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# Subjective nature of Reality: The Metabrain and Schroedinger's Cat

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## Abstract

We show that according to quantum theory and special relativity that "objects" do not have independent existence or characteristics. We argue that reality consists of highly correlated but distinct streams of consciousness possibly created by a "metabrain".



**Keywords:** subjective nature of reality, entangled particles, metabrain

## 1. A thought experiment

We argue for the subjective and mental nature of reality [1-2] by means of a thought experiment involving entangled particles. This is shown in Figure 1. A spin zero particle decays, perhaps in the distant past in the early history of the universe. The spin zero particle decays into an electron and a positron, each having spin ½. The observer B is at a space-time location also labeled B. He is moving at such a velocity that the point P near the left hand particle is simultaneous with B. Therefore for B near the right hand particle before it is measured, the left hand particle at point P has a z-component of spin which is in a superposition of +1/2 and -1/2. It has also been in this superposition in the distant past in his point of view. Its wave function has not collapsed. Observer C is near the right hand particle after its z-component of spin has been measured at M. He is moving at such a velocity that the point P is also simultaneous with C. For observer C the wave function has collapsed and the left hand particle at P has a definite z-component of spin and has this definite and known z-component in the distant past from his point of view. Thus the left hand particle either has or does not have a definite z-component depending on the observer. It does not have an independent reality. Also it had no independent reality throughout the distant past of the universe. It is different for the stream of consciousness of B than it is for the stream of consciousness of C. In fact B and C could be the same person who has changed his velocity.

Realizing that two observers may disagree on whether a wave function has "collapsed" or whether a situation is definite or describable by a superposition of states resolves the Schrödinger cat problem [3]. For the person not observing the cat, the cat is not part of his stream of consciousness. He may, however, calculate a probability, using the wave function or probability amplitude, that if he were to observe the cat he would find it

alive/dead. The cat, or someone observing the cat, on the other hand, knows if he is alive; he has a different stream of consciousness.

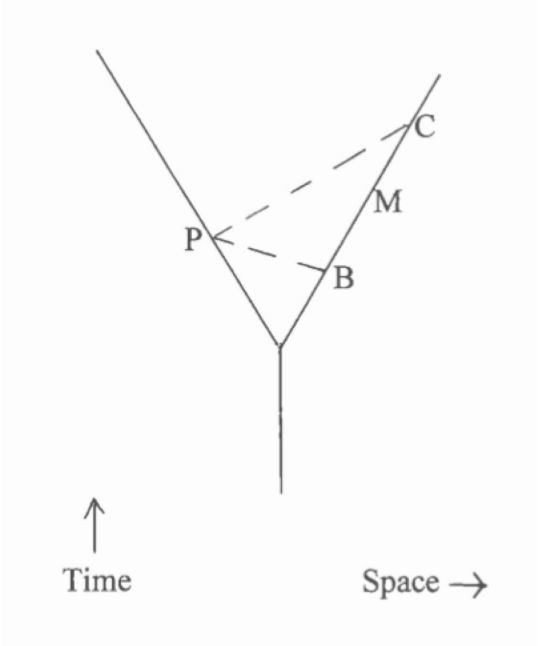


**Fig. 1** Subjective nature of reality in case of a thought experiment involving entangled particles. For observer at rest with respect to original un-decayed particle, time is shown vertical and space horizontal. Space-time diagram of particle decay and two observers with different reference frames. For observer B the particle at P is in a superposition of spin components; for observer C it has definite and known spin component. Point P is simultaneous with both B and C in their respective reference frames.

We will make an analogy with a dream. You dream of a mountain; you do not know what is behind the mountain. Is there a jungle or is there a desert? You may consider a superposition of possibilities. The question is meaningless until you observe, in your dream a jungle or a desert. What you observe is your reality. This is just the Schrödinger cat situation. Having argued for the "dream" nature of observable reality, we now discuss the "brain" or "metabrain" which produces the correlated streams of consciousness.

## 2. The "*Metabrain*"

We remind the reader of experiments performed by the neuroscientist Roger Sperry [4] and his associates. He cut the corpus callosum of his patients thus partially separating the left brain hemisphere from the right. There were still other connections connecting them. He showed that this resulted in two consciousnesses. If information was presented to one hemisphere the consciousness associated with that hemisphere was aware of it. However the consciousness associated with the other hemisphere was ignorant of the information. Thus there were two distinct consciousnesses.

We imagine a "metabrain" divided into many portions, not just two, one for each existing stream of consciousness. The different portions of the metabrain are connected thus resulting in the very highly correlated though not identical streams of consciousness; they all observe the same apparent world. The "metabrain" is not in our observable world just as when we are sleeping and dreaming the "outside world" and in particular our

"physical" brain is not observable in our dream world, though it produces that dream world. Think of the metaphor of the brain in a vat which is stimulated to produce an "artificial" world. In that world we are not aware of the vat. With the model of the metabrain it is also possible to derive Born's rule that the probability of an event being observed equals the magnitude of the probability amplitude squared. See Figure 2. We assume that the metabrain has some characteristics of an ordinary brain. It has "currents", pathways for these currents, "synapses" and "neurotransmitters". The currents, we suppose, have magnitude and phase. In the circuitry these currents may be added when pathways are joined. The currents can conveniently be combined, magnitude and phase, by describing the currents as complex numbers, thus sharing some characteristics of quantum probability amplitudes. We shall, in fact, assume that the currents are proportional to probability amplitudes. We shall also assume that in many situations the "firing" of a synapse, that is, the crossing of a synapse by a signal, corresponds to a conscious experience. This firing of a synapse changes the pattern of currents in the metabrain thus changing the metabrain which in turn affects the firing of other synapses thus affecting the "dream".

