

The Complex Quantum-State of Consciousness

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The human brain and its mental aspects are associated with classical brain physiology and are also part of a quantum physical universe. We consider the whole universe being multi-dimensional. We consider the universe having (4+D)-dimensional Friedmann-Robertson-Walker type universe having complex scale factor $R + iR_1$, where R is the scale factor corresponding to the usual 4-dimensional Universe while iR_1 is that of D-dimensional space-time. It was shown mathematically that when $D = 6$ (i.e. $4 + 6 = 10$ - dimensions), $R_1 = R$ and then real/physical universe actually starts. With respect to the quantum theory, it was shown that our universe started with the symmetry breaking of the Gaussian energy group $SU(11)$. We may consider that the extra-dimensions 'D' are associated with a mental or that of the individual mind is (partly) an expression of a universal mind through holonomic communication with quantum fields. This was proposed by the Pribram 1986, 2011, in his holographic (holonomic) theories. The human brain conceived as an interfacing organ that not only produces mind and consciousness but also receives information. The brain or parts of the brain are conceived as an *interference hologram* of incoming data and already existing data (a "personal universe") which equivalent to the subject's memory. If properly exposed ("analyzed"), information about the outer world can be distilled where "analyzer" is cerebral electrophysiology. Again "Bohm" hypothesized that *additional dimensions (i.e. extra-dimensions)* are necessary to describe QM interference processes, thereby circumventing probabilistic theories and consciousness-induced collapse of the wave function. According to this theory, assumed that the universe is a giant superposition of waves, representing an unbroken wholeness, of which the human brain is a part (Bohm, 1990).

In quantum theories of consciousness, it is suggested that consciousness is such a fundamental property. It was shown in my previous article(2012) that the energy densities of the two phases are directly proportional [i.e. $\epsilon_1(t) \propto \epsilon(t)$] which indicates that the large or small matter energy density in the vapor phase (so called nothing) changes to the large or small matter energy density in the liquid phase (Einstein's 4-dimensional universe) and hence it is found, an important fact, that the existence of discrete structure in the universe, ranging from galaxies to super-clusters. The concept implies entanglement (non locality) means the apparently diffuse time space localization of mental functions argues in favor of an underlying multidimensional space-time reality. So that the

Potential energy to couple wave information to mental processes, proposes that wave information is transmitted from and into the brain by wave resonance. According to Vattay et al. 2012; Hagan et al. 2002. The quantum system (of the brain) interacts with a quantum environment, the phase information is lost and cannot be reassembled. By entanglement, the quantum coherence in a small region, e.g. the cell or the brain, might have spatial long-range effects.

I. Appearance of Our Universe

There is no consensus yet on how the universe initially came to be, the general assumption is that perhaps an energetic fluctuation caused the universe to tunnel into the existence from quantum foam. The question of why the large energy of the universe is in a dark, i.e. not found in practical, the observed vacuum energy is so small in comparison to the scales of particle physics is known as cosmological constant problem. It is generally thought to be easier to imagine an unknown mechanism which would set vacuum parameter exactly to zero and so it can be considered that there exist several unifications from the very early universe. This class of symmetry group can be expressed mathematically as $SU(11) \supset SU(5) \times SU(6) \times U(1)$; $SU(23) \supset SU(12) \times SU(11) \times U(1)$; $SU(47) \supset SU(24) \times SU(23) \times U(1)$;so on. We can assume $SU(5)$ as matter energy group and $SU(6)$ a new type of energy sources may be called as latent energy group together which changes into the energy group $SU(11)$ [similarly, apply for $SU(23)$; $SU(47)$ etc.], i.e. to the super unified group. So, it is considered that the breakdown of SUT (Super Unified Theory) symmetry group $SU(11)$, breaks into fundamental group $SU(5) \times SU(6)$ leads to a phase transition and then the fundamental group $SU(5)$ which also breaks into subgroups $SU(3) \times SU(2) \times U(1)$, in which the scalar field Φ changes. The original vacuum, i.e. false vacuum ($\Phi = \sigma$) is no longer the true vacuum ($\Phi = 0$). The inflationary stage arises, however, if the true vacuum is not immediately attained. It can explain how the universe appears from nothing. It seems our universe comes from nothing to the universe belongs to the energy

