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Preprint · October 2023

DOI: 10.31219/osf.io/x93mz

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The Human Soul as a Type of Quantum Field

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October 14, 2023
Revised March 31 and October 5, 2024

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Abstract

It is proposed that the human soul is a type of quantum field that interacts only with certain fields in the physical universe, and not directly with matter. Fields that interact with the soul field include electromagnetic waves as evidenced by near-death experiences where events that could not have been seen through the eyes of the individual are verified. Since electric fields and electromagnetic fields have the same quanta consisting of photons, electric fields may also interact with the soul field. This could result in the transfer of information on working memory content to the soul through electric 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 electric fields and the recently proposed mechanism of cytoelectric coupling.

Keywords

Human soul, physics of the soul, quantum soul, near-death experiences, reincarnation, ephaptic coupling, cytoelectric coupling, photon interactions

Introduction

In his blog "Physics and the immortality of the soul" (Carroll, 2011), 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, 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. The laws 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 type of quantum field whose properties and behavior have some overlap with the characteristics of quantum fields that exist in the physical universe.

Massless particles likely arise from quasi-fields in the soul domain, just as massless 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. If there is no Higgs type field in the soul domain, there would be no elementary particles that have mass, and the soul domain would be massless. Or it may simply be the case that only massless particles arise from quasi-fields in the massless soul domain.

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. Since quantum fields in the physical universe contain energy in the form of quanta, it is conceivable that the human soul is a type of quantum field, that is, a quasi-field as defined above, and that the soul has properties which have some overlap with the properties of quantum fields that exist in the universe. The

characterization of the soul in terms of quantum concepts has been pursued in the literature, see for example (Goswami, 2013; Hameroff and Chopra, 2012). However, the perspective given in this article differs from past work.

The soul field would be expected to have values or a distribution of values corresponding to the intensity or strength of the quasi-field or of the massless particles comprising the field. 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 field 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 massless 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 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” (Pravica, 2015). 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 (Wesson, 1999). 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 type of quantum field in higher dimensions would necessitate a nonphysical 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 fields in the physical universe. In particular, the soul field does not (directly) interact with 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 type of 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, imparting energy and momentum. This would be analogous to how electrons absorb photons in human vision. 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," (Woollacott and Peyton, 2021). 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 electric fields are components of EM fields and their quanta are also photons (both real and virtual), it would be expected that electric fields can affect the soul field, as is the case for EM waves. It is known that electric fields arise in brain function, and that neural ensembles (collections of neurons and synapses) produce electric fields that contain information about working memory content (Pinotsis and Miller, 2022). 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 (Anastassiou et. al, 2011) 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 (Pinotsis et. al, 2023). 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 is likely not feasible, and thus experimental verification of the existence of the soul via its impact on electric or EM fields in the human body may be impossible.

Conclusion

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 soul field.

The nature of the interaction between these quanta brings up several profound questions. For example, is there actually a transfer of energy during the interaction as suggested in this article? If so, this would imply that energy in the physical realm carries over into the realm of the soul, or perhaps there is some transition in the form and nature of energy during the interaction.

Another key question is whether photons are absorbed in the interaction with the quanta of the soul field. If photons are absorbed, 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. The appropriate equipment at the location of the NDE may prove the point.

Given the probable impossibility of performing direct measurements on the soul, there may never be an in-depth theory of the soul. But it may be possible to develop further an investigation of the interactions between the soul field and fields in the physical realm. This may require further advances on field/field or quanta/quanta interactions in quantum field theory.

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