Quantum Panpsychism
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Abstract
Quantum mechanics accounts well for behavior of objects, but what does it mean for the actual nature of things? That is difficult within physicalism. Panpsychism can help, and even provides possibilities for quantum-neurologic modeling of conscious experience.

Dualism, etc.
Cartesian dualism posits that there are two basic substances – mental and physical. A problem with that – already raised by Princess Elizabeth of Bohemia in 1643 – is how could such different things interact? Physical and mental monism reduce existence to one or the other substance. Physicalism has problems explaining why we have experiences. Chalmers (1995) calls that “the hard problem,” arguing that neurological activity does not include any components that could produce consciousness. Idealists note that we directly know only sensory experience, and any physical nature of things, as well as causation, are postulates that we cannot go beyond our senses to verify. They allow the theory of physical objects for prediction, because it works well, but don’t considering it reality. Neutral monism says a more fundamental substance underlies both mind and body, but doesn’t identify it. That would double the interaction problem – both mental and physical substances would have to interact with it.

Panpsychism is called “dual aspect monism.” There is one substance, with both physical and mental aspects: all physical particles contain a bit of consciousness. The problem is how these could combine to produce experience. One possibility advanced is aggregation. Bits of consciousness are too disorganized to cross the threshold of human awareness. A lot of brain activity goes on unnoticed, but a large aggregation of similar
content could be experienced.

The term “physical” is under pressure these days. Here objects are called “classically physical” if they consist of particles and forces controlled by cause and effect. Forces act on things to produce outcomes, just like people do.

Classical physicalism holds that the universe is entirely classically physical. This was a good hypothesis after Newton, assuming that experience eventually will be explained. It is a strong hypothesis and is testable. However many accepted it as more than a model, but as truth. It became what Freese (2008) characterizes as “more vampirical than empirical – unable to be killed by mere evidence.” Strawson (2008) cites some of the more extreme adherences to this doctrine – like denying that we actually have experiences – as akin to a faith.

Quantum mechanics challenges to classical physicalism

Quantum waves follow a wave equation which drives observable outcomes. The waves carry information that produces probability distributions for mass and electric charge. The probabilities come from mathematical determinism, different from cause and effect. Forces do not push the waves around but are constraints on solutions of the wave equation. Some events are impossible because their resulting probabilities are zero. Eg., electrons in an atom cannot collapse into the nucleus, even though they have opposite charge and can be very close. Forces are not pushing the electrons away, but are not getting them in closer either. Quantum mechanics shows how atoms, neutrons, protons, etc., which act like classical physical objects, are created by the waves from wave-equation probabilities.

Mathematically, a wave’s value is a number in a two-dimensional complex plane. One axis is the real axis and the other is called imaginary and is denoted by multiples of i. The square of i is -1, which does not have a real square root. In fact, all algebraic equations have solutions in the complex plane. A complex number is a+bi. The math
works well for quantum events. But what the waves consist of has not been specified. They are not classically physical. Physicalism’s true believers adopt the idealists’ reasoning: quantum waves can be used for prediction, because they work well, but they are not reality.

A common conversation-ending non-answer to what quantum waves are is: “the quantum field is a Hilbert space.” A Hilbert space is an abstract mathematical entity that can easily accommodate all the quantum calculations. Such a response seems to assert that quantum waves and everything they produce exists wherever mathematical objects do – Plato’s heaven? It sounds like idealism, but it is surely not meant that way. If Newtonian physicists said “the universe is a three-dimensional Euclidean space,” they wouldn’t have meant it is a mathematical object created in Euclid’s imagination. They would just mean that it follows that model. The Hilbert-space comment is similar. It only says that that is the model, and says nothing about the nature of quantum waves.

Randomness poses similar problems. Quantum waves jump with apparent randomness among solutions, as was observed early on. This looks like an empirical refutation of cause and effect, but for many that theory was too vampirical to be rejected. So called “interpretations” of quantum mechanics have been built to try to hold on to classical physicalism, including determinism. Elaborate unobservable structures are postulated as hidden classically-physical drivers.