group $SU(11)$, a special unitary group having 11×11 matrices, such that $SU(11) \supset SU(5) \times SU(6) \times U(1)$. Thus, we have from $SU(11)$, the Hermitian matrix H has 120 arbitrary constants. Which correspond to 120 bosons that now mediate between the different basic entities, of these we already have 60-bosons from the matter energy group $SU(5)$, latent energy group $SU(6)$ and from $U(1)$. Thus, $120 - (24 + 35 + 1) = 60$ more bosons are namely J-bosons are expected to link the participants of $SU(6)$ with $SU(5)$. Therefore, in the theory of $SU(11)$, it is possible to change any of 30 (thirty) latent energy bosons of $SU(6)$ into any of the 30(thirty) matter energy bosons of $SU(5)$ or vice-versa by the exchange of the J-boson. That is why it becomes possible to create or destroy matter particles and hence the universe seems to appear from nothing. In the present dissertation there is neither any starting point nor any ending point of the wider (measurable in quantum cosmology) universe (i.e. complex space-time). Only there exists the initial and end conditions for narrower (measurable classically) universe (i.e. Einstein space-time) which emerged from wider universe by the process of changing phase, where it is a continuous process. Again, on the other-hand, the idea that our 4-dimensional universe might have emerged from a higher dimensional space-time is now receiving much attention where the compactification of higher dimensions plays a key role. However, the question arises of how and why this compactification occurs. From string theory we know that the compactification may take place provided that the higher dimensional manifold admits special properties, namely if the geometry of the manifold allows, for example, the existence of a suitable killing vector. However, it is difficult to understand why such manifolds are preferred and whether other possible mechanisms for compactification do exist. In cosmology, on the other-hand, different kinds of compactification could be considered. For example, in an approach, called dynamical compactification, the extra-dimensions evolve in time towards very small sizes and the extra dimensional universe reduces to an effective 4-dimensional one. It is then a natural question that how an effective four dimensional universe evolve in time and whether the resulting cosmology is similar to the standard FRW four dimensional without extra dimensions. A universe is based on the considerations of dark energy sector. One may start from a fundamental theory including both gravity and standard model of particle physics. In this regard it is interesting to begin with 10 (= 4 + 6)-dimensional space-time, in which case one needs a compactification of 10-dimensional super gravity theory where an effective 4-dimensional undergoes acceleration. On the other-hand, from cosmological point of view it is not so difficult to find cosmological models in which the 4-dimensional universe undergoes an accelerating expansion and the internal space contracts with time, exhibiting the dynamical compactification. In my paper we consider the internal space as imaginary (pseudo-space, $b = iR$), where the matter belongs to another phase by the phase transition process with the help of the latent group $SU(6)$. It is shown that using a more general metric and introducing matter without specifying its nature, the size of compact space evolves as an inverse power of the radius of the universe. The FRW equations of the standard four dimensional cosmology is obtained using an effective pressures expressed in-terms of the components of the higher dimensional energy-momentum tensor and the negative value of this pressure may explain the acceleration of our present universe. In the present dissertation, we consider in the very early universe up-to the Big-Rip singularity, there were several unifications. This class of symmetry group can be expressed mathematically as follows: $SU(11) \supset SU(6) \times SU(5) \times U(1)$; $SU(23) \supset SU(12) \times SU(11) \times U(1)$; $SU(47) \supset SU(24) \times SU(23) \times U(1)$;.....so on. Thus we have, $SU(12n-1) \supset SU(6n) \times SU(6n-1) \times U(1)$, where, $n = 2^0, 2^1, 2^2, 2^3, 2^4, \dots, \infty$. i.e. $SU(12n-1) \supset SU(6n) \times \dots \times SU(24) \times SU(12) \times SU(6) \times SU(3) \times SU(2) \times U(1)$. Hence, according to the law of symmetry breaking of the energy group, i.e. according to the symmetry breaking of the Gaussian energy group, there exists neither any Big-Bang nor any Big-Crunch singularity, only there Big-Rip singularity and Big-Break singularity. All the dark energies $SU(12)$, $SU(24)$, etc. Are also responsible for the various consciousness and intelligence of the living cells or bodies according to the progress for biological revolution as such the progress of the material universe depends on the sub-energy groups of $SU(5) \supset SU(3) \times SU(2) \times U(1)$ stated by the standard model of physics. Again the activities of the energy groups for consciousness are restricted to unfold for each galaxy of the universe as well as for every solar system of the galaxies. Our physical universe, starts from $SU(11)$, classically from 10-dimensional space-time, the super-symmetry of the universe. The quantum wave energy universe actually starts from Big-Rip singularity it was shown there exists energy pressure and densities simultaneously.

