The Human Soul as a Manifestation of Quantum-Like Fields

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Abstract

It is proposed that the human soul is a manifestation of a soul field consisting of a collection of quantum-like fields. The soul field interacts with the electromagnetic field, manifested by photons interacting with the quanta of the soul field. Evidence for this comes from near-death experiences where reported events that could not have been seen through the eyes of the individual are verified. Since bioelectric fields are a type of electromagnetic field, bioelectric fields may also interact with the soul field. This could result in the transfer of information on working memory content to the soul via interactions with bioelectric fields produced by neural ensembles in the human brain. The soul field may also affect neurons on the molecular level in the brain through interactions with bioelectric fields and the recently proposed mechanism of cytoelectric coupling. The human soul is coupled to the body through its interactions with bioelectric fields in the body. Manifestations of the quantum-like fields comprising the soul field may carry out different functions such as encoding memories and experiences, representing emotion states, and defining personal identity. Interactions of these fields and their quanta could produce emergent properties such as self-awareness and consciousness.

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Introduction

In his blog "Physics and the immortality of the soul" (1), the physicist Sean Carroll writes: "the laws of physics underlying everyday life are completely understood, and there's no way within those laws to allow for the information stored in our brains to persist after we die. If you claim that some form of soul persists beyond death, what particles is that soul made of? What forces are holding it together? How does it interact with ordinary matter?"

The laws of physics, and in particular, quantum physics, may be well understood in terms of the application to phenomena in the physical universe, but if there is something that exists outside of the universe, it would not be expected that physics as it is known today would provide an understanding of what that something is and how it works. In other words, our current laws of physics would likely not apply to all of reality if reality extends beyond the physical universe.

The possibility of the existence of something beyond the physical universe is now

accepted by many cosmologists who subscribe to the eternal inflation theory of multiple universes. The existence of the multiverse does not provide an answer as to where souls reside. The point is that other domains outside of the universe may exist. Although the laws of physics most likely vary from universe to universe in the multiverse scenario, it is conceivable that quantum fields and quanta (discrete packets of energy) underly the existence of every universe in the multiverse, which is true for our universe.

Characterization of the soul domain and souls

If human souls exist, they must originate from some realm and then return to that realm after death of the body. Current theories of physics may not apply to this realm, but there may be some aspects of the physical universe that have a counterpart in this realm. In particular, it is possible that there are counterparts to quantum fields and quanta in the soul domain where souls reside. These fields will be referred to as quasi-fields, so a quasi-field is a quantum-like field whose properties and behavior have some overlap with the characteristics of quantum fields that exist in the physical universe.

Quanta consisting of discrete units likely arise from quasi-fields in the soul domain, just as particles arise from quantum fields in our universe. There may be quasi-fields whose quanta are counterparts to photons, which are the quanta of electric and electromagnetic fields in the physical realm. The quanta of quantum fields are energy-generated excitations of the fields and are measurable, whereas the quanta of quasi-fields are likely something quite different and are not measurable. Hence, the quanta of quasi-fields and the fields themselves are non-physical.

The quanta of quasi-fields may be units of information analogous to bits (zeros and ones), qubits (quantum bits and superpositions), or more complicated informational structures. This connects to Wheeler's information-theoretic characterization of physical reality as "it from bit" (2).

In quantum field theory, fields are defined as existing throughout three-dimensional space in the universe, and their manifestations are localized physical phenomena consisting of their quanta and interactions of these quanta. Quasi-fields exist in a higher-dimensional space with additional coordinates representing space in the soul domain, and their manifestations are non-physical localized phenomena consisting of the quasi-fields' quanta and interactions of the quanta.

As to the questions of what particles make up the soul and what forces hold it together, most of the existing literature treats the soul as a form of energy, called spiritual energy. But a description of the soul as energy can only be a part of the answer.

It is proposed that the human soul is a manifestation of a soul field consisting of a collection of quantum-like fields; that is, a collection of quasi-fields as defined above. The characterization of the soul in terms of quantum concepts has been pursued in the literature, see for example (3,4). However, the approach taken in this article differs from past work.

The soul would be expected to have values or a distribution of values corresponding to the intensity or strength of the manifestations of the quasi-fields comprising the soul. But there may be no possibility of ever being able to directly measure these values using some type of sensor. The values of the soul would have to depend on three-dimensional space and time since the soul resides in a physical body during the lifetime of the body. But it would also depend on other spatial coordinates and perhaps a different time variable when it resides in the soul domain. Hence, the soul would have to exist in higher dimensions than the four-dimensional space-time in which humans live. This assumes that the soul domain contains space, or something analogous to space, and there is movement of souls in that

domain. There would have to be time to allow for non-instantaneous movement.

