

# Quantum Reality, the Importance of Consciousness in the Universe, the Discovery of a Non-Empirical Realm of Physical Reality, and the Convergence with Ancient Traditions of Indian and Western Philosophy.

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## *Abstract*

We review some characteristic aspects of the metaphysics of quantum theory which lead in a remarkable way to a confluence of powerful traditions of Indian and European philosophy. The metaphysical aspects include 1) the discovery of a non-empirical part of physical reality in a realm of potentiality; 2) the emanation of the empirical world out of a realm of non-material forms; 3) the discovery that the nature of physical reality is that of an indivisible Wholeness – the One; and 4) panpsychism: the possibility that the One is aware of its processes like a Cosmic Consciousness. The convergence of powerful traditions of seemingly disparate cultures is particularly important to point out in the present process of globalization, when a unifying view is needed to avoid controversy and conflict.

## *I. Introduction*

20th Century Physics has shown that physical reality is not what it looks like. It is now possible to propose that the basis of the material world is non-material; that reality is an indivisible wholeness – the One; and that microphysical objects possess properties of consciousness in a rudimentary way. Indications are that the wholeness is aware of its processes, like a Cosmic Consciousness. Thus, physical reality is shot through with elements of consciousness at all levels, and physics has discovered a non-empirical part to physical reality.

The first appearance of such aspects of reality within the framework of mechanistic and materialistic Western science was a surprise. In the Indian tradition they have been the basis for a comprehensive view of the world for a long time. As Sri Aurobindo described it (McDermott 2001, 39): “The teaching of Sri Aurobindo starts from that of the ancient sages of India: that behind the appearances of the universe there is a reality of a being and consciousness, a self of all things, one and eternal. All beings are united in that one self and spirit but divided by a certain separativity of consciousness, an ignorance of their true self and reality in the mind, life, and body.”

In a globalized world it is important to focus on the similarities and kinship of different cultures to avoid controversy and conflict. It is the purpose of this paper to describe some of the connections that exist between contemporary Western science, Western philosophy, and traditional Indian thought.

## *II. Some characteristic aspects of quantum reality*

### *1. The Basis of the Material World is Non-Material*

Erwin Schrödinger's quantum theory is currently the only theory, which allows one to calculate the properties of polyatomic molecules. In this theory the electrons in atoms and molecules are not tiny material particles, little balls, but standing waves, wave functions, numerical patterns, or mathematical forms. We owe to Max Born the discovery that the nature of these forms is that of probability waves or probability amplitudes.

Probabilities are ratios of numbers. Thus, probability waves are empty; they carry no mass or energy, just information on numerical relations. Yet, all visible order in the universe is determined by the rules of their interference. Interference of the wave functions of atoms, for example, determines what kind of molecules can form and what kind of chemistry is possible. The interference of the wave functions of molecules, in turn, determines what intermolecular interactions are possible, including those, which, in living cells, are the basis of life.

In this way we find numerical relations at the foundation of reality on which the order of the world is based. Reality is built on principles that transcend the monist materialist views of classical physics, which claimed that all phenomena can be reduced to the motion of material particles. In modern science this finding was unexpected, but new it is not: Pythagoras already thought, "all things are numbers" (Russell [1946] 1979, 54), and "the entire cosmos is harmony and number" (Hirschberger 1976, 1:25). Similarly, Plato believed that the real atoms are not material bodies but mathematical forms. Thus, the Western universe, once closed by Newton's materialism, has opened again. Cracks have opened to a different type of reality, and the world of mass-energy is not completely sealed any more: *the basis of the material world is non-material*.

### *2. Non-Locality: Reality has the Nature of an Indivisible Wholeness*

In the commonsense reality of our consciousness, no signal or influence can move at a speed faster than the speed of light. In contrast, in the quantum world, elementary entities can act without any delay and at long distances on each other. Under certain conditions, decisions made by an experimenter in one laboratory can have an instantaneous effect on the results of an experiment performed in another laboratory a long distance away. Two particles, which at one time interact and then move away from each another, can stay connected and act as though they were one thing, no matter how far apart they are.

