumann QM. The observer's choices as Henry Stapp^{19,20} emphasizes play a fundamental role in the “external” reality that one observes, in accordance with Bohr's the Copenhagen interpretation of QM. The observer is an integral part of the process of what is to be observed. Quantum theory opened the door to consciousness but did not provide a solution^{21,22} as to “what consciousness really is”. Even if physicists such as Einstein¹³ and Bohr differed on the interpretation of QM, the spiritual aspect brought out by the importance of the mind, was a common ground for all great thinkers of the first part of the 20th century and continues to this day.

This review article offers the possibility that the quantum mechanical view of the universe is in agreement with the operational principles of Oriental Medicine, which would allow for a modern synthesis across health and medicine. It also offers the possibility that the great schools of the East and in fact Western philosophy itself are very relevant for the synthesis between modern physics and oriental medicine. We emphasize that the work presented here is a framework for further research and practical applications, to advance human health and well-being, the goals of Oriental Medicine. In summary, the nature of Reality, consisting of universal Consciousness, the Self of every being and at every level of existence, the individual human being, and the world of objects, all form a triad of undivided wholeness.

2. Philosophical systems

Perennial philosophies of the East and the West concern themselves with the nature of Consciousness, the relationship of the individual to the universe, and the relationship of the individual to Consciousness itself.^{23,24} Although Oriental Medicine is practical and yields specific results, its origins are tied to ancient systems of thought originating in India, China, and other countries of the East.

The nondualistic systems originating in India, specifically Advaita Vedanta and Kashmir Śaivism, give us a higher view of the individual, the universe and the nature of consciousness.²⁴ The underlying premise, is that the human being is a reflection of fundamental Consciousness and the universe is reflected in the individual and vice versa. This underlying reality of the Absolute is called *Brahman* in Vedanta and *Paramasīva* or Supreme Śīva in Kashmir Śaivism. Both accept Consciousness as the ultimate Reality, the underlying reality of all objects, subjects, and processes tying them together. Monistic (Advaita) Vedanta emphasized that Brahman is the only reality and the universe as something separate is an illusion. Śaivism accepted the universe as real, being part of universal Consciousness, i.e., Śaivism is more natural than the modern scientific approach.

2.1. Advaita Vedanta

Advaita (monistic) Vedanta accepts the authority of the Vedas, and other sets of scriptures spanning several centuries.²⁵ Its basic principles are summarized in the *Viveka Chudamani* (Crest-Jewel of Discrimination) by Adi Śankarā²⁴: (1) “Brahman is Reality”; (2) “The world is an illusion”; and (3) “The individual Self is nothing but Brahman”. In other words, to see the world as independent and separate from the Self, is an illusion.

The *Viveka Chudamani* (Crest-Jewel of Discrimination) of Adi Śankarā states: “The Ātman is one, absolute, indivisible. It is pure consciousness. Therefore, know that you are the Atman, ever-blissful, one without a second”, while his *Aparokshānubhuti* (Self-Realization) states²⁴: “There exists no other material cause of this phenomenal universe except Brahman. Hence this whole universe is but Brahman and nothing else”. Vedanta accepts a triadic Self, consisting of the static (Sat) aspect of the universal Being, the dynamic (Citi or Śakti) aspect of Consciousness, and Bliss (*Ānanda*).²⁴ Vedanta’s teaching is that the Ātman (the individual Self of any being) is identical to Brahman. This is precisely the foundation of Oriental Medicine.

2.2. Kashmir Śaivism

The ancient system of Śaivism²⁴ and its more recent specific form as developed in Kashmir,^{26–29} constitutes a body of monistic philosophical teachings, with practical implications for everyday life. It flourished in Kashmir between the 8th and 12th centuries CE, and is closely related to and built in the tradition of Vedanta.