Carroll (2019) is a recent elaboration of quantum mechanics not based on classical materialism. Quantum waves are what are actually real, and apparent particles are distant views of compact waves whose details can be ignored. But he does not have any ideas for the nature of the waves. He also supports an interpretation called “multiple worlds” to maintain mathematical determinism: what look like random jumps are actually waves dividing into all possible jumps, each getting its own new universe. A universe looks random, but it is deterministic given its history of jumps, which define
which universe it is. Every event in every future universe is pre-determined. A lot of universes result – very roughly speaking a googleplex \((10^{10^{10^2}})\) of them. These keep dividing, but stay in that realm. If each one divides into a googleplex more, giving a googleplex squared, that is \(10^{10^{10^2.001}}\). The count never gets very large compared to large numbers in mathematics, like Graham’s number, which are too big to express in exponential notation within the universe.

Carroll has clever, but not totally convincing, arguments for why this interpretation is consistent with energy conservation and Occam’s Razor. For the latter, he seems to feel that pure randomness is a bigger conceptual leap than adding universes. We already have one example of those, so multiple worlds are more of the same. Pure randomness is new, and a bigger addition. That is a matter of opinion. Many do not find it so big, but it might seem so if coming from a strong faith in classical materialism.

**Enter panpsychism**

Without particles, where could panpsychism be in the quantum world? The waves would have to include consciousness, which would go into the classical matter they create. One possible approach: the universe consists of three dimensions of space plus a complex information plane for wave values, giving existence five dimensions. Postulate then that the information plane consists of awareness on the imaginary axis and physical content on the real axis. This is builds consciousness into information space, which is part of the universe. Awareness here means the capability to experience; the content comes from the real-axis part. Awareness does not require a subject. Language philosophers including Russell (1912) and Strawson (1967) argued against Descartes’ “I think therefore I am,” saying that it twisted language. Thoughts do not imply a thinker, as existence is not a predicate – a property that some things have and some don’t.

Panpsychism’s aggregation approach of consciousness accumulating in the brain could explain experience. In fact, Bassett and Gazzaniga (2011) find necessary and
sufficient neural processing for conscious experience to be produced. This involves massively replicated neural signals. Details of quantum neurology need to be better understood to see if this would suffice. Conscious experience might involve asymmetric functions of real and imaginary values. Physical-world probabilities arise from an extremely symmetric function of the waves that does not distinguish between positive vs. negative or real vs. imaginary values. Thus there is a lot more going on in the waves than gets into the physical world.

Another model for how consciousness could arise from asymmetric quantum functions, by Pradhan (2012), utilizes the complex conjugate of the waves, which doesn’t change probabilities, but is asymmetric in the imaginary direction.

The neural processing Bassett and Gazzaniga found has no mechanism that would explain how consciousness arises, just as hard-problem theory would predict. Conscious experience is an emerging effect of neural networks, which is often postulated as how they arise in the brain. Unfortunately, that approach has no apparent path towards a theory that would provide a mechanism for producing consciousness, unless it is already present in the universe.

An aspect of quantum waves not part of classical physicalism is quantum coherence. This is a form of correlation and is part of what makes quantum computing possible. It is regarded as a possible generator of consciousness besides, or as part of, aggregation. E.g., see Hameroff and Penrose (1995). But it is easily dispersed (by decoherence) and so seems unlikely to be maintained in neurons. Fisher (2015) proposes nuclear coherence protected by atomic electron shells that could be so maintained. He is not trying to explain consciousness, just the degree of calculation the brain achieves. But his quantum-neurological model is one where models of consciousness in quantum waves might be applied.

In summary, panpsychism can be incorporated into quantum waves. There is room to do that, as the waves’ nature is so far unspecified. This could create avenues for
modeling consciousness in the nervous system without requiring it to be an entity beyond the wave function.

References