The existence of the soul in higher dimensions is considered by the physicist Michael Pravica in his essay “What is the soul” (5). As noted in his essay, the possibility of the existence of extra dimensions is predicted by the mathematics of string theory. However, these extra dimensions are "curled up onto themselves” and likely do not correctly represent the additional spatial coordinates of the soul domain.

A higher dimension also arises in the unification of gravity and electromagnetism (6). This work is in five-dimensional space, but as Wesson notes in the preface to his book, Einstein’s field equations can be generalized to any number of additional coordinates. Such a generalization would yield an N-dimensional theory of relativity where N is a suitably large positive integer. It is an interesting question as to whether the specific topological aspects and metrics of the theory would be applicable to the description of space in the soul domain.

It is tempting to argue that the existence of higher-dimensional theories in physics lends support for the existence of souls in higher dimensions. In his book, Wesson notes that for practical applications, there needs to be a “physical understanding of the nature of the extra dimensions and the extra coordinates.” However, the treatment of the soul as a manifestation of quasi-fields in higher dimensions would necessitate a non-physical understanding of extra dimensions.

Interaction with fields

The last question raised by Carroll given above is how the soul interacts with matter. In his article he suggests that if the soul interacts with electrons, then there would have to be a term in the Dirac equation accounting for that interaction. But there is no experimental evidence which supports the existence of such a term. His conclusion appears to be that either quantum field theory (QFT) is wrong or there is no soul.

As a resolution of this QFT/soul quandary, it is proposed here that the soul does not directly interact with matter; rather, the soul field interacts only with certain massless fields in the physical universe. In particular, the soul field does not (directly) interact with the electron field and electrons, and thus there is no term in the Dirac equation to account for the existence of a soul. This is also the case for other particles that have mass with spin 1/2, including quarks.

However, the soul field does interact with electromagnetic (EM) waves which are a manifestation of the electromagnetic field. The evidence for this comes from accounts of near-death experiences (NDEs), where the person experiencing the NDE sees events occurring that could not have been seen through the eyes of the individual, and yet those events are verified by others who are present during the NDE. Visions involve propagating light which consists of EM waves, and thus the soul field can “sense” and “process” EM waves. Sensing of the EM waves is likely achieved by the photons in light impacting the quanta of the soul field. This would be the counterpart to photons impacting pigment molecules in the retina of an eye in human vision, resulting in the energy carried by photons exciting electrons to higher energy levels. Hence vision is a result of photon/electron interactions. How the processing could be carried out to achieve vision through the soul is perhaps beyond speculation.

One example of many verifiable NDEs is the case reported in the paper “Verified account of near-death experience in a physician who survived cardiac arrest” (7). In this account, the heart of a female physician stops beating while she is having surgery with her eyes taped shut. Among other events, during her NDE she sees a white-haired senior physician in scrubs entering the operating room and then working on her, which is confirmed to have taken place. Her description of what she sees and feels

gives the impression that the soul is like a floating cortex after separating from the body.

As revealed in this NDE and in many other reported cases, the soul can hear people speaking, which raises the question as to how this is possible. An answer is that even though there is cardiac arrest, the cells in the auditory system are still functioning, and thus sounds continue to result in electrical signals that propagate along the auditory nerve to the brain. These signals generate EM waves which are then processed by the soul field, giving the soul the capability of hearing.

Since bioelectric fields are a type of EM field, it would be expected that bioelectric fields can affect the soul field, as is the case for EM waves. It is known that bioelectric fields arise in brain function, and that neural ensembles (collections of neurons and synapses) produce fields that contain information about working memory content (8). If these fields contain a sufficiently detailed representation of the memories stored in neural ensembles and the soul field can "read" these fields, then a viable working memory would be transferred to the soul during the lifetime of the body. This would imply that memories do not cease to exist after death, rather they move on with the soul after death.

The interaction between the soul field and electric/EM fields is likely two way; that is, in addition to these fields affecting the soul field, the soul field may impact these fields. This could be a component of the mechanism by which a soul field induces memories and individual self-awareness into a fetus or child in reincarnation. It is known (9) that neuron extraceller electric fields feed back onto the electric potential across the neuronal membranes of neighboring neurons via ephaptic coupling, and it has recently been proposed that electric fields in the brain can influence neurons at the molecular level through cytoelectric coupling (10). Hence there is the possibility that the soul field can affect neural activity by interacting with electric fields in the brain.

