Einstein and the measurement problem: Is he right again?

In quantum mechanics there exists an unresolved and much debated foundational issue known as the 'measurement problem', of how and where one goes from the microscopic quantum world to the macroscopic classical world when an abstract entity called the wave function collapses as a result of a measurement. Exactly where is the boundary?

Several decades ago John Bell, the theoretical physicist, commented upon this state of affairs in quantum mechanics. "Nobody knows what quantum mechanics says exactly about any situation, for nobody knows where the boundary really is between wavy quantum systems (microscopic world) and the world of particular events (macroscopic world)."

So far all the emphasis in this debate, from a theoretical and experimental standpoint, has been focused upon the *inanimate* world of particles such as photons, electrons, etc. with very little discussion of the relationship between the *animate* world and quantum mechanics.

The Nobel laureate Brian Josephson has explored the issue of whether significant differences exist between the living organism and the type of nonliving or inanimate system studied so successfully in the physics laboratory, and whether one can deal with living organisms in quantum mechanical terms with the same degree of rigor as is normal for nonliving particle systems

In a recent paper, Fred Thaheld has proposed a resolution of the 'measurement problem' involving the utilization of what is known as the Stark-Einstein law, after making a slight addition to the law incorporating information acquired by the photon, with emphasis upon the animate aspect, which has heretofore been neglected by physicists.

The Stark-Einstein law, also known as the photoequivalence or photochemical law, was independently formulated by Johannes Stark and Albert Einstein between 1908 and 1913, and is essentially an obvious consequence of Einstein's original quantum hypothesis in 1905. It says that each quantum of light or photon that is absorbed by a molecule, will cause a primary chemical or physical reaction in that molecule. While it was first proposed for physics and chemistry in the inorganic material world, it also has a great potential in the field of biology from an information standpoint. This revolves around the fact that in addition to the energy possessed by the photon, as expressed by its wavelength, it can also contain information derived from the natural environment or by either having been emitted or scattered by the text projected on a computer screen or printed on a sheet of paper. Both the energy and the information are then passed on to and absorbed by a very receptive light sensitive molecule in our eyes known as retinal. This area encompassing the modified Stark-Einstein law and the retinal molecule, provides a natural boundary between the quantum and classical worlds.

The retinal molecule is in an extremely unique position with regards to nearly all the other numerous organic and inorganic molecules from the standpoint of the Stark-Einstein law in being able to utilize this environmental information, rather than it being discarded and lost, as is the case in plant photosynthesis. It is this information which, after being processed and amplified by certain components in our eyes and passed on to the brain, is how we perceive the world around us.

This theory can also be immediately subjected to experiment, as has been outlined in this and previous papers of Thaheld, based upon recent technological advances in the field of biophysics. For us humans and over 1.3 million phyla in our world possessing some form of eyes, this may be the most important law in the universe in that without it, we would never have been able to see and therefore never have come into existence!

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