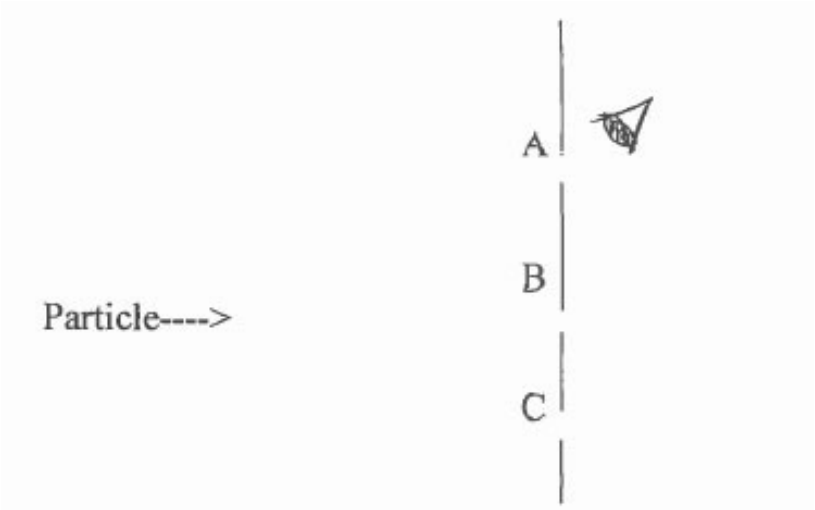


**Fig. 2 (a)** Physical ("Dream") world with opening A observed

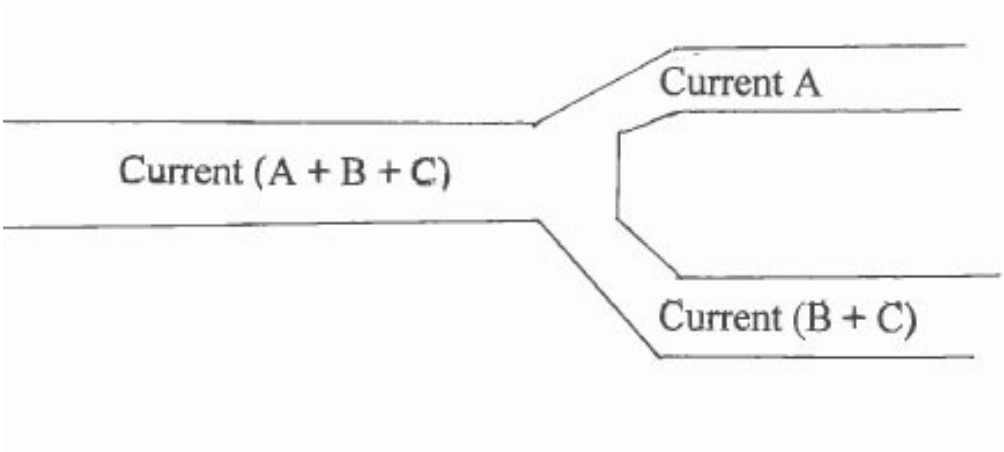


**Fig. 2 (b)** Corresponding metabrain currents

Each metabrain current has many "components" in something like a Hilbert space. Just as a three dimensional vector has three components, an x, y and z component, a vector in a Hilbert space has many components as the Hilbert space is many dimensional not just three dimensional. To each component there is a basis vector which is an eigenvector of some operator corresponding to an observation in the "dream". The "filter" is something like an ordinary polarizing lens which only allows one component of electromagnetic radiation to pass through. Similarly the filter only allows one component of the many component Hilbert space vector to pass through. Let us suppose that the probability of an experience, measurement or observation due to the firing or connection across a synapse is proportional to the average amount of "neurotransmitter" released per unit time. It takes energy to release the neurotransmitter; thus it is presumed that the average quantity of neurotransmitter released per unit time is proportional to the average energy released per unit time (the average power). Postulating Ohm's law, a major assumption, this average power is proportional to the square of the magnitude of the current, like the power dissipated in the resistor of an ordinary electric circuit ($I^2R$). Thus in the metabrain model the probability that an event is observed is proportional to the square of the magnitude of the current. This corresponds to the square of the magnitude of the complex quantum amplitude. Thus we arrive in our model at the quantum theoretic Born Rule for calculating probabilities.

## 3. The example of the multiple slit experiment

A particle goes through a barrier with three openings, A, B and C shown in figure 2(a). A detector is placed behind slit A but no detectors are behind slits B or C. A screen lies behind the barrier. Thus the particle is either observed to go through hole A or known to go through a superposition of B and C, neither uniquely one nor the other.

This is a very fundamental experiment in the history of quantum theory. We show the "dream" situation for this experiment above the "metabrain" representation in Figure 2(b). The probability of finding the particle at positions on the screen depends on the square of the magnitudes of the currents. There is no separate experience for passage through B versus C so the corresponding currents (amplitudes) are combined as they are for quantum amplitudes.

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