If the soul field acts on electric/EM fields in the human body, then there should be a term for that interaction in Maxwell's equation for an electric field and in the wave equation for EM waves. But that term would be present only when the interaction is occurring, which in reincarnation may be limited to the moment of conception or during the gestation period. Carrying out measurements during those times would be challenging, and thus experimental verification of the existence of the soul via its impact on electric or EM fields in the human body may be difficult to achieve.

Additional aspects of the soul

The analysis given above indicates that the soul is coupled to the physical body through its interactions with bioelectric fields in the body. These interactions provide a bond between the body and the soul field. This is analogous to the coupling of a moving charged particle such as an electron to an electromagnetic field, where the coupling is mediated by the electric charge and is described in physics by an interaction term in a Lagrangian (11). A similar description may exist for the interaction between the body and soul field, but the inability to carry out empirical measurements may make this impossible to determine.

Although the soul is coupled to the body through its interactions with bioelectric fields, it may not be confined to the body. This raises the possibility that remote viewing is a result of the soul expanding out from the body to remote locations. This contrasts with parapsychological theories which propose that consciousness can access information non-locally, such as through the Akashic field (12).

Just as the human body consists of a complex collection of manifestations of matter and massless fields (e.g., electron fields, quark fields, and electromagnetic fields), the soul may consist of very complicated manifestations of quasi-fields, which would carry out different functions such as encoding memories and experiences, representing emotion states, and defining personal identity. Interactions of the quasi-

fields and their quanta could produce emergent properties such as self-awareness and consciousness.

Discussion

Verifiable NDEs where reported events could not have been seen through the eyes provide evidence of the existence of a soul which interacts with light. This raises the question as to how vision through the soul is possible, or more precisely, how the information carried by photons in light is transferred to the soul. The answer proposed in this article is that it is a quanta/quanta interaction; that is, the quanta of light (photons) interact with the quanta of the quasi-fields comprising the soul field. Since all photon interactions occurring in the physical universe are quanta/quanta interactions, the only possible mechanism by which the soul interacts with light may be through quanta/quanta interactions.

The nature of the interaction between photons and the quanta of the soul field brings up several profound questions. For example, is there a transfer of energy during the interaction? If so, this would imply that energy in the physical realm carries over into the realm of the soul. But if that were the case, the loss of energy in the physical domain would violate the law of conservation of energy. On the other hand, if reality does consist of the physical realm combined with the soul domain, energy would be conserved as it would pass from one realm to the other.

If the quanta of quasi-fields are units of information, the interactions between these quanta and photons could encode the information carried by photons into the informational patterns generated by the quanta. This transfer of information may result from the energy carried by photons increasing the complexity and organization of the informational structures consisting of the quasi-fields' quanta. This would be analogous to the energy carried by photons moving electrons to higher energy levels in atoms which enables or enhances atomic reactions. It is also possible that reductions in complexity or reorganizations of the informational structures comprising the soul could result in the release of energy manifested by the emission of photons. Hence visible light could be emitted from the soul which may explain reports of luminous orbs appearing in hospital videos of deathbed scenes.

If the quanta of the soul field are units of information, energy transfer between the physical realm and the soul domain would therefore be realized by the absorption of photons into the informational structures comprising the soul and the emission of photons from these structures. This would be the basis for the transfer and encoding of information between the soul and light and between the soul and bioelectric fields.

If photons are absorbed in the interaction with the quanta of the soul field, then presumably they would be removed from the light. This raises the possibility of proving the existence of the soul by using sensors capable of detecting missing photons. Searching for shadows using the appropriate equipment at the location of the NDE may prove the point.

The appearance of shadows and luminous orbs in videos of NDEs and deathbed scenes may appear to be contradictory, but this can be explained in terms of context. The soul's absorption of light causing shadows may occur in NDEs, but in deathbed videos the soul has completely separated from the body which may result in the emission of photons due to a "relaxation" (de-excitation) of the informational structures comprising the soul.

Interactions of the soul with light could alter the states of the quanta of the quasi-fields without the transfer of energy. For example, the quasi-fields could resonate with light resulting in the oscillatory patterns of photons modulating the quanta of the quasi-fields, thereby encoding the information carried

by photons into the quasi-fields. Even if photons are not absorbed and there is no transfer of energy, the quanta/quanta interactions could alter the properties of the photons which may be detectable.

Given the probable impossibility of performing direct measurements on the soul, there may never be an in-depth theory of the soul. But it should be possible to develop further an investigation of the interactions between the soul field and fields in the physical realm. This would include devising and carrying out experiments that can detect and explore interactions between the soul and light or between the soul and bioelectric fields. Future advances on field/field or quanta/quanta interactions in quantum field theory may also help to define these interactions.

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