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## Comments

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## SAVING THE PHYSICS II: WHO NEEDS TO BE SAVED? IT DEPENDS ON YOUR METAPHYSICS

Menas C. Kafatos

**ABSTRACT:** Physics does not need to be saved. If anything, physics was rescued in the early twentieth century with the advancement of both the theories of relativity and quantum mechanics. What needs to be saved is our world outlook or metaphysics because how a society acts and develops depends on what its belief systems are. Here we explore how a new metaphysics where consciousness is fundamental might just be what modern societies need.

**KEYWORDS:** Consciousness;; Quantum Mechanics; Qualia, Metaphysics; Ontologies

### THE QUANTUM UNIVERSE

The quantum universe framework that emerged in the first part of the twentieth century has many profound implications for how we humans view the world. This in turn affected our understanding of the role of the nature of consciousness in science. Yet, consciousness and the nature of the mind continue to challenge all of science: Not much progress has been achieved in understanding or even accounting for the most elementary subjective experiences, on the one hand; and how does the mind arise or what it even is, on the other hand, challenges psychology, the mental fields and our modern society in general. Our universe in the words of John A. Wheeler<sup>1</sup> is a participatory one, “no phenomenon is a phenomenon until it is an observed phenomenon”. The participation enters the picture in the quantum universe and is tied to the so-called measurement problem, expounded by the Orthodox view of quantum mechanics (QM) as proposed by John von Neumann<sup>2</sup>, see also Stapp<sup>3</sup>. The problem of

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<sup>1</sup> Wheeler, J.A. (1980). In *Some Strangeness in the Proportion*, ed. H. Woolf (London, Addison-Wesley).

<sup>2</sup> von Neumann, J. (1955). *Mathematical Foundations of Quantum Mechanics*, translated by Robert T. Beyer (Princeton University Press, Princeton, NJ).

measurement in QM and the role of the observer have been part of quantum theory from the very beginning of its founding but have still not been resolved. It is one of the main reasons for having so many different interpretations of quantum theory, see Klein<sup>4</sup>, namely how to take into account measurements and the so-called “collapse of the wave function”. What specific value will emerge upon measurement QM cannot predict. It is now an accepted view that observational choice in the laboratory determines the context of what a measurement is to observe, and we may even presume (as Richard Feynman and John A. Wheeler would say) that without observation, quantum systems don’t even exist. In other words, the observer is an integral part of the process of what is to be observed, of the quantum system itself. QM opened the door to consciousness but has not progressed in accounting for elementary experience<sup>5</sup>.

What the mind is challenges not just the mental professions but QM itself. Is the mind a dual to physical world? Or, as Stapp and Kafatos hold, following the lead of von Neumann, is the universe in its basic nature mental? Yet, many neuroscientists hold the view that the brain, which they presume gives rise to mental processed, has nothing to do with quantum mechanics. This is strange as no one disagrees that QM is fundamental to physical reality and, therefore, in this general view, the brain itself. This is a contradiction that still has not been resolved and yields a chasm that cannot be bridged and a dualistic nature of reality that goes back to Descartes.

Today, scientists in several polls when they are asked what are the top two most important and unsolved topics facing science, they respond, the nature of the universe, and the nature of conscious experience<sup>6</sup>. These two profound issues might in fact be closely related to each other.

## MATHEMATICS ENTER THE PICTURE

Some brilliant attempts have been made to tie consciousness to physical processes, and approach consciousness in different ways than the Orthodox view. For example, Hameroff and Penrose<sup>7</sup> take collapse as giving rise to consciousness in the brain.

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<sup>3</sup> Stapp, H. (1993), *Mind, Matter and Quantum Mechanics* (Springer-Verlag, NY).

<sup>4</sup> Klein, S.A. (2017). Present volume.

<sup>5</sup> Kafatos, M., Nadeau, R. (1990; 2000). *The Conscious Universe*, Springer Verlag, New York. And, Kafatos, M. (2011). “The Science of Wholeness”, in *Analecta Husserliana*, T. Tymieniecka, A. Grandpierre (edit.), Springer Science, Business Media, B.V.

<sup>6</sup> Chopra, D., and Kafatos, M.C. (2017). *You Are the Universe* (Harmony, Random House, NY).