II. Double Slit Experiments

It may be explained by a series of new energy sources $SU(6)$, $SU(12)$,etc. which may be established the concepts of reality or objective existence of the above mentioned double slit experimental theorem. Some of the new energy sources exist which are not being observed by an observer practically. Our 4-dimensional matter/particle universe or physical universe observed when there was created a "whole", like single slit open i.e. by the symmetry breaking of the unified group

SU(5) and creates a shower of photons & quanta of the matter particles on the natural screen of the universe or otherwise like double slits open from the 10-dimensional space-times photons & quanta by the new energy sources of SU(6) emitted as 'knew' [i.e. the symmetry breaking of the super-unified energy group SU(11) and then SU(5)], we found an entangled-like matter energy with spirit energy by SU(6). It was compared with a situation of the universe where relatively very lower energy density in the ocean of the new energy sources in one phase, starting from Big-Rip singularity like as in the gaseous phase and then vapor & liquid phase. It is observed from the Einstein's space-time theory, that means we have from the Friedmann equation for the evolution of the cosmic scale factor $R(t)$ which represents the size of the universe, is found at a finite time in the past R must have been equal to zero (my article 2012). Then the contents of all the galaxies must have once been squeezed together in a small volume i.e. numerically, the volume of the matter universe once been squeezed in a zero volume. We may assume that the matter universe is then transferred into another phase by the phase transition system with the help of latent energy group SU(6) [$SU(11) \supset SU(5) \times SU(6) \times U(1)$]. The subgroup SU(6) has been interpreted as a new type of energy sources other than SU(5) [$SU(5) \supset SU(3) \times SU(2) \times U(1)$], the standard model of physics. So there were several environmental atmosphere according to the unified group SU(11), SU(23)... ∞ etc. all belonged to so called "nothing" as said by Einstein. We assumed that our universe appeared from something instead of nothing. It was discussed in my previous article that the quantum behaviour having some classical counterpart that can always choose such a quantum state, which does not disappear at any value of R_t , which guarantees the positivity of the quantum average of the operator. Coming back to our cosmological model we can say that the requirements of the well-definiteness of the pseudo-tachyonic part of the Hamiltonian operator in the Wheeler-DeWitt equation, does not imply the disappearance of the wave function of the universe at some values of the variables and thus, does not reveal the effect of the quantum avoidance of the cosmological singularity.

The strength of weak force gradually decreases and strength of strong force increases as we advanced from the symmetry breaking of the unified group SU(5). The first stage of the formation of our universe from so called nothing which was basically from non-locality to locality by the symmetry breaking of the SUT group SU(11), where the energy group SU(6) remains latent and behaves like as consciousness relative to the energy group SU(5). The bosons of the energy group SU(6) always controlled all measurable energies of SU(5) including 'quarks' & 'leptons' etc., which comes from pure energy stays in the form like vapor (i.e. in another phase) and hence from the symmetry breaking of SU(11) with the energy group SU(12), we found new types of quanta with conscious energy, quark-like, & lepton-like particles etc. and specially produces a strong neutral current which are applicable within 'live' cells/elements/animals/plants etc. with an electromagnetic interaction created by SU(6) with U(1) in the frame-work of $SU(6) \times U(1)$ etc. called spirit stuff, and then from SU(5) are found matter energies, fermions, charge particles, spin, etc. like the decomposes of water by applying electric charges (extra energy) connecting with an electric circuit, we get hydrogen, oxygen as charged particles primarily and then gases with different characters from the characters of water. But the two gases may again react with each other at some situation and get water having no characters either of Hydrogen or Oxygen. It is very interesting that the generated hydrogen and oxygen from water can be reacted with other chemical elements in the some situations and found different characters in different forms. So, we consider, there exists two phases of the universe, (1) local, that means, particle produces as per requirement of the second phase i.e. as per the requirements of our universe which maintain the law of wave-particle duality theorem (physical stuff) and (2) non local, i.e. particles in the wave form (called spirit), produces in the first phase of our universe which controlled the second phase, our physical universe.

