

Consciousness in the Quantum Realm

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Abstract

Biological beings use their conscious wills to initiate changes in their own momenta and in the momenta of other objects and beings. If one rejects the idea that consciousness resides only in biological beings, logic suggests the following postulate: that all changes in momentum and hence all forces are initiated by the conscious wills of intelligent beings. If this is true, wherever there are forces there are intelligent beings. Subnuclear scale intelligent beings create the strong and weak nuclear forces, thereby forming protons, neutrons, and nuclei in the nuclear space-time realm; Subatomic scale intelligent beings create the electromagnetic forces between nuclei and electrons that give rise to atoms, molecules, chemistry, and biochemical systems in the atomic/molecular space-time realm. The subnuclear and subatomic space-time realms are smaller and move faster than the biological space-time realm. They are quantum space-time realms. It is proposed that civilizations of intelligent beings in the quantum realms build nuclei, atoms, molecules, macromolecules, cells, and organisms. The Heisenberg Uncertainty Principle, $\Delta E \Delta t \geq \hbar/4\pi$, applies in these realms and predicts that in isolated atoms or nuclei where $\Delta E \rightarrow 0$, it follows that $\Delta t \rightarrow \infty$. The “long term averaging” provided by $\Delta t \rightarrow \infty$ in these realms yields the averaged wave-particle behavior described by quantum mechanics. Further it is proposed that the consciousness and behaviors of biological beings are manifestations of the conscious wills and behaviors of the quantum realm beings that create them.

Physics, chemistry, biochemistry, and biophysics explain actions of biological beings based on causal mechanistic processes occurring from the quantum level to the organism level. However, this approach does not predict the consciousness (i.e. mind) associated with these processes. Consciousness appears in none of the descriptions and arises in none of the predictions. Therefore, because consciousness does exist, the present scientific description is incomplete. The questions addressed here are: in what direct way is consciousness connected to the mechanistic behavior of the atoms, molecules, macromolecules, cells, neurons, organs, and the biological beings themselves; and what are the implications of this connection for other mechanistic processes?

The connection between the mechanistic laws of physics and consciousness becomes apparent if one looks at one's own human behavior and the behavior of other biological beings.¹ For example, I can choose to get up and turn on the tv, or go outside for some fresh air, or to the refrigerator to get a beer, etc. It is my conscious will that determines my behavior, i.e. my changes in momentum. If this is true for biological beings, might it also be true for other changes in momentum? This supposition is the basis for the following postulate : that *all changes in momentum, i.e. forces, are manifestations of willful behavior of conscious beings.*²

A corollary to this postulate is that the presence of forces indicates the presence of intelligent conscious beings.³ There are four known *elementary* forces, the *strong nuclear force*, the *weak nuclear force*, the *electromagnetic force*,⁴ and the *gravitational force*. The strong nuclear force is usually confined to the nucleus. The weak nuclear force is responsible for radioactive decay and transmutations and is also usually confined to the nucleus. Electromagnetic forces have longer range effects but are dominant in atoms, molecules, and all issues having to do with chemistry, biochemistry, neurochemistry, and hence with the behavior of biological beings. Gravitational forces also have long range effects and dominate stars, solar systems, and galaxies, but can nevertheless overcome electromagnetic forces and nuclear forces in neutron stars and black holes. These forces operate in different space-time realms simultaneously.

Is a rock conscious? From the biological being perspective it does not seem to be, but there are intermolecular and interatomic forces present in the atomic/molecular quantum space-time realm, hence according to the postulate there are intelligent conscious beings present in that realm. And there are also nuclear forces hence intelligent conscious beings in the nuclear space-time realm simultaneously. So if the postulate is correct, yes, a rock is conscious in that it is built of and by living quantum realm beings in their respective quantum realms.

The nuclear and atomic/molecular space time realms are both quantum realms where the Heisenberg Uncertainty Principle applies.^{5,6} The form that is most useful to understand conscious

¹ Including plants and microorganisms

² Benesi, Alan J., Theory of Consciousness, 2017, First Edition Publishing,

³ *ibid*

⁴ The weak and electromagnetic forces are different manifestations of the same electroweak force.

⁵ Heisenberg, W. (1927), "Über den anschaulichen Inhalt der quantentheoretischen Kinematik und Mechanik", *Zeitschrift für Physik* (in German), **43** (3–4): 172–198

⁶ Sen, D. (2014). "[The Uncertainty relations in quantum mechanics](#)" (PDF). *Current Science*. **107** (2): 203–218.

behavior in the quantum realm is

$$\Delta E \Delta t \geq \frac{h}{4\pi} \quad (1)$$

where ΔE is the uncertainty in the energy, Δt is the uncertainty in the time, and h is Planck's constant. Since for isolated electrons, protons, nuclei, atoms, and molecules $\Delta E \rightarrow 0$, it follows that $\Delta t \rightarrow \infty$. This means that the observed conscious behaviors in a quantum realm are averaged over enormous times *for that realm*, thereby resulting in the smoothed wave particle behavior described by quantum mechanics. Because of the Heisenberg Uncertainty Principle, position, momentum, energy, and time in the quantum realms are ambiguous for beings in the biological space time realm. The details of their behavior are unknown, but the averaged behavior is predicted well.