<sup>7</sup> Hameroff, S. and Penrose, R. (1995). “Orchestrated Reduction of Quantum Coherence in Brain Microtubules: A Model for Consciousness,” in J. King and K. H. Pribram, edit., *Scale in Conscious Experience: Is the Brain Too Important to be Left to Specialists to Study?* (Lawrence Erlbaum Associates, Mahwah, NJ).

The plethora of quantum interpretations are, in my view, arguments about the underlying ontology. The accuracy of QM and its modern version, quantum field theory, is so great that no one who is serious enough can question QM. Nevertheless, no one has shown how QM and its variants which were developed to account for physical processes involving microsystems<sup>8</sup>. Leaving aside which physical theory is *the* ultimate theory, might another approach be that *all* of them have something to contribute to the nature of consciousness? If this is the case, and consciousness or fundamental Awareness from which all conscious processes arise, is *the* fundamental Reality (rather than theories about it), an approach which can take us further than any physics is mathematics itself. The reason is simple enough: mathematics is the language of all physics, not the other way around.

In other words, if Awareness is fundamental in the universe, mathematical frameworks are better suited to reveal its main aspects than physical models or theories. A Hilbert space approach has been proposed for the primary relationships between the observer with the observed, suitable for primary qualia<sup>9</sup>. We have developed<sup>10</sup> mathematical frameworks for consciousness and shown that a *single mathematical framework* is unlikely to hold for Awareness. Insights from category theory, and the calculus of indications or laws of forms have been provided by Kafatos and Narasimhan. They propose that mathematical frameworks as fundamental languages of our interaction with the universe should be further developed with consciousness being the driving force.

### THREE LAWS AND QUALIA

In previous works<sup>11 12</sup> we have developed a generalized principle of Complementarity as a foundational Law for all realms of reality. The fundamental relationships between subjects and objects form the foundation of qualia. The world of experiences reveals three fundamental Laws of Nature, reflected in QM, going beyond the psychophysical,

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<sup>8</sup> Bohr, N. (1961), *Atomic Theory and the Description of Nature* (Cambridge University Press).

<sup>9</sup> Kafatos, M.C. (2015). "Fundamental Mathematics of Consciousness", *Cosmos and History: The Journal of Natural and Social Philosophy*, 11(2): 175-188 <http://www.cosmosandhistory.org/index.php/journal>.

<sup>10</sup> Kafatos, M.C., and Narasimhan, A. (2016). "Mathematical Frameworks for Consciousness", *Cosmos and History: The Journal of Natural and Social Philosophy*, vol. 12, no. 2.

<sup>11</sup> Kafatos, M., Nadeau, R. (1990; 2000). *The Conscious Universe*, Springer Verlag, New York. And, Kafatos, M. (2011). "The Science of Wholeness", in *Analecta Husserliana*, T. Tymieniecka, A. Grandpierre (edit.), Springer Science, Business Media, B.V.

<sup>12</sup> Theise, N.D., Kafatos, M.C. (2016). Fundamental Awareness: A Framework for Integrating Science, Philosophy and Metaphysics, *Communicative & Integrative Biology* 9(3): 00-00.

mental, all human endeavors, in the way Consciousness objectifies the world: *Complementarity, recursion, and creative interactivity or flow.*

*Complementarity* (or *Integrated Polarity*) is the first unifying Law, where ultimately the *apparent opposites become unified at the deeper levels* of universal Consciousness. Complementarity is at the foundation of the Copenhagen Interpretation and the von Neumann Orthodox QM interpretation but goes beyond these quantum frameworks, as complementary relations are ubiquitous.

The second Law is *Recursion* (or *Correspondence*), which can be simply stated, “as here, so elsewhere”, “as above, so below”<sup>13</sup>. Recursion allows science to be conducted by any scientist independent of language and cultural differences, a universality of scientific descriptions is assumed, with all physics laws applying everywhere.

The third Law, *Creative Interactivity*, provides a framework of interactions at many different levels, such as interactions between subjects and objects, between sentient beings (in which case it takes on the special form of *Sentience* as described by Theise and Kafatos in their 2013 work); between stars and planets, cells and cells, quantum particles with quantum particles, etc.

The three Laws *give meaning to the universe*, they are the principles of organization and manifestation of the cosmos. Along with the three Laws, Awareness projects the cosmos through a very large, if not infinite, number of powers. Three are universal and most important: Will, Knowledge and Action<sup>9</sup>.