All the symmetry breakings from infinite space-time [i.e. Big-Rip singularity] to SU(5) belongs to the phase, pseudo-tachyonic & tachyonic universe. Hence all the energy groups from infinite effects ourselves while the energy group SU(6) directly controls the whole universe including ourselves creating as consciousness or intelligence and creating others, like emotions etc. and with the collaboration of atoms formed by the energy group of SU(5) produces biological particles. So, by the collapses of quanta with the strong forces of SU(6) within the environmental situations of SU(11) where 30-bosons of SU(6) changes to the 30-bosons of SU(5) or vice-versa, unfolded the physical universe and then we found everything of our universe. It is a continuous process from infinitely discrete universe.

III. Difference of Computer Robot And Human Brain

I, agree with Eugene Wigner's (see Wigner, 1992) suggestion that it is consciousness that collapses the wave function, as stated by Penrose and that the collapse of a special (objective) type of wave function produces consciousness.

It is helpful to have a conceptual picture of quantum superposition in a super gravitational context that means in the super-unified theory of $SU(11) [\supset SU(5) \times SU(6) \times U(1)]$, where the energy group $SU(6)$ creates gravitational field. According to modern accepted physical theories, reality is rooted in 3-dimensional space and a 1-dimensional time, combined together into a 4-dimensional space-time. But here we consider that the origin of reality is rooted in $(4 + D)$ -dimensional Friedmann-Robertson-Walker type universe having complex scale factor $\mathbf{R} + i\mathbf{R}_1$, where \mathbf{R} is the scale factor corresponding to the usual 4-dimensional Universe while \mathbf{R}_1 is that of D -dimensional space. It is then compared with $(4 + D)$ -dimensional Kaluza-Klein cosmology having scale factors \mathbf{R} and \mathbf{a} ($= i\mathbf{R}_1$), the internal space-time. It is shown that the rate of compactification of higher dimension depends on extra dimension 'D'. The Wheeler-DeWitt equation is constructed and general solution & particular solution is obtained. It is found that for $D = 6$ (i.e. in $4 + 6 = 10$ dimension), the Wheeler-DeWitt equation is symmetric under the exchange $\mathbf{R}_1 \leftrightarrow \mathbf{R}$. Hence, according to the new theories our actual reality of the so called material universe is rooted in 10-dimensional space-time instead of 4-dimensional space-time. Our conscious energies are associated with 10-dimensional to 5-dimensional space-time.

It is now well known that superconductivity and other large-scale quantum effects can actually occur at temperatures very far from absolute zero.

