

Pan-psychic Consciousness in Mass-Charge Interactions

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Abstract

When we observe the brain from the outside we cannot find a neuro-biological structure that resembles the phenomenological world in front of ones noses. The simplest conjecture addressing this problem is that consciousness is correlated with the internal configuration of brain material not directly accessible to external observation. The theory describing the domain of this interior is Quantum Mechanics however both its development and its complexity makes this theory difficult to apply to neuroscience or studies of mental phenomena. A simplified approach suggests that a separation between charge and mass can be used to visualization the interior configuration of material. We will show that the forces that hold charge and mass together in the interior of matter act to counterbalance gravito-electric influences from the rest of the universe. Since the configuration of charge and mass is always in equilibrium with both external and internal forces it is an accommodation to stimulation from the outside world and is interpreted as an internal model of that world. We postulate that this internal, and not directly observable model, is the physical correlate of consciousness and the forces holding charge and mass together are the forces of consciousness. These forces and their associated energy patterns exist in all material as a primitive pan-psychic consciousness. Consciousness does not emerge during the evolution of the universe but rather, it is integrated in the structure of all material. Only the size and complexity of our brain material produces human consciousness but other forms exist in both smaller and larger material structures.

Key Words: Pan-psychic Consciousness, Event Physics, Cognitive Action Theory, Process Ontology, Mass-Charge Interactions

1. – Introduction

The most popular and useful model of classic physical reality looks like a space containing objects and fields of influence. A graphic description of such a model is shown in the lower portion of figure 1. Here an icon of a cognitive being is shown standing on the earth holding an apple. At the outer limits is a ring of masses shown as stars. Inside the skull is a small oval that represents a brain. This small piece of matter is attached to a mind, shown in the upper portion of figure 1 as a thought bubble. The mind is mysteriously connected to the brain as indicated by a small set of bubbles. The experiences shown in the mind is a 1st Person view of a man holding an apple in his left hand.¹ The nose is shown on the right side of the

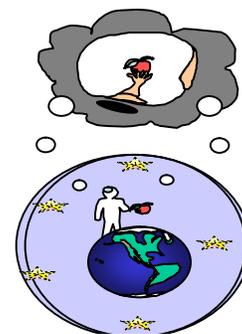


Fig. 1 Our Standard Reality Model

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observable optic field. The mind is shown outside the physical universe both for clarity and because the long standing debate regarding its material or spiritual nature has, since the time of Descartes, not been resolved.

We normally project the phenomenal experiences appearing in the mind into the skull of a second person however projecting our own 1st Person experiences into our experience of our own skull has proved problematic. Both the “Hard Problem of Consciousness”² and the “explanatory gap”³ have shown that the phenomenal experiences we see as objects at a distance *in front* of our nose cannot logically exist inside the space *behind* our noses. These contradictions have made our materialistic science an objective world view that applies to an external 3^d Person perspective and does not include our 1st Person conscious selves. Attempts to explain consciousness as an emergent property evolving from classic physical reality are doomed to fail because the personal subjective experience has been systematically eliminated from classic physical model and cannot be consistently added without evoking new physical formulations.⁴

The simplest solution to the problem of consciousness involves two steps. First it is necessary to remember that since the advent of quantum theory physics has been successfully dealing with the inside of matter. By “inside” we do not mean the inside of an object such as a rock that can be seen by breaking it apart, but the inside of an atom that is never, even in principle, seen directly. Knowledge of this inside is always derived from evidence gathered by measuring instruments that produce observables on their external readout displays and is therefore a theoretical inference. The theoretical nature of our knowledge allows us to project the mind and its phenomenal experiences into the inside of material *without* conflict with the fact that we do not see our feelings and experiences when we open the brain to look at it directly. The conventional wisdom that conscious mental experiences happen inside the Brain is therefore justified as long as we accept the definition of “inside” as the domain of characteristics beyond the boundary of the measuring instruments through which we know the world. In this case mental experiences are correctly projected into the physical reality happening “inside” of brain material. In conclusion: we propose that the mind happens in the quantum domain beyond the boundary of our senses.

The second step is a bit trickier since it requires an understanding of the mechanism we use to identify objects. In the last paragraph we claim that the 1st Person experience of the world seen in front of our noses is the direct experience of our internal material structure. The statement that “the world in front of us happens inside our material” is so counter intuitive that it will require a careful definition of our words to avoid confusing the observational language, used to describe what we see, from the theoretical language used to describe what we believe is really there, in order to understand its meaning. The distinction between observational and theoretical language was first introduced by the Vienna Positivists⁵ to distinguish between observables describing what we see and the language of quantum theory, i. e. Schrödinger’s wave function, describing what we believe is physically real. In every day English the same words are often used to refer to both, leading to never ending confusion. For example the cognitive being shown in figure 1 will be heard saying, “I see an apple”. When in fact he sees a colored blob that must go through a recognition process to be recognized as an object that is identified with the word “apple”. Directly naming a qualia by an object name eliminates conscious acknowledgement of the observational stimulation and refers to a sensation in theory terms. This habit reinforces our belief that we live in an objective reality when in fact this is a theoretical statement.

Consider a scene on a television. We instantly recognize the content of the screen as the outer surface of objects. However we are actually seeing the output of a display into which we project the properties of an object. So it is with us. We actually experience the output of our sensory processing on a mental display inside our brain material. We take the queues from the immediate sensation of the display and calculate what could explain it in our model of reality. At the time of writing we normally use an objective model to explain sensations. We search and usually find a model object that serves as a candidate for explaining the sensation. We know the identified model object is correct if it produces the same stimulation on the display as the original thus reinforcing its appearance. In addition the knowledge we have of objects in our model allows us to project additional object characteristics into the display sensation. This additional information is also experienced as an observable display but usually in a second modality, i.e. our imagination, and is then fused with the original sensation display. The speed with which an explanatory sensation is fused with the original one appears to be instantaneous under normal circumstances but can be lengthened and explicitly experienced when the explanation of the original sensation display is ambiguous. In conclusion: when we think we are seeing an object we are actually experiencing the visualization output of our objective reality model fused with the original sensory stimulation display and both display sensations are correlated with the inside material configuration of our Brain.

2) Visualization Trap in the Theory of Science

To see how object recognition happens for a cognitive being outfitted with a quantum model of reality let me go through an example of how a quantum physicist sees and identifies the cause of a sensation. Figure 2 shows the processing paths for a physicist who sees a light flash and recognizes it as an electron transition from an atom. The upper section outlined by a dashed oval represents the physicist's observables which are composed of his optical sensation field and his visualization of the cause of those sensations in the gray thought bubble below it. We are using the shape of a thought bubble to represent the space of his imagination, which is identified as the dark volume surrounding one's self when one's eyes are closed. The sequence of events will be described using numerical references between listed descriptions and the circled numbers on the drawings.

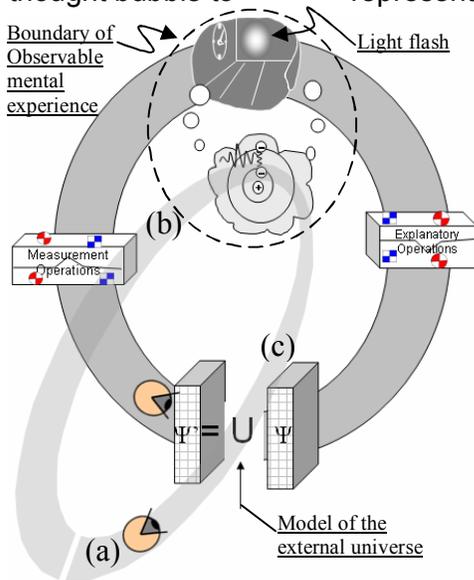


Fig. 2 Processing Paths for objective Recognition

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- 1) The physicist sees a light flash in his optical field
- 2) He process through a series of explanatory operations to trace the causal chain back to his retina.
- 3) He calculates the pattern stimulation that must have happened and produces a simulated stimulation in the retina model part of his real world model. Mathematically this corresponds to the Schrödinger Ψ -function in the Hilbert space defining his sensor boundary.
- 4) The stimulation must have been caused by an outside agent here represented by

- the theoretical symbol U , which represents a unitary transformation in quantum theory.
- 5) The unitary transform applied to the sensation pattern Ψ is a time propagation operator that produces a theoretical next sensation pattern Ψ' .
 - 6) The Ψ' pattern in the simulated optical sensor array is processed through a measurement operation which is implemented in the brain circuitry to produce the expected sensation of light. If the model is correct the expected and original sensation reinforce each other and the explanation has been found.

The outer darker processing cycle is now complete and the physicist continues to see a light in his optical field. If the physicist is isolated and not interacting with the outside the processing cycle through his model may continue undisturbed continually holding the sensation of a light flash in his observable consciousness. The implication is that the symbol U , implemented in his brain circuitry as his model of physical reality, is an operational component of his optical processing system. Its operational function is determined by its physical structure and how it interacts with the other physical structures in his brain. In order to understand what such an operational symbol does requires that a meaning must be assigned. The meaning of a symbol is not intrinsic to its physical attributes but is assigned by an outside agent in this case the physicist, or more precisely ourselves. A global meaning was already assigned when we stated the symbol U is the physicist's model of physical reality, but that only replaces a symbol U with another symbol "physical reality". The meaning of both of these alternative naming statements must be an observable sensation not simply another symbol. Our physicist looking at U will recognize that only the part of the universe that represents the atom needs to be modeled. This part can be visualized as a Bohr atom. The lower portion of the physicist's conscious observables shows a positive nucleus with electron orbiting at a larger excited energy orbit. The electron transitions to a lower energy orbit emitting a photon, which is shown as a horizontal wavy line in figure 2. This observable happened in Niels Bohr's imagination and continues to happen in all following physicists who subscribe to the Copenhagen interpretation of quantum theory. The processing path (a) is shown as the light colored ellipse which passes through the U is processed by the physicist as an interpretation of his working symbol and is displayed as a Bohr model of the atom in his imagination (b). Once the atom is imagined as an orbiting electron and the angular momentum quantization condition imposed the Hamiltonian operator is derived and in turn the unitary transformation U calculated (c). This closes the second loop.

In figure 2 the light flash sensation and the interpretation of the quantum symbols as a Bohr atom are shown as separated observable sensations. The separation was drawn for clarity. In practice the visualization of the explanatory model is projected into the sensation it is trying to explain and often the physicist will say he is seeing an atom when in actuality he is imagining a visualization of the Bohr atom, or whatever other interpretation of quantum symbols he subscribes to. This explanation of a sensation with another sensation in a different sensory modality is a ubiquitous characteristic of human thought processing. If a classic physical reality model is used instead of a quantum model the same processing flow would project a visualization of an object into the sensation as discussed in section 1 above. Thus a conscious being outfitted with a classic model would project a classic object visualization into the observed colored blob and say he is seeing an apple.

The critical lesson derived from these examples is that is normally taken to be the real objective external world is actually a visualization of the theory incorporated in the material of a cognitive being and externalized in the symbols of the theory the being believes and uses. We have now completed our discussion of the two steps required to explain consciousness in physical terms. The first step assumed consciousness happens on the “inside” of material. The second step was to recognize that what we take to be objective reality in front of our noses is actually composed of two internal phenomenal experiences. The first being the sensation displayed from the interpretation of stimulation driving our external sensors and the second being the visualization of the meaning of our explanatory theory projected into our external sensation display.

The data processing paths shown in figure 2 immediately show why it is impossible to explain consciousness with our classic physics theory. It is because we normally act and believe the observable meaning of our theory is physical reality when it is not. We cannot find a causal connection between what are two observables. A similar difficulty is encountered when trying to explain the causal connection between two actors seen on a television screen without understanding the flow of electrons which cause both images to appear. We now know a processing flow between a model incorporated in the internal structure of our material produces both our sensation and the sensation of its explanation. They do not cause each other. It is necessary to grasp the process architecture between the model and the display it drives in order to find the physical cause of our conscious experience. Since we have identified location of this model as the “inside” of material we can now look further into our knowledge of the interior of matter to gain insight into how consciousness is incorporated in all its forms.

3) The Simplified Interior Model of Matter

We have identified both our direct sensory experience and our experience of our reality model generated explanatory visualization as fused cognitive experiences happening in the inside of our material. The inside of material has been the domain of atomic and nuclear physics for more than one hundred years. Though quantum theory as defined by von Neumann⁶ has acknowledged that consciousness is involved when a human acknowledges the final result in the last stage of a measurement process chain, the development of this branch of science has largely been driven by particle collider experiments. These efforts answer old questions and generated new questions that are closely tied to the methods and theories of the investigation program. This program is not centered on exploring the role of the conscious beings performing the experiments, but still attempts to discover the mysteries of the universe as though that universe had an independent external existence detached from the experimenter. As the result the standard model describing the interior of matter is overly complex and usually ignored by the neurophysiologists, psychologists, and other workers dealing with cognitive beings. To overcome this difficulty a fresh look at the physics applicable to the interior of matter has been initiated specifically with the goal of defining the minimum physical characteristics necessary to include conscious awareness without the necessity of explaining all the details encountered in high energy physics experiments.^{7,8}

This simplified approach rests on the fact that only two major forces are used to build and capture all the data ever recorded from which all current scientific theories about the physics of matter's interior are derived. These two force categories are the gravitation and inertial forces (F_{gi}) attached to the mass of objects and the electric and magnetic forces (F_{em}) attached to the charge of objects. In addition it has generally been traditional

for physicists to think of particles i.e. small objects, as the basic organizational unit from which the physical universe is built and to treat mass, charge, volume, shape, and any other physical characteristics as properties of those particles that are attached to the location of the particle. The behavior of a particle is the given by specifying the three translation degrees of freedom and the three rotational degrees of freedom of the particle and all properties are assumed to move along the single particle trajectory. An electron for example is visualized as having a charge and mass instantaneously located at one point orbiting a proton in the Bohr model of the atom.

That such a single particle model is not adequate to describe the operations of the brain was suggested by G. Vitiello who required a doubling of the degrees of freedom in order to analyze brain functions when the brain was analyzed as an open system in continuous interaction with its environment.⁹ W. Baer the suggested that such doubling could be accomplished if the location of charge and mass were not always located in the same place, but were treated as separate entities that are held together by internal forces. By introducing a force of charge on mass (F_{cm}) and the force of mass on charge (F_{mc}) two internal forces could be postulated that control the interior of matter. Such forces could be identified as the forces of consciousness that control the interior structure of matter according to our step one postulated described in the introductory section above. Figure 3 shows how the two external gravito-electric and the two cognitive forces propagate in time through material when mass and charge are allowed to take on their own individual locations.

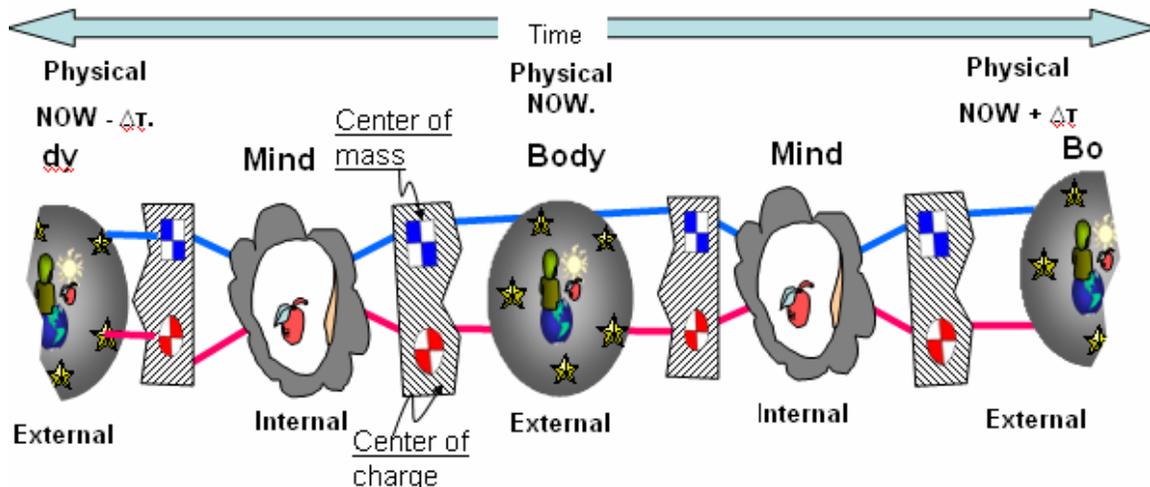


Fig. 3 – Force influence flow through outer and inner material

The picture shows a time sequence of influence traveling from the outside of matter, labeled body, through the inside and back to the outside. Matter is shown as a hatched space cell representing a charge and mass density that is often simply treated as a center of charge and a separate center of mass. The charge center is depicted by a round BWM icon. The mass center of mass by a rectangular equivalent. The external real world is here represented by our old classic object model. Jagged external surfaces of the space cell is the side of our sensor boundary that transmits and receives gravito-electric signals. Between the straight edged interior side of the cell, the crossed force lines of consciousness interface with phenomenological world of sensations and feelings, is show. An apple is shown in front of the nose in the 1st Person view. The same body is seen with the same apple in the 3d Person objective view.

A quantum model would replace the mind-sensation icon so that the Schrödinger wave function is identified as the mass charge separation field vector thus fulfilling Heisenberg's fundamental pillar of Copenhagen interpretation of quantum theory, "that quantum theory is the physics of the system that knows the world." We now comment on the central linearity feature of quantum theory. Quantum mechanics is the physics of the system that knows the world when the displacements between charge and mass are small enough so that their motion can be described by harmonic oscillations around an equilibrium. When mass charge separation becomes large the force between mass and charge can no longer be approximated by a linear restoring force, then quantum theory no longer describes the situation. In such cases we encounter macro size quantum phenomena including the creation and destruction of the underlying Hilbert space and the display in which objects appear. In physics experiments this level of description would include the setup and breakdown of the instrumentation required to explore atomic and nuclear phenomena, which are currently handled in the classic physics domain inside the Heisenberg cut. Further discussion of the relation between quantum physics and this simplified interior material modeling approach is given in several references.^{11,12} Here we are only concerned with the implications of the Step 1 proposition, which identified the interior of matter as the holder of mind and its content, and thus provided a physical pan-psychic explanation of what we are consciousness of.

3.1) Physical Implications of the Mass Charge Hypothesis

The drawing shown in figure 3 shows activities spread out in time. This is a theoretical view point describing a flow of influence in the time direction and represents the side view, i.e. meaning view, of operational symbols discussed in section 2 above. Figure 5 shows the classic theoretical view of matter. It shows there are two sides of material. The past side onto which gravito-electric force fields fall and the future side from which gravito-electric forces radiate out to the rest of the universe. Physicists traditionally made two assumptions. First they assumed mass and charge were always co-located so that the force holding them together was infinite. Second they assumed the reception and transmission of gravito-electric force happened instantly so that no time elapsed between the reception and transmission of gravitational or electromagnetic radiation. Although challenged by String Theory these assumptions are still made implicitly in atomic and nuclear physics where elementary particles are largely treated as points of charge and mass. These assumptions leave no room for internal activities and no place for consciousness to be attached to material.

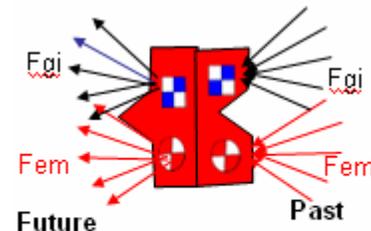


Fig. 5 Outside theoretical matter view

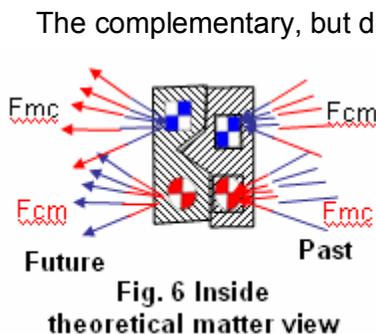


Fig. 6 Inside theoretical matter view

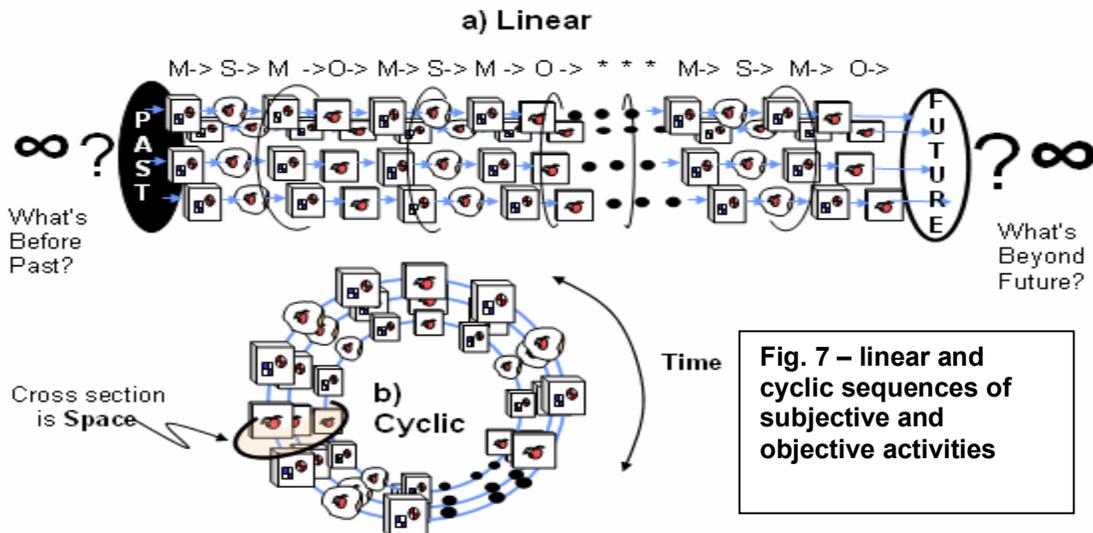
The complementary, but decidedly non scientific view holds that all is really consciousness and matter is a manifestation in the mind of god. Such a view is characterized by an elimination of material as physics describes it and can be depicted as an inside or mental view of material as shown in figure 6. Here the forces of consciousness, which may heuristically be identified with such terms as will, desire, love, and hate move the material of our bodies. Although individuals outfitted with spiritual reality models have not formulated the subjective forces in quantitative terms, as they impinge

on mass-charge components of material, the symmetric picture shown in figure 6 shows the reception of past and transmission of future forces without any room for an exterior material world. Such an extreme, "it's all in the mind", philosophy is no longer popular and instead the current most prevalent spiritual model allows for earthly material gravito-electric influences to propagate between receivers from and emitters into the conscious realm. The earthly universe is shown as our external body model universe in figure 4.

By introducing an explicit inside mental aspect to matter into physics while at the same time keeping the external aspect of mass and charge already developed by classic physics, we have achieved an integration of mind and body in terms of influence fields that sequentially flow through both aspects in tandem. From the physical point of view the masses and charges located in the rest of the material universe impinges upon the mass and charge of any specific piece of matter. This influence signals the mass to move toward a mass expectation location and the charge to a generally different location, thus pulling the two apart. The two movements are neither completely coincident as they would be if the F_{cm} and F_{mc} forces were infinite nor are they completely independent if the same forces were zero. Instead when a mass is moved toward an expectation location, the finite but non zero internal forces act to pull its associated charge along. Simultaneously the charge, which is moving toward its expected charge location pulls its associated mass along as well. In general the two directions of pull are not in the same direction so that an internal tension exists between charge and mass which exactly counteracts the external forces pulling them apart. A balance between internal and external forces is established at some vector distance between charge and mass. The balance equation is given by the extended dAlambert principle,¹²

$$\text{Eq. 1} \quad 0 = F_{em} + F_{gi} + F_{mc} + F_{cm} + F'_{em} + F'_{gi} + F'_{mc} + F'_{cm},$$

where the primed forces represent backward traveling influences that can either be interpreted as reaction forces to radiation or actual backward traveling influences along the time line. The existence of internal forces implies an internal energy pattern exists inside of material which exactly counter balances the energy pattern in the rest of the universe. This pattern is not necessarily an exact model of the external material configuration but should rather be interpreted as accommodations made by ones internal material structure to the influences from the rest of reality. Since we normally believe what we see in front of our noses is at least a representation of the external world the identification of a balanced internal mass-charge structure implies that we do not actually experience a reproduction of the outside, but each of us experiences our own personal interpretation of the influences we are subjected to.



The Mind body sequence depicted in figure 4 shows a single space cell containing centers of mass and charge. Single cells were drawn for clarity and to more clearly support the discussion of internal and external forces involved. A better model would show a field of such cells within influences travel mainly along the time direction but also from neighbor to neighbor in the spatial direction. The cross sections of such a field is identified as the spatial plane of time instances are shown in figure 7 in both a linear and cyclic configuration.

Both configurations show time sequences of material in which subjective (S) and objective (O) aspects occur between inner and outer occurrences of material (M). A spatial cross section containing internal energy patterns contain the pattern of observable experiences. There is no distinction between human bodies and any other material system. All material whether the human brain or an inanimate rock is composed of the same body mind sequences. This shows the pan-psychic nature of a primitive awareness is built into material itself and is not an ad hoc or emergent property. The difference between humans and rocks is the detailed organization of the material and the resulting intertwined action flows not the a qualitatively different substance or capacity.

The straight line model sequence is useful in many practical problems in which a distinct beginning and end is required. Such impositions, though practical because it limit ones problem to a finite domain, leaves one with the question of what happens before or after the beginning and end respectively. Within the evolution of the universe activity never stops but may transform itself into different patterns of activity. On the cosmological level the big bang theory suggests the beginning of the universe happened when all action paths emerged from a single point. Though consistent with the Doppler interpretations of astronomic red shift observations, it is difficult to imagine the spontaneous creation of something from nothing. A more prudent approach would be simply to acknowledge that all theories have limits of applicability. Such limits are called singularities and the closer one gets the less likely the theories in which they appear are applicable. The steady state theories lead one to the logical conclusion that eventually the configuration of material must repeat leading one to favor a cyclic form for activity as an architecture of the whole. Such theories leave us with an equally puzzling question of how the whole cycle sprang into existence in the first place.

In either case the suggestion put forward in this paper is that external influences propagate through the interior of matter to re-emerge as external influences on the rest of the matter in the universe. The internal activity can then be correlated with consciousness when viewed as a 1st Person direct experience while only a visualization of a model of such interior activities can be projected into the phenomenal brain of a 2nd Person. The theory of consciousness is an evolving project. Whether the evolution of the human species will lead is to a more and more accurate theory or whether, as Don Hoffman¹³ points out, survival of the fittest only guarantees an evolutionary trend toward the most practical and workable theories is a matter of debate. What is clear is that a charge-mass separation model is a simpler and more practical hypothesis addressing the physical basis of consciousness than current theories being developed in atomic and nuclear physics. This simplification should open the door to the possibility that theories of mind may play an important role in our understanding of the interior of matter and lead to an expansion of quantum theory to the macroscopic realm of every day life.

4) Conclusions and Summary

We have proposed that the physical correlates of consciousness can be identified with the occurrences happening in the interior of matter. Such a hypothesis resolves the question of why an ever closer examination of the brain does not reveal the holistic structure associated with our every day first person experience. It also implies that that quantum mechanic, as our best current theory of the interior of matter must be involved when dealing with questions of the mind and consciousness. A closer examination of quantum theory acknowledges its success as an instrumentalist theory whose symbols perform operational tasks but whose interpretations are controversial and inappropriate for application to neuroscience and the explanation of our own phenomenological experiences. The task of associating the meaning of such symbols with visualizable experiences is greatly simplified if we consider charge and mass as basic material properties, which are held together by internal forces that are identified with the phenomena of consciousness and 1st Person awareness. Visualization of the propagation of force influences from the external side of material through its interior and back to the outside leads to a picture of reality in which the subjective and objective aspects cause each other in an endless sequence of activity. The details of our own personal experience is then recognized as our own accommodation of the internal structure of our material to external gravito-electric influences. That structure is determined by the equilibrium positions taken on by charge and mass centers under the simultaneous influence of both classic physical forces on one side and cognitive forces on the other side of a now instant. Such an approach integrates the beliefs of the materialistically oriented scientific and spiritually oriented religious community into a common framework in which the large body of knowledge gathered in both domains are treated as equally relevant to the human condition.

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