This is the nonlocality of the quantum world. Menas Kafatos and Robert Nadeau (1990) have drawn a remarkable conclusion from this phenomenon: If reality is nonlocal, the nature of the universe is that of an undivided wholeness. Because our consciousness has emerged from this wholeness and is part of it, it is possible to conclude that an element of consciousness is active in the universe: a Cosmic Consciousness. In this way contemporary physics has led many physicists (David Bohm [1980] 1981; Hans-Peter Dürr 2000, 2004; Hans-Jürgen Fischbeck 2005) to the view that ultimate reality is unknowable wholeness – the One - which David Bohm describes as "Flowing Movement" (Bohm [1980] 1981, 11) Out of the constantly changing flux certain

temporarily enduring and relatively independent aspects – the elements of our direct experience of the world – can be abstracted or “relevelated” (Bohm [1980] 1981, 151). Among them, mind and matter. “In this flow, mind and matter are not separate substances. Rather, they are different aspects of one whole and unbroken movement.” (Bohm [1980] 1981, 11) Thus, everything emanates out of this flux, including life, matter, our consciousness and its concepts: *The One is alive and aware of its processes.*

### 3. *The Importance of Consciousness in the Processes of the Universe*

Elementary particles display aspects of consciousness in a rudimentary way. That is, quantum objects can react in a mechanical and automatic way to the flow of information in that, under certain conditions, they change their behavior when what we know about them changes. For example, in single particle interference experiments, *which-way information* destroys coherence; i.e., the ability to interfere. In the ordinary world of our conscious experience, the only thing that we know which can react to information is a mind. In this sense we can say that we find entities with mindlike properties at the foundation of ordinary things.

“Information sits at the core of physics, just as it sits at the core of a computer,” John Wheeler and Kenneth Ford wrote (1998, 340). And Norbert Wiener, founder of Cybernetics, emphasized (1961, 132), “information is information, not matter or energy. No materialism, which does not admit this, can survive at the present day.” Similarly, astrophysicist Arthur Stanley Eddington wrote: “The universe is of the nature of ‘a thought or sensation in a universal Mind’.” (1939, 151) And his colleague, James Jeans concluded, “Mind no longer appears as an accidental intruder into the realm of matter; we are beginning to suspect that we ought rather to hail it as the creator and governor of the realm of matter.” (1931, 158)

Aspects of Mind come in many phenomena to the fore. For example, the nonmaterial probability waves are closer to the nature of a thought than that of a thing. In quantum jumps quantum systems react spontaneously. A mind is the only thing that we know that can do this. Ascribing mind-like properties to microphysical entities in this way is a metaphysical stance that suffers from the fact that electrons, protons, and atoms do not in themselves have a psyche or conscious. How can they possibly act as though they did?

The answer to this enigma is as follows: electrons, protons, and atoms do not in themselves have a conscious mind, but the mind-like properties that they display are those of the wholeness of reality; that is, they are expressions of the Cosmic Consciousness. Since the Cosmic Consciousness is wholeness, it *is* everything and is aware of everything. It is aware of all of its processes and reveals its awareness in a rudimentary way in the automatic and mechanical reactions to information at the level of elementary particles, and through all the levels of consciousness in nature up to and including human consciousness. Electrons can act like elements of consciousness because the Cosmic Consciousness is acting through them. This is the meaning of the thesis that “an element of consciousness is active in the universe.” Consciousness is not a property of the emanated, material universe, but of its foundation, the One, which displays its awareness in the objects and processes of the empirical world. *The One is aware of its processes.*

Similar views are found in Indian ontology, where *Atman* is an important concept, which has the meaning of *cosmic soul* or *cosmic self*. In Mantra 4 of the Iso-Upanishad, Atman is described in the following way: the Atman does not move; is one and is swifter than the mind; the senses reach it not, as it is the foremost in motion. It goes beyond the others in rapid motion while it is itself at rest. (Ramprasad 1998, 113) Here one is also reminded of Aristotle's principle of causality, according to which motion arises where form meets matter and every motion must have a mover. When everything in motion has a mover, which is itself in motion, a causal chain results that leads to a mover who himself has not been moved by anything else. This, Aristotle thought, is God: *the unmoved mover*.

#### *4. Non-empirical Reality: Realm of Forms and Potentiality*

If one pursues the nature of matter to its roots, at the level of atoms and molecules all matter is lost and all of a sudden one finds oneself in a realm of non-material forms, where actuality turns into potentiality and reality reveals that it consists in two domains: there is the open and well-known domain of empirical, material things – the realm of actuality; and there is a hidden and invisible domain of non-material and non-empirical forms – the realm of potentiality. The forms are real, even though they are non-empirical, because they have the potential – Aristotelian *potentia* – to appear in the empirical world and act in it. In fact, the quantum phenomena suggest that the realm of forms is the primary reality and the empirical world is an emanation out of it. Since the forms are contiguous, reality is an indivisible wholeness.

These aspects of reality cannot be derived from the visible order of the world, because that order appears to us in isolated, actual and material objects. The material things cover up, as it were, the realm of non-empirical forms, from which they emanate. Thus, at its frontiers, observable reality does not fade into nothing but into something non-empirical. *There is a Non-Empirical Part to Physical Reality*.

#### *5. Some empirical evidence for the existence of a non-empirical reality*

At first sight the concept of a non-empirical reality appears self-contradictory. How can something be real if it is not material and cannot even be experienced? However, entities do exist of which we can have no experience and yet they are real because they can express their logical order in the empirical world and have an effect on us.

Among the non-empirical entities we have to list all quantum systems in *superposition states*. The superposition concept in quantum theory denotes the characteristic ability of quantum systems to evolve in states in which a given system is not in a state of actuality, but of potentiality. That is, in such a state, a particular property, like the position in space, does not have a single actual value, but a multiplicity (a superposition) of potential values (C. N. Villars, 1987). For example, when an electron leaves an atom and becomes a free electron, it can evolve in a superposition of possibilities to be found in many positions in space. Thus, the system is not part of the actual (empirical) world, but it has the *potential* to appear in it, and superposition states belong to the realm of potentiality in physical reality.

Such states are non-empirical because observation destroys them. In an observation, the superposition of states collapses to a single one of the states that is included in it, and that state will then appear as the observed, *actual* state.

A second class of non-empirical states is found in the empty states of atoms and molecules. All ordinary material systems exist in quantum states. But every system consists not only of the state which it is occupying when it is observed, but also of countless other, invisible states, which are empty. Quantum chemists call empty states *virtual*. They are part of physical reality but, since they are empty, not of the empirical reality. Virtual states are mathematical forms, patterns of information, but they are more than mere formulae or ideas of mathematical forms: they contain the empirical possibilities of a system. When a system makes a transition into a virtual state, that state becomes an empirical state. Since they can manifest themselves in the empirical world, virtual states, too, belong to the realm of potentiality.

Central to the revelation of a non-empirical reality is the phenomenon of *coherence*. Coherence is the ability of single quantum entities to interfere. That ability is apparent in interference phenomena. Such phenomena are always observed when the same experimental result can be achieved for a single quantum object in two different classically conceivable but indistinguishable ways. An example of this is found in single particle interference phenomena at double slits. (For a detailed description see, for example, Schäfer 1997, 2006, 2008.)

### *III. Non-empirical reality and the Convergences of Indian and European Thinking*

The discovery of a non-empirical part of physical reality has raised some metaphysical issues which lead in a remarkable way to a convergence of ancient Indian and European teaching. These issues involve the concept of potentiality, the importance of forms as principles of being, and the aspects of cosmic wholeness and consciousness in physical reality.

#### *1. Potentiality and Form*

In European philosophy, the concept of *potentiality* as a mode of being was first introduced in Aristotle's metaphysics. Aristotle believed that form and stuff (matter) are among the fundamental causes through which something real is created in the world. Thus there are formal causes and material causes. Everything that has come into being is a composite made of stuff and form. As Hirschberger writes (1976, 1:192), for Aristotle "being means to have been formed; becoming means receiving a form; decaying (fading out of reality) means losing form." Form is the true being and the logical and ontological essence of a thing. Matter without form is not quite real, but it has the potential, *potentia*, to become real; namely, when it finds a form. Thus, for forms to create reality, stuff (matter) has the function of potentiality. By form alone nothing can come into existence. Something has to be there, i.e., stuff (hyle), that can be formed. (Hirschberger 1976 1:196)

The state of *potentia* is a special state of being. Potentiality in quantum reality is like Aristotelian *potentia*, but it also different from it. In Aristotle's metaphysics it is matter that is not quite real but has the potential to become real

when it is formed. In quantum physics it is the forms that are non-empirical but become empirical when they are actualized in matter. Quantum form is first, matter is second. Unformed stuff in Aristotelian *potentia* is often described as *not quite* real. It would not be precise to describe the quantum forms in the same way because, in the realm of quantum potentiality, they are *always and truly* real. The precise description is that the forms of potentiality are real, but non-empirical. Their potentiality lies in their ability to actualize in the empirical world.

Aristotle's metaphysics founded a powerful tradition of thinking in Western philosophy. In the sixteenth century Giordano Bruno (1548-1600) wrote about the structure of reality that there is "coincidence of matter and form, potency and act, so that being, logically divided into what it is and what it can be, is physically undivided and one" (Bruno, 1998: 10). More recently Ervin Laszlo ([2004] 2007) proposed that a cosmic information field exists, which generates, conserves, and conveys information and links all the parts. He called this the *Akashik field* inspired by the Indian concept of *Akasa*, which denotes an all *encompassing medium that underlies all things and becomes all things*, thus representing a realm of potentiality in reality. The Buddhists do not agree with this view of *Akasa*, but they regard it as *Avaranabhava*; i.e., the absence of a covering or occupying body. However, according to Vedantic scriptures, *Akasa* is an emanation out of Brahman. (Sivananda 1999, Chap.2:3)

In Indian philosophy, the concepts of potentiality and forms are conjoined with the theories of various schools regarding the creation of the universe. According to these views, the material universe emanates out of Brahman, but the emanation is not *creation* because the universe is already hidden in Brahman before it emanates, like a tree in the seed; that is, the universe is not absolutely non-existent before the creation because it already exists in Brahman as a *potentiality*.

In *Sruti*, i.e., the revealed literature of Indian Philosophy (Radakrishnan 1968, 22), one finds the Sanskrit *sloka* (or statement): "Asad va idam agra asit". (Sivananda 1999, Chap.2:24) The literal translation means, "At first the universe was there, but non-existent". Here the word *Asad* is derivative of *asat*, which does not mean absolute non-existence. The word *sat* has to be taken as *being manifest* and not simply as existence in the sense of having a name and form, and being differentiated (i.e., being structured). Its negation, *asat*, means subtle, fine and unmanifested. Thus, it should be taken as a subtle state of an object and the *sloka* given above means that the *asat* universe existed in an extremely subtle, unmanifested state before it became manifest in a differentiated state. *Existence* and *non-existence* are the different modalities of the ultimate reality.

The Vedantins think that the Akashic realm of potentiality has the quality of sound. Interestingly, space is inferred from the attribute of sound, and the primordial sound or vibration in *Akasa* is thought to create all kinds of forms and matter. In physics, sound is a wave phenomenon that needs a material medium to propagate and exist. In quantum theory the realm of potentiality consists of potentiality waves. Potentiality waves are not sound waves and they are not a material phenomenon, but they are non-material forms. Nevertheless they share with the Vedantic view of Akashic potentiality the property of being waves. Similarly, in modern cosmology, the vacuum is considered to be subject to primordial and fluctuations which can be wave-like and give rise to matter. (Kuzmin

and Tkachev, 1998) The importance of vibrations has been discussed in various schools of Indian thought for many centuries. According to the school of *Kashimiri Shaivism* (Singh 2005), *spanda* (that is, vibration) plays a pivotal role in creating forms and matter. In the empirical universe, all types of vibration need a supporting medium or field. In contrast, the vibration represented by *spanda* does not need any kind of medium or field to support it; it is a real but non-material phenomenon, forming a realm of potentiality; that is, *spanda* gives birth to the material world.

In quantum theory, the entire universe is considered a quantum system. Its occupied states form the visible part of actuality; its virtual states and superposition states form the non-empirical realm of potentiality. The former contain everything that is actual; the latter, everything that is possible. Virtual cosmic states form a realm of Plato's Ideas. In this way the quantum perspective of reality assumes an underlying non-empirical order, which is not stored in empirical forms but in the realm of potentiality in physical reality.

Virtual States revive the ancient Idea of "Forms as Metaphysical Principle of Being." (J. Hirschberger 1976, 1:604) Pythagoreans claimed that number is the arché of all things. "Thus, the principle of all being is no longer seen in stuff, but in form." (J. Hirschberger 1976, 1:24) In this way the concept of virtual states takes physics right into the center of historic traditions of spirituality. Virtual state wave functions are pure, nonmaterial forms, in which matter abandons itself or has not yet appeared. In Aristotle's metaphysics there was only one pure form: God.

Similarly, the actualization of the empirical reality out of virtual states is like an emanation out of a wholeness that is One. In the metaphysics of Plotinus (205-270), God is the One and the world is not a creation of the One, but an emanation, due to a necessary flowing over of the Divine. "The One is all. All is out of the One." (Hirschberger 1976, 1:304)

In the metaphysics of Augustine of Hippo (354-430 B.C.E.) the eternal forms have the important function as the lasting and immutable essence of things. He believed that they exist in the mind of God. Thus, it is possible to think that, through the realm of virtual states, Divine Reality is shining into human reality. Non-empirical reality is the liaison reality where the Spiritual and the Physical merge and transcend the human comprehension.

In the first half of the twentieth century Swiss psychiatrist Carl Gustav Jung (1875-1961) believed to have found empirical evidence for the existence of a realm of non-empirical forms or structures which can appear spontaneously in our consciousness, influencing "our imagination, perception, and thinking." (Jung [1959] 1990, 44) He called these forms or images the archetypes. (Jung [1959] 1990, 4) As "typical modes of apprehension" the archetypes shape the conscious contents of our mind by regulating, modifying and motivating them. (Jung [1960] 1981, 137),

In order to be able to live, to give meaning to life, and to develop a conscious Self, human beings constantly need to reach into this realm of forms, termed *collective unconscious* by Jung. "A psychic system of a collective, universal, and impersonal nature which is identical in all individuals ... It consists of pre-existent forms, the archetypes, which can only become conscious secondarily and which give definite form to certain psychic events." (Jung [1959] 1990, 43) Jung's description of the collective unconscious is like of a Wholeness and non-empirical realm of potentiality. Beyond the narrow

confines of our personal psyche the collective unconscious is, “a boundless expanse full of unprecedented uncertainty, with apparently no inside and no outside, no above and no below, no here and no there, no mine and no thine, no good and no bad ... where I am indivisibly this and that; where I experience the other in myself and the other-than-myself experiences me. ... There I am utterly one with the world, so much a part of it that I forget all too easily who I really am.” (Jung [1959] 1990, 21)

Archetypes are pre-existent forms, universal Ideas. By having the potential to become conscious in us, they form a realm of potentiality. They are non-empirical entities because they “have never been in consciousness” before. (Jung [1959] 1990, 42) Thus, the birth of the Conscious Self is from a Realm of Non-Empirical Forms.

## 2. *Cosmic Consciousness:*

The quantum phenomena make it possible to think that the nature of the One is that of a Cosmic Consciousness. The equivalent view, in Vedantic teaching, involves the concept of Brahman. Brahman is the ultimate reality, which is without form, and is the only cause of the universe, which emanates out of it. Like the realm of quantum potentiality, Brahman is absolute and has the nature of *intelligence*, (Sivananda 1999, Chap.2:3) Furthermore, according to Vedanta, the Brahman contains the universe in unmanifested form, before it emanates out of Brahman. Here, all objects of the universe (both animate and inanimate) are supposed to have consciousness but in varying degree. Thus, cosmic consciousness is concealed even in the smallest entities.

In Buddhist philosophy (Suzuki 1999, 176), the concept of Alayavijnana plays a significant role in understanding various states of consciousness and the mind. *Alaya* denotes a storehouse where all kinds of goods are kept in storage. *Vijnana* denotes a principle of consciousness, as distinguished from the body. The function of Alayavijnana is to store, as seeds, all the memories of all sentient beings of their thoughts, affections, desires and deeds. According to various other schools of Indian spiritual teaching (Sivananda 1999, Chap.2:84), Alayavijnana denotes a Cosmic Mind, which is the repository of all individual minds in a potential form. Strictly speaking, Alayavijnana should be considered as a *cosmic soul* or *cosmic consciousness*, which is the repository of all individual minds in a potential form.

As to the problem of mind and matter, most Indian schools think that mind is a special form of *thin* matter, which is meant to be different from the ordinary matter of material things. In contrast, the *Carvaka school* claimed that mental states do not possess an autonomous ontological status and can be reduced to physical events. (Chattopadhyaya and Gangopadhyaya, 1994) This corresponds to the modern monist materialist view of consciousness, according to which all thought processes and cognitive activities are embodied in neuronal functions of the central nervous system.

In the philosophy of G. W. F. Hegel (1770-1831), “absolute Spirit” is the primary structure of reality and everything that exists is the actualization of this structure. In Hegel’s Absolute Idealism spirit is everything, creates everything, and thinking and being, subject and object, the real and the ideal, the hand the divine – all are One. To this Hegel added the concept of evolution: God is in our history and in all cosmic processes of becoming. He abandons himself in the world in order to find himself.

In the metaphysics of quantum physics, the elements of our empirical world – material particles, the galaxies, our consciousness, life – have emanated out of the wholeness, the flux of potentiality. Thus, all empirical phenomena have somehow a common root in the realm of non-empirical forms. Vice versa, if reality is wholeness, the Cosmic Consciousness is a part of us. If one is entangled with another, the other is entangled with the one. In this way one arrives at Hegel's thesis that *the Cosmic Spirit is thinking in us, becoming conscious of himself*.

Somehow we were spat out of the wholeness and we have the feeling of a loss. This is the Biblical story of the eviction from Paradise. But Paradise is not a garden of sensual pleasures, not a land of plenty, but the non-material realm of the mind-like wholeness of reality. We have a longing to return. It is the basis of all mystical experiences, of our spiritual needs. It is the longing of our consciousness to get entangled with the Cosmic Consciousness.

The Logion 113 of the Gospel of Thomas states (Davies 2004, 193): “His disciples said to him, ‘On what day will the Kingdom come?’ (He said,) ‘It will not come by expectation. They will not say, ‘Look here’, or, ‘Look there,’ but the Kingdom of the Father is spread out on the earth and men do not see it’.” That Kingdom is the non-empirical realm of physical reality.

#### *IV. Confluence*

In all perspectives of reality – scientific, metaphysical, and spiritual – a powerful process of integration is now taking its course, unifying hitherto seemingly irreconcilable positions. In this unifying process the hidden parallels come to the fore, which exist in the Indian and European traditions of thinking, and in the metaphysics of contemporary physics, leading to a confluence of worldviews that is of great significance for the current process of globalization.

A completely new relationship is now being formed between science and spirituality in the Indian and European traditions, and the accredited religions will have to respond to it or lose their influence. “Like the meridians as they approach the poles, science, philosophy and religions are bound to converge as they draw nearer the whole,” Teilhard de Chardin wrote (Teilhard [1955] 1959, 30), whose ontology and theory of evolution are very similar to those of Sri Aurobindo's.

The discovery of a non-empirical part to physical reality with its aspects of potentiality, wholeness and consciousness, is of universal significance. The immensely artful web of reality now appears to be spun out of non-material, non-empirical and mind-like forms. When all empirical phenomena – the material world, life in its empirical appearances, our conscious self, our expressions of consciousness, concepts and thoughts – emanate out of a single realm of forms, then that realm appears as the all-encompassing domain of spirit – Cosmic Spirit – in which science, philosophy and religion, regardless of their origins, dissolve into the single order of the One.

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