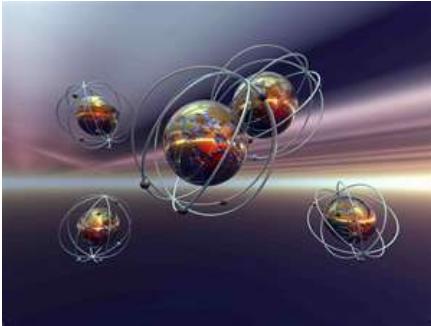


Religion and Science: The Emerging Relationship
The Quantum Enigma
X



The atoms or elementary particles themselves are not real; they form a world of potentialities or possibilities rather than one of things or facts. Werner Heisenberg

In the beginning there were only probabilities. The universe could only come into existence if someone observed it. It does not matter that the observers turned up several billion years later. The universe exists because we are aware of it. Martin Rees

These quotes by physicists, Werner Heisenberg and Martin Rees are from the book entitled, *The Quantum Enigma*, by Bruce Rosenblum and Fred Kutter. What these two quotes are getting at is the role of consciousness in the world, especially as it applies to quantum physics. For the science of quantum physics it is important to note that an atom or any other particle is **not anywhere** until we observe it! Take this situation. Let us suppose that there are two boxes in the room. The observer is asked to open one of the boxes to see in which box the atom is. It is either in one or the other. However, prior to the observer looking for the atom the atom was in both boxes as a *wave* possibility, in a state called, *superposition*. It did not appear in one or the other boxes until the *observer* made the choice to look for the atom! This sounds strange indeed! But in this situation the choice of the observer was critical because the atom was made manifest by the observation. The observer was not measuring something that was already there. His or her choice made the atom appear! In the quantum world conscious observation is critical to making the atomic world manifest. In fact, some would argue that the universe exists because it is observed by conscious creatures. Some push this further and suggest that, in fact, all exists because of a conscious choice by a super intelligence.



(Max Planck)

The quantum revolution in science began with Max Planck in the early 20th century and further developed by such people as Marie Curie, Neils Bohr, John Bell, Max Born, Erwin Schrodinger, Albert Einstein, Werner Heisenberg and others. Quantum physics opened up a whole new perspective on the nature of physical reality. Prior to this revolution in science, scientific discoveries and laws of Newtonian physics helped to create the perception that all physical interactions were determined by mechanical laws of the universe that, if we could know them completely, we could predict what would happen in the universe far into the future. This understanding of the laws of physics led to a vision of the universe that some refer to as *mechanistic determinism*. That would mean that nothing novel could arise in the universe other than what was the product of the laws of nature. This was often used by some philosophers and scientists to insist that the novelty of the resurrection of Jesus was impossible because the dead cannot rise, God notwithstanding, since God would not violate God's own laws! With the arrival of quantum physics this worldview is close to being shattered. Quantum physics tell us that at the foundation of physical reality is an openness or indeterminacy to the universe that allows for new things to simply spring into existence. Rather than simply the fixed laws of Newtonian physics, at the foundation of the universe are probabilities and outcomes.



(Bohr and Einstein)

The vexing nature of this scientific revolution is captured by physicist, Dr. Manjit Kumar:

No one knew how to interpret the equations of quantum mechanics, what the theory was saying about the nature of reality at the quantum level. Questions about cause and effect, or whether the moon exists when no one is looking at it, had been the preserve of philosophers since the time of Plato and Aristotle, but after the emergence of quantum mechanics they were being discussed by the twentieth century's greatest physicists. 1

The question that someone may ask may be, “What is typical of quantum physics that provokes such a new understanding of the universe?” Well, as noted in the abovementioned experiment with the boxes, quantum theory tells us that the atomic world is a world that seems to be more mysterious than first realized when scientists first theorized about atoms and the subatomic world. Quantum theory maintains that an atom is not present in some definite pre-existing space, or *location*, rather it exists in a superposition in a wave form that is spread out that has no specific location until we look for it. Atomic reality exists either as a wave or a particle, what was termed *complementarity* or wave/particle duality.



(Werner Heisenberg)

When we consciously choose to look for the atom this *collapses the wave* into the particle form of the atom. What's more, according to Werner Heisenberg's, *Uncertainty Principle*, we can know where the particle is but we cannot measure what is doing (momentum) and vice versa. Also, the more we know about the position of the particle the less we know about what it is doing and vice versa (my head hurts!). Another peculiar characteristic of quantum reality is called *entanglement*. This refers to the reality that when two electrons, for instance, interact at one time, no matter how many billions of light years they may be away from each other, anything that affects one will affect the other instantaneously. This Einstein referred to as *spooky actions from a distance*.² The theory of *entanglement* has led to the understanding that quantum reality operates within a field of relationships, revealing the interdependent nature of physical reality. This was given popular expression in the hit film, *Jurassic Park*, when Dr. Ian Malcolm, in a shorthand explanation of *chaos theory*, noted that when a butterfly flaps its wings in China it storms somewhere else in the world. In effect, no one can give account of why these two electrons communicate instantaneously over distances of billions of light years unless it is done ³ non-local or transcendent realm. Anglican Priest and Physicist, John Polkinghorne sums it up this way:



(John Polkinghorne)

Quantum entities can be found in states where effectively they behave as a single system, so that acting on one has an instantaneous effect on the others. Physical reality fights back against crass reductionism. It is not possible to describe the world of subatomic physics atomistically! Nature is intrinsically relational.