The gravitational space-time realm is primarily a relativistic realm although it can create huge quantum realm forces stronger than all other elementary forces.⁷ It is described mechanistically by classical mechanics and Einstein's Special and General Theories of Relativity, and also possibly by quantum field theory as mentioned below.⁸

Clues about the nature of quantum realm beings are provided by the "standard model" of elementary particle physics.⁹ The theoretical basis of the standard model is quantum field theory:¹⁰ quantum electrodynamics for the electromagnetic force,¹¹ quantum chromodynamics for the strong nuclear force,¹² and quantum flavordynamics for the weak nuclear force¹³. All of these forces are mediated by gauge bosons, integer spin wave-particles (i.e. spin 0, 1, 2, ...).¹⁴ Gauge bosons are virtual wave particles, in that they are not emitted to their surroundings but instead transferred within the nucleus, atom, or molecule. They are not directly observable to external observers. They are "force carriers" that cause momentum changes of mass bearing half integer spin (i.e. spin ½, 1, 3/2, 2, 5/2, ...) particles called fermions (e.g. electrons).

The gauge boson for the strong nuclear force is the gluon. It has spin 1, no mass, and travels at the speed of light.¹⁵ It is the force particle between quarks. Quarks are mass bearing spin 1/2 fermions with -1/3 or +2/3 charge that, in combination with the gluons, give rise to protons, neutrons, and nuclei. It is noteworthy that the rest mass of a neutron or proton is roughly 100 times the sum of the rest masses of the quarks that make it up. Most of the rest mass of neutrons and protons is generated by relativistic effects caused by the near light speed motions of the quarks and gluons within them.¹⁶ The source of the much smaller rest mass of the quarks is thought to be the Higgs boson (spin 0). For the

⁷ for example in black holes and neutron stars

⁸ Quantum field theory for gravitation is difficult to prove because individual gravitons are of such low energy

⁹ https://en.wikipedia.org/wiki/Standard_Model

¹⁰ , Meinard, "Quantum Field Theory", *The Stanford Encyclopedia of Philosophy* (Summer 2015 Edition), Edward N. Zalta (ed.), URL = <<https://plato.stanford.edu/archives/sum2015/entries/quantum-field-theory/>>.

¹¹ [Feynman, Richard](#) (1985). *QED: The Strange Theory of Light and Matter*. Princeton University Press. ISBN 978-0-691-12575-6.

¹² https://en.wikipedia.org/wiki/Standard_Model

¹³ https://en.wikipedia.org/wiki/Weak_interaction

¹⁴ https://en.wikipedia.org/wiki/Gauge_boson

¹⁵ All massless bosons travel at the speed of light. Mass bearing bosons travel more slowly.

¹⁶ http://www.fnal.gov/pub/today/archive/archive_2012/today12-01-13_NutshellMassReadMore.html

electromagnetic force the gauge boson is the photon, with spin 1 and no mass.¹⁷ It is the force particle between nuclei and electrons. It gives rise to atoms, molecules, all of chemistry and biological beings. The gauge bosons for the weak nuclear interaction are the Z, W^+ , and W^- bosons, mass bearing spin 1 particles of charge 0, +1, and -1 respectively. The W^+ and W^- bosons are antiparticles of each other. The weak nuclear bosons cause transformations of quarks from one type to another, thereby causing radioactive decay processes. The hypothetical (as yet unobserved) gauge boson for the gravitational force is the spin 2 graviton that has no mass and also travels at the speed of light.

If the postulate of consciousness is correct, *gauge bosons are controlled by conscious beings*. But where exactly are the beings, what exactly do they “look like”, what are their lives like? What is their reality?

The dimensions and time intervals for the different space time realms are vastly different: Nuclear diameters are on the order of 1×10^{-15} m. Dividing this by the speed of light ($c = 2.993 \times 10^8$ m sec^{-1}) yields about 3.3×10^{-24} sec, the time for a gluon traveling at the speed of light to traverse the nuclear diameter. The corresponding values for a photon in the atomic/molecular realm are on the order of 1×10^{-10} m and 3.3×10^{-19} sec. The corresponding values for a nerve signal in the biological realm are about 1 m and 1 sec. The corresponding values for a graviton traveling at the speed of light across a galaxy are about 1×10^{21} m and 100,000 years.

If the postulate of consciousness holds true, the key question becomes *how do ensembles of quantum level minds combine to produce much larger biological minds?* One idea that is consistent with the intricate structures and processes found in biological beings is that they are “civilizations” built by intelligent quantum realm beings, and that the minds of biological beings are the collective minds of the civilizations of quantum realm beings that build them. Thus, the minds in the substructure create the mind of the superstructure. From this it also follows that the thoughts and feelings of quantum realm beings create the thoughts and feelings of biological beings, and that the thoughts and feelings of biological beings are therefore similar to those of the quantum realm beings that build them.

¹⁷ the basis of religious and cultural ideas....e.g. “Let there be light”, “I saw the light”, etc.