Śaivism is a *Trika* (triadic) system, consisting of *Paramaśiva* or supreme Śiva, the Absolute, undifferentiated Being; *Śakti* (universal Energy), also known as Citi (universal Consciousness, as the creative power of the Absolute); and the individual soul.²⁴

“The triadic teaching holds that there is *no difference* between Śiva and Śakti/Citi, and in fact no difference between Consciousness which is the One Paramaśiva/Citi and the individual. The monism could be also viewed as a three-fold Reality, consisting of Consciousness, the universe, and the individual; or, alternatively, the object, the subject and the processes tying them together. The view of the underlying Reality in Śaivism is in harmony with Vedanta.³⁰ As Citi unfolds the universe, She as the Creatrix of everything) . . . gives rise to countless beings and countless worlds.”

The creative process itself manifests in an infinite variety of vibrations (*Spanda*) of Ultimate Reality. *Spanda* derives from a term which means “subtle motion”, and as such, Śaivism is based on the doctrine of vibration.²⁷ Quantum field theory (QFT) and Śaivism agree on the importance of vibration in the creative process: QFT assigns objective existence to vibrations of the quantum field, Śaivism assigns reality of objects to vibrations of the infinite field of Citi.

The first sūtra (aphorism) of the Śiva Sūtras states: “Consciousness is the Self”, having the absolute freedom of will, knowledge, and action (see below). How does the universe manifest? The first sūtra of the *Pratyabhijñā-hṛdayam*, “The Secret of Self Recognition”, authored by Kṣemarāja^{28,31} states: “Citi, supremely independent universal Consciousness, is the

cause of the manifestation, maintenance, and reabsorption of the Universe”. In contrast to the way scientists view the universe as being caused and driven by the laws of Nature, the *Pratyabhijñā-hṛdayam* states that the cause is Consciousness itself. But then the question would arise, what is the origin of the vast diversity of objectified existence? Sūtra Number 3 of the same text explains: “That becomes diverse because of the division of reciprocally adapted objects and subjects”^{28,31} while sūtra Number 4 states: “Even the individual, whose nature is Consciousness in a contracted state, embodies the universe in a contracted form”. Manifestation that gives rise to all objects in countless worlds is referred to in many texts of Śaivism.^{26,28,29,32–36} The universe is projected out in 36 levels of manifestation, or planes of existence, called *tattvas*.

Buddhism, a vast system of philosophies and way of living in Asia, started in India and spread in China, Korea, Japan, Tibet, and Southeast Asia. In Korea, early monks believed that the traditions of Buddhism that they received from foreign countries were internally inconsistent. Because of that reason, they developed a new holistic approach to Buddhism, which is different from Mahayana Buddhism. This approach is characteristic of virtually all major Korean thinkers, and has resulted in a distinct variation of Buddhism, which is called *Tongbulgyo* (“interpenetrated Buddhism”), a form that sought to harmonize all disputes by Korean scholars.³⁷ Korean Buddhist thinkers refined their predecessors’ ideas into a distinct form.

Mahāyāna is one of two or three main existing branches of Buddhism and a term for classification of Buddhist philosophies and practice. The Buddhist tradition of *Vajrayana* is sometimes classified as a part of Mahayana Buddhism, but some scholars may consider it as a different branch altogether.³⁸

When Buddhism was introduced to Korea in the 4th century CE, the Korean peninsula was politically subdivided into three kingdoms: Goguryeo, Baekje, and Silla. Some Korean Buddhist monks traveled to China or India in order to study Buddhism in the late Three Kingdoms Period, especially in the 6th century. Several schools of thought developed in Korea during these early times:

- Samnon or East Asian *Mādhyamaka* school focused on *Mādhyamaka* doctrine
- Gyeyul or *Vinaya* school was mainly concerned with the study and implementation of śīla “moral discipline”
- Yeolban or *Nirvāna* in Sanskrit school, which was based in the themes of the *Mahāyāna Mahāparinirvāna Sūtra*

Madhyamaka also known as *Śūnyavāda* refers primarily to a Mahāyāna Buddhist school of philosophy³⁹ founded by Nāgārjuna. According to *Madhyamaka*, all phenomena (*dharmas*) are empty (*śūnya*) of “nature,”⁴⁰ a “substance” or “essence” (*svabhāva*) which gives them “solid and independent existence,”⁴⁰ because they are dependently co-arisen. But this “emptiness” itself is also “empty”: it does not have an existence on its own, nor does it refer to a transcendental reality beyond or above phenomenal reality.^{41–43}

Monistic views are not found just in the East. They are also reflected in ancient Greek philosophies, influencing Christianity. In modern times, the Western philosophical systems of

Baruch Spinoza, Immanuel, Georg Wilhelm Friedrich Hegel, and particularly Alfred North Whitehead^{44–46} had many ideas related to reality and the role of consciousness. Whitehead's ideas mesh well with the foundations of QM, arguing that reality consists of events rather than matter. His *Process and Reality*⁴⁵ forms the foundation of process philosophy. In Whitehead, process philosophy and QM are intimately connected, directly tying philosophy to modern physics.

Having provided some foundations from major Western philosophies and the monistic systems of Vedanta, Śaivism, and Buddhism^{24,38,39}, we present below a possible path to integrate these philosophical views with QM, with science in general and applied to Oriental Medicine. It is our view that the way forward is to explore foundations of philosophical statements tied with the subject–object relationships, so central to both the foundations of consciousness-based philosophies; and, through the issue of observational choices, to the foundations of QM itself, from the Copenhagen Interpretation²¹ to its outgrowth, the orthodox version developed by von Neumann discussed by Stapp.^{19,20} What we have learned from QM may then lead to a scientific framework of consciousness and an understanding of Oriental Medicine.

3. Three universal principles

The role of the observer has been part of quantum theory from the very beginning of its founding, but this issue has still not been resolved and remains the central reason for having so many different interpretations of quantum theory, specifically how to take into account measurement and the so-called “collapse of the wave function”.²¹ Building upon the quantum framework, we realize today that quantum theory has many profound implications for understanding the nature of consciousness. However, not much progress has been achieved in understanding or even accounting for the most elementary subjective experiences. Many neuroscientists even hold the view that the brain has nothing to do with QM. We do not seem to even agree on a common framework of consciousness-related terms. However, what used to be in the domain of philosophy and metaphysics, the origin of the mind, the nature of consciousness, and how consciousness itself arises, can now be approached by science. Any theoretical advance will have to involve an understanding and development of a suitable set of mathematical languages.^{2,47,48}

As we move towards a mathematical formalism of the fundamental relationships between subjects and objects, it is important to understand the common framework that may be applicable to all levels of experience, as revealed primarily by quantum theory, though not limited to it. The world of experiences reveals three fundamental Laws of Nature, which are primarily reflected in quantum theory, but apply to all science. It is the means in which Consciousness objectifies the world: *Complementarity, recursion and creative interactivity*.^{44,49}

Complementarity^{11,12} (or *Integrated Polarity* in everyday language) is the Law that accounts for the “apparent opposites becoming unified at the deeper level” of universal Consciousness. As complementary relations are to be found at every level of existence and for every system and sets of processes, including brain science,^{50,51} this constitutes a justification that

QM is indeed the starting point for developing a scientific framework of consciousness. A consequence of complementarity principle is that it provides horizons of knowledge.^{21,51,52} However, boundaries set up in knowledge systems, or horizons of knowledge, “are not absolute”: In von Neumann's QM picture, they depend on the act of observation.

The second Law of Nature is *Recursion* (or *Correspondence* in everyday language), can be simply stated, “as here, so elsewhere”,⁵² “as above, so below”. Recursion assures that all particles of one kind (say electrons) are similar, in fact in this case, identical; all electrons obey the Pauli Exclusion Principle; all cells in different organisms are similar; all stars share common properties. Without recursion, science and knowledge themselves would not even be possible: The world (and therefore Consciousness, which is its foundation) operate through recursive relations.