The most perplexing and important aspect of quantum physics is the role of the *observer*, what some term the *skeleton in the closet* of quantum physics. A better way to put this is the need to understand the role of consciousness in the universe. As we noted, quantum reality shows itself when someone consciously looks for it. This defies the Newtonian world view where an observer measures a pre-existing entity. Quantum physics says the entity was not there until a person chose to look for it!! This insight is captured by the Nobel recipient in physics, Eugene Wigner:

When the province of physical theory was extended to encompass microscopic phenomena through the creation of quantum mechanics, the concept of consciousness came to the fore again. It was not possible to formulate the laws of quantum mechanics in a fully consistent way without reference to consciousness.³



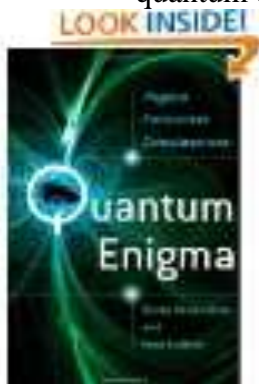
(Eugene Wigner)

This greatly annoyed Einstein who felt that the openness and the randomness of the universe was like the floor being pulled out from under us. He once noted, *God does not play dice with the universe*. He was disturbed by the fact that something was not there before one chose to look at it. What quantum physics seems to suggest is that the

universe itself is manifest because someone observed it!! (Martin Rees) Einstein expressed his concern with this when he stated, *I like to think the moon is there even when I am not looking at it*. Yet, Einstein also noted that the great wonder of all is that the most incomprehensible thing about the universe is that it is comprehensible; suggesting that humanity was created to be the being who could do so!

The major findings of quantum physics are summarized by physicist, Amit Goswami when he says:

- A quantum object (for example, an electron) can be at more than one place at the same time (*the wave property*).
- A quantum object cannot be said to manifest in ordinary space-time reality until we observe it as a particle (*collapse of the wave*).
- A quantum object ceases to exist here and simultaneously appears in existence over there; we cannot say it went through the intervening space (*the quantum jump*).
- A manifestation of one quantum object, caused by our observation, simultaneously influences its correlated twin object—no matter how far apart they are (*quantum action at a distance*). What some refer to as quantum entanglement.⁴



The religious implications of this modern vision of reality are in discussion. Certainly, the notion that miracles, and for Christians, the greatest miracle of the resurrection of Jesus Christ once considered by *mechanistic determinism* a violation of God's own laws of the universe, are not, in fact, such a violation because the universe is an open not a closed system; so novel things can happen! This is noted by Dr. Goswami when he states:

The interruption (we can call it a measurement) offered new possibilities. This is the message of quantum mechanics. The world is not determined by initial conditions, once and for all. Every event of measurement is potentially creative and may open up new possibilities. 5

What's more, quantum entanglement tells us that reality is an interconnected field of relationships. Cardinal Walter Kasper addresses the religious understanding of this interdependence of relationships and the reality of God in his book, *The God of Jesus Christ*:

When we define God, the reality that determines everything, as personal we are also defining being as a whole as personal. This entails a revolution in the understanding of being. The ultimate and highest reality is not substance but relation. 6

Where does this leave us? Clearly, science itself is acknowledging that relationship and consciousness are the basis of the universe, more so than matter; whatever matter is.

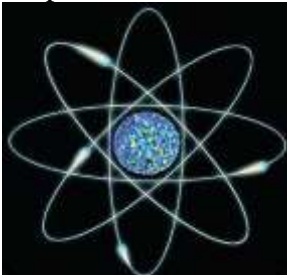
Physicist, Pascual Jordan put it this way:

Observations not only disturb what is to be measured, they produce it.7

Astrophysicist, Bernard Haisch summarizes the central character of quantum mechanics thusly:

To cut to the chase, quantum mechanics is telling us that consciousness creates reality. Naturally, this has profound consequences for the interpretation of our own nature, and, yes, even why it may make sense to trace everything back to conscious intelligence rather than simply inanimate fields and forces.8

This is the fundamental basis of quantum physics, what we observe we change! Consciousness plays a pivotal role in physical and non-physical reality. For centuries, and more pointedly, since the 16th century, science began moving toward the *mechanistic determinism* model whereby all reality was about chemistry and matter. Today, that model has all but been shattered by the new physics, and studies in the brain/mind relationship. This being said, it does not mean that we can prove God via science or that science can disprove God because of new discoveries. But what it does say is that modern scientific discovery opens the possibility to infer God from the very nature of observable reality itself; reviving the traditional cosmological proof of God argument, or what is termed Natural Theology that we see in Romans 1. This is not a knock down proof, but only a pointer to the fundamental mystery of all reality, whom believers call, God. It is also a lure to those who pay attention to the world around them, to look deeper!



Notes

1 Manjit Kumar, *Quantum: Einstein, Bohr, and the Great Debate about the Nature of Reality*, (New York: W.W. Norton Coc., Inc., 2008) p. xiii.

2 Bruce Rosenblum and Fred Kuttner, *Quantum Enigma: Physics Encounters Consciousness*, (New York: Oxford University Press, 2006), p. 125.

3 John Polkinghorne, ed. *The Trinity and an Entangled World: Relationality in Physical Science and Theology*, (Grand Rapids, Michigan: William B. Eerdmanns Publishing, 2010), p. 6

4 *ibid.*, p.5.

5 Amit Goswami, *The Self-Aware Universe: How Consciousness Creates the Material World*, (New York: Tarcher/Penquin, 1993), p. 9

6. *ibid.*, p. 42

7 Walter Kasper, *The God of Jesus Christ*, (New York: Crossroad Publishing, 1984), p. 156.

8 Bruce Rosenblum and Fred Kuttner, *Quantum Enigma: Physics Encounters Consciousness*, (New York: Oxford University Press, 2006), p. 103.

9 Bernard Haisch, *The Purpose-Guided Universe: Believing in Einstein, Darwin and God*, (New Jersey, New Page Books, 2010), p .66.