The issue of *qualia*, individual instances of subjective, conscious experience, may then be tied to fundamental mathematics. The so-called “hard problem”<sup>14</sup> proposed by Chalmers, addresses the difficult if not impossible task for science to account for experience in terms of physical theories. Experience cannot be taken out of a quantum-based ontology, as observation implies experience, see for example von Neumann<sup>2</sup>. The issue of what is the meaning of collapse and the interesting role of observation has recently been addressed<sup>15</sup>: Quantum non-local, eraser experiments actually imply the existence of a universal Observer (O) beyond space-time. It is *structured or organized information* that is responsible for the collapse of the wave function and not some mysterious mental action tied to observation by a human observer<sup>6 16</sup> (o).

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<sup>13</sup> Theise, N. D., Kafatos, M. C. (2013). “Sentience Everywhere: Complexity Theory, Panpsychism & the Role of Sentience in Self-Organization of the Universe”, *Journal of Consciousness Exploration & Research*, **4**, (4): 378-390.

<sup>14</sup> Chalmers, D.J. (1995). “Facing Up to the Problem of Consciousness”, *Journal of Consciousness Studies* **2** (3): 200-219.

<sup>15</sup> Narasimhan, A., Kafatos, M.C. (2016). “Wave Particle Duality, the Observer and Retrocausality”, in *AIP Retrocausality Conference*, D. Sheehan (edit.), <http://arxiv.org/abs/1608.06722>.

<sup>16</sup> Stapp, H.P. (2009). *Mind, Matter and Quantum Mechanics*, Springer Verlag, Berlin, Heidelberg.

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## METAPHYSICS AND SOCIETY

As such, what used to be in the domain of philosophy and metaphysics, the origin of the mind and in more general terms examining the nature of consciousness and how consciousness arises, is now tied to science through QM. Yet, metaphysics or the underlying framework on which physics is based, has to be examined from the get go. The metaphysics of an external physical reality which gives rise to consciousness is different from the metaphysics of a fundamental Awareness from which all phenomena arise. In the latter metaphysics, Awareness operates through three fundamental laws which apply at all levels of reality and is characterized by three universal powers.

David Kaiser<sup>17</sup> in his acclaimed book presents the thesis that a new breed of physicists saved physics. We take this to mean that consciousness was brought in a fundamental way. However, for historical accuracy, QM and the theories of relativity as developed in the first part of the 20<sup>th</sup> century had already rescued physics and indeed all science by acknowledging the fundamental role of consciousness. Capra's *Tao of Physics* attempted to tie physics to Eastern worldviews.

We are now more than a century since quantum mechanics was put together by several physicists in Europe. The revolution unleashed in the early part of the twentieth century has wide implications for the nature of reality, the role of consciousness in measurements and the metaphysics of modern physics. Physics and biology, which surely in the end need to be connected in a fundamental way, have achieved great advances. Yet, as we saw, the quantum universe is fundamentally different from the classical world of sensory experience tied to our species, which we take as the only reality. If anything needs to be saved, it is not physics, or for that matter biology, but the way we understand the cosmos we live in and how we relate to it<sup>5,6</sup>.

Although it sounds pessimistic that we may not make it into the 22<sup>nd</sup> century, we have to look at the world view we blindly follow which states that we are isolated in an external reality and all answers need to be found externally. What needs to be saved or better put who needs to be saved, is ourselves. From ourselves. What is crucial in the present times as is always the case, is what we truly believe, since our beliefs shape our actions. Scientists, and particularly physicists have to abandon their ego-centered superiority complex and become practical. In this way, leaving behind a better world for their children and children's children. Otherwise, we will prove ourselves to be at the lowest levels of evolution, being outsmarted and outlived by species that we now

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<sup>17</sup> Kaiser, D. (2012). *How the Hippies Saved Physics: Science, Counterculture, and the quantum revival*.

consider as inferior to us. The universe with its estimated  $10^{22}$  Earth-like planets which likely harbor life will go on. But we as human species may not.

What or who needs to be saved depends on what world view, the metaphysics of reality one prescribes to, one follows. Those who follow fundamental Awareness as the foundation of everything, know that “saving” one from something, is part of Awareness and therefore in a sense, no one or no thing need to be saved.

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