The third Law of Nature, *Creative Interactivity*, states that interactions at many different levels, between objects, between living organisms, between planets and stars, occur all the time. An example is universal interactivity through gravitation, interactivity through electromagnetic interactions, etc. Interactions between subjects and objects, between sentient beings (in which case it takes on the special form of *Sentience*), between objects and objects, between cells and cells, etc. In particular, *Sentience* is, in a sense, a fundamental aspect of Consciousness, that forms the foundation of the Conscious Universe.²¹

The three Laws form an undivided whole of operating principles and *give meaning to the universe*. They are the workings of how Consciousness manifests the universe and they apply at all levels, beginning with the fundamental subject–object relationships and the mathematics of Consciousness presented below.⁴⁴

4. Qualia and participation

The notion of relative and absolute planes of existence is widely found and points to complementary truths. For example, Tibetan Buddhist tradition speaks of a primordial consciousness while it accepts two types of phenomena, relative and ultimate.⁵³ The question of how consciousness arises and if there is an underlying reality based on Consciousness has no answer in any system that takes the division of subject and object as absolute. There are even endless disagreements as to what one means by “consciousness”. We here focus on *qualia* (from the Latin term *qualis*, which means “of what kind”) which are at the heart of an experience-based philosophy of mind. The so-called “hard problem”⁵⁴ addresses the difficulty of accounting for experience in terms of physical theories, implying the fundamental role of qualia. QM opened the possibility that experience is fundamental through the role of measurement itself.^{15,19–21,55} Erwin Schrödinger¹⁴ himself held the view that qualia are not material and cannot be accounted for by material theories:

“The sensation of color cannot be accounted for by the physicist's objective picture of light-waves. Could the physiologist account for it, if he had fuller knowledge than he has of the processes in the retina and the nervous

processes set up by them in the optical nerve bundles and in the brain? I do not think so.”

We advocate a “reasonable or common sense” approach: quantum theory opened the door to consciousness but cannot account for consciousness; we cannot “take out” the subjective experience from the practice of science. In the end, it boils down to what are the ontological assumptions (or axioms) of a system of thought. Bohr in the Copenhagen Interpretation argued that QM is silent on this. He opted for epistemology instead. Here we argue that ontology is *implied* in QM and presents with a new vision of reality wherein qualia play a fundamental role.⁵⁶

The most fundamental qualia are related to the relationship between subject and object and powers associated with the resultant interactions. Prior to the clear separation between distinct subjects and objects, we have “five universal logical statements”, each associated with the most fundamental powers of all Consciousness, including individuals. These have now been put in mathematical language.⁴⁴ The logical, mathematical statement of each level with emphasis in bold is shown below, followed by the fundamental power in parentheses:

I (Existence, pure Being)

That (Thatness, objective Reality)

The next three levels begin the “potential process of manifestation”:

I (Am) That (Power of Will): in this relationship, as the subjective part of the relationship **I (Am) That** is emphasized, it signifies the *Will* aspect of Consciousness.

That (Am) I (Power of Knowledge): The emphasis is in **That**, i.e., the statement is written as **That (Am) I**. Here, as the objective part of the relationship, **That** is emphasized. As before any action is undertaken, the object has to be identified. Here, it signifies the *Knowledge* aspect of Consciousness.

I (Am) That (Power of Action): this statement shows balance between the **I am** and **That**, and it is recursive, i.e., repeated forever. The balance between Subject and Object signifies the (potential) for *Action*, equally weighted.

In the above, the Subject and the Object are not yet separated but are *poised* to move on to separation.⁴⁴ At the first five levels, all entities experience in the same fashion. They are all One, Subject, Object, and the (latent) relationship between them.⁴⁴ The five levels described above are described in Shaivism.^{29,36} The mathematical formalism in logical relationships presented here links to philosophical monism and as such to the principles of Oriental medicine. Before action takes place, it is preceded by knowledge, and before knowledge, the will to know is required. Prior to these, pure existence or “I-ness” and “otherness” (in latent form) are required.

All three Laws of Nature are operating at these five levels with the most fundamental powers, which is the unity of Consciousness.⁴⁴ Complementarity is operating as the

fundamental relationship between Subject and Object. Recursion operates as the relationships can go either way, left to right, or right to left and in fact can repeat forever, always giving rise to pure Being. And sentience is found in all relationships; the Subject (potentially) senses or interacts with the Object. We emphasize that as no separation has yet occurred, multiple statements like **That (Am) I (Am) That (Am) I**... can in fact repeat forever.

As we move next to the level of breakdown of the above universal relationships, pure *Will* gives rise to (limited) will, to know and act. Pure *Knowledge* gives rise to (limited ability to) know and then to act. Pure *Will* and *Knowledge* give rise to *Action* but in limited form, with limited agency to act. In other words, the same universal statements operate but now in “limited form”. At that point, the Subject and Object become separated and they become many subjects and objects. The subjects interacting with other subjects and objects now “appear” as differentiated levels of existence, willing (in a limited way) to know (in a limited way) and act (in a limited way). A certain “veiling of Consciousness occurs, manifest in veiling of quantum non-locality”.⁵⁷ The full mathematics is under development. At this point, it suffices to say that what occurs is the logical statement **I (Am) Not that**, or **That Not (Am) I**. Here the symmetry that applied to the first five levels breaks down providing an account of qualia.

At the level of breakdown of the five pure levels, veiled non-locality and cosmic censorship enter the picture⁵⁸: Hence, the world appears as classical, composed of separate subjects and objects. However, the general principles of complementarity, recursion, and sentience still hold but now in an infinitely complex set of entities. The universe is conceptually born. Fundamental mathematics at the first five “pure” levels is the expression of the fundamental principles. Subsequently, in the manifestation of the universe, Consciousness manifests space-time, and objectified existence. These manifestations are all qualia. The Universe “evolves” out of Consciousness; it is nothing less than Consciousness, in a “condensed” form.

5. Oriental medicine and future synthesis work

The von Neumann interpretation of QM assigns a divide between the subject and the object which is exemplified by the “cut” between them. In the standard QM interpretation, the interaction of the two causes the superposition within the wave function to collapse. The standard QM interpretation assigns a fundamental role to observation and as such opens the door to conscious interacting with observed systems.

The starting point, our “ontological assumption is axiomatic”⁴⁴: stated simply is that underlying, “universal Consciousness operates at every level of reality”. It is founded on the fundamental “I-ness”. The basic nature of Consciousness is also basic to each and every one of us: it is the perfect I-consciousness, the I-awareness.³³ Three Laws of Nature, by contrast, allow universal Consciousness, which otherwise would be unmanifest and unknowable, to operate and give rise to all subjective experiences. The Universe is participatory as Consciousness is in partnership, or participation, with

everything in it. This participation manifests as sentience “at all levels, in all objects”.

These conclusions are an integral part of Oriental Medicine. For example: the individual reflects the universe and vice versa. Yin and Yang are but another term for complementarity. Participation of one’s own awareness and the healing prescribed by Oriental Medicine leads to one’s own balance and healing. Universal principles applied to the individual and Oriental Medicine brings out these principles in an integral and practical way. The physical body is not a machine; the mind plays a fundamental role. The mind allows experiences to be created in an interactive way, which can, again, lead to healing. Objective understanding of the human being, healing, and spirituality are not opposites; they complement each other, as Oriental Medicine holds, etc.

It is hoped that this brief, introductory review will lead to a merging of understanding of the two great systems, science and particularly QM with all its implications, and oriental medicine. As western medicine is based on science, the merging of western and oriental medicines will be a natural outcome. The merging will not only provide a better understanding of both, science and oriental medicine, it will lead to a better set of healing and curing Oriental Medicine modalities.

Conflicts of interest

The authors declare that they have no conflicts of interest.

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