It is very convenient to say about the participation of the neutral current occurs in the frame-work of the super-unified group $SU(11) [\supset SU(6) \times SU(5) \times U(1)]$, i.e. specially in the frame-work $SU(6) \times U(1)$, where $SU(6)$ having 35-bosons, out of which five bosons namely $\mathbf{J}_{K3}, \mathbf{J}_{K8}, \mathbf{J}_{K15}, \mathbf{J}_{K24}, \mathbf{J}_{K35}$, corresponding to the five diagonal matrices, thinks to plays a key role for the consciousness of the universe also for human consciousness. The strong neutral current created by $SU(6)$ with $U(1)$ are likely to be compared with the weak interaction of $SU(2)$ with $U(1)$ of the unified group $SU(5) [\supset SU(3) \times SU(2) \times U(1)]$, where $SU(2)$ does not directly involve with electric, it still seems to demand charged bosons \mathbf{W}_1 and \mathbf{W}_2 . This circumstances prompted efforts to link it with an electromagnetic interaction. This link achieved via $SU(2) \times U(1)$ frame-work originally proposed by A. Salam and S. Weinberg and sometimes called the electro-weak interaction. The link brings the photon (which is a boson), closer to three particles $\mathbf{W}_1, \mathbf{W}_2$ & \mathbf{W}_3 , where $\mathbf{W}_1, \mathbf{W}_2$ are two opposite charged particles and the third (\mathbf{W}_3) neutral. In this unified picture it is more convenient to say that another neutral particle \mathbf{Z}^0 instead of $\mathbf{W}_3, \mathbf{Z}^0$ has zero mass and charge, just like the photon. However, the photon does not interact with the neutrino while the \mathbf{Z}^0 does. The exchange of \mathbf{Z}^0 does not alter electric charge, and hence such an interaction is called a neutral current interaction. Similarly, if we go beyond the standard model of physics i.e. in the symmetry theory of $SU(11)$, we see there are five neutral particles of the latent energy group $SU(6)$, in which two pairs, namely $\mathbf{J}_{K3}, \mathbf{J}_{K8}$ and $\mathbf{J}_{K15}, \mathbf{J}_{K24}$ were interchanged without any colour changes, but the neutral particle \mathbf{J}_{K35} , like as \mathbf{Z}^0 also create a neutral current i.e. electromagnetic interaction through the frame-work $SU(6) \times U(1)$, called pseudo-electromagnetic interaction which may responsible for the consciousness sensory with material weak electromagnetic interaction achieved by the frame-work of $SU(2) \times U(1)$. We observe that, towards unification of $SU(3), SU(2), U(1)$, the strength of weak force gradually increases while strength of strong force gradually decreases and ultimately we found the unified group $SU(5)$. So, in the theory of $SU(11)$ i.e. in another phase we found quark-like & lepton-like particles, which may be five times of each quark [i.e. u-quark, d-quark,.....etc. of the standard model of physics of the unified group $SU(5)$] or each of five different quarks [namely, $\{\mathbf{u}_1, \mathbf{u}_2, \dots, \mathbf{u}_5\}$ -quarks, $\{\mathbf{d}_1, \mathbf{d}_2, \dots, \mathbf{d}_5\}$ -quarks,.....etc.]. Thus \mathbf{Z}^0 - like neutral particle of $SU(6)$ like zero mass & charges instead of \mathbf{J}_{K35} interact with other particles of $SU(5)$ creating strong neutral current with conscious sensory information system.

In the theoretical physics, we observe the flavour-changing neutral current (FCNC's) are hypothetical expressions that change the flavour of a fermions current without altering its electric charge. If they occur in nature (as reflected by Lagrangian interaction terms) these processes may induce phenomena that have not yet been observed in experiment. Flavour-changing neutral currents may occur in the standard model beyond the tree level, but they are highly suppressed by the GIM mechanism. FCNC's are generally predicted by theories that attempt to go beyond the standard model, such as the

models of Super-Symmetry or Technicolor. Their suppression is necessary for an agreement with observations, making FCNC's important in model-building. The Cemi-field theory conceives that the electromagnetic field in the brain fine tunes the probabilities of neuron firings. The affected neurons may be a part of the larger connected assemblies, and this leads to memory and learning. In simulated networks non-synaptic neuronal interactions via the electromagnetic field and also gap junctions enhance learning. Modulation of long term potentiating by electromagnetic fields has also been demonstrated in vitro in rat hippocampus slices.

I.

IV. Photon And Electric Charge-Mediated Consciousness

The change of a larger group SU(11) of symmetries to the subgroup SU(6) × SU(5) × U(1) is spontaneous by the redistribution of energy particles of stages like gaseous as explained before. The above subgroup which contained the U(1) group, there inevitably arises particles (whose annihilation formed charge particles) that have the characteristics like a magnetic mono-pole. Typically, the mass of which (in energy units) may be $\sim 10^{19}$ Gev (Plank energy). Monopoles like charge particles are highly stable particles and once created are not destructible. And so they would survive as relics to the present epoch. The explanation of the two energy groups SU(5) and SU(6) of the SUT energy group SU(11), we begin with the analogy of ferromagnetism and crucial role of the Curie-temperature (770°C for iron). Above this temperature a bar of iron shows no magnetism in an external field. This is because its elementary nuclear magnets are randomly aligned with no resultant magnetization. Energetically, this is the lowest state for the bar and it chooses to remain in that state as the most stable one. Below the Curie temperature the state of lowest energy changes to that in which all the nuclei are aligned along the bar, which develops polarity at its ends. There are two states of the same lowest energy possible, depending on which (north or south) of the two poles falls at a given end. The ultimate choice of one state apparently breaks symmetry although theoretically and inherently the symmetry is always there. In the early universe something similar happened to the super unified theory SU(11) and then SU(5). Above like a critical temperature T_c , the vacuum state, the state of lowest energy, is none other than the potential $\phi = 0$. Below T_c , the states of lowest energy of the thermo-statistical particles are changed. It now corresponds to a situation when ϕ has non-zero values. Corresponding to states of the same lowest energy, let us suppose that there exist alternative values ϕ_i ($i = 1, 2, 3, \dots$) which now acquire that status of vacuum. There were basic symmetry with respect to all ϕ_i , but in practice the system may spontaneously acquire one of them. This is again an apparent break-down of the symmetry. The consequences of this for the very early universe are that it is divided into different domains, each with a different value of ϕ_i . In this way the universe acquires discontinuities along the domain walls. These translate into highly significant discontinuities of matter distribution. The fact that we do not see such discontinuities in actuality (say in the form of large sheets of matter) is hard to explain away. This difficulty is known as the domain wall problem. The intersection of two domain walls is a linear structure known as "cosmic-string" such filamentary structure have been invoked in scenarios for galaxy form.

V. Conclusion

Quantum physics indicates that consciousness is related to the awareness that an electron appears to show in the wave/particle duality (double slit experiment). Quantum physicists have shown that the electron behaves differently when being observed by a human. When the electron is not being observed, the electron behaves like a wave, but when an observing instrument is placed in the experiment, the electron behaves like a particle. This experience indicates that the electron will change its behaviour/reality depending on whether or not the electron is being observed as if the electron is aware that it is being observed. This awareness is very similar, if not the same, as human awareness and may be related to the same consciousness. Thus consciousness understood if there creates lives otherwise it becomes pseudo but working silently for the formation of our universes and then behaves like entanglement. Consciousness is, therefore, a non-material entity capable of independent, eternal existence, and not a property but in some sense may be used as property. Consciousness is not emergent, and is eternal similar to the electron. It can remain localized in the human brain and interact with the brain, and thereby, control the activities of the human body. While electrons in the brain behave as particles, these electrons prevent the consciousness from realizing that it is part of a larger whole. When the electrons behave as a wave, the consciousness becomes aware of its existence outside the human mind, which makes OBE and NDE possible. Whenever the electron wave function collapses, the OBE and NDE ends and the person returns to their physical body and its perception of reality similar to the collapsing of the wave function in the double slit experiment in quantum physics. During the OBE and NDE while the electron is behaving as a wave function, consciousness can leave the brain and go into an independent

floating existence outside the human body where it can travel independent of space-time similar to the entangled electron.

How does the “I” or “self” or the perceived wholeness of one’s world emerge from a system consisting of so many parts, billions of neurons. What creates the “Oneness” of thought processes? What creates individuality and “I”-ness or “self”? What creates feelings, free will, and creativity? The problem is solved only by making a complete total body assumed like an atom/molecule with the combination of two different characters of electromagnetic wave functions producing in two different phases by the symmetry breaking of $SU(11)$ & $SU(5)$ and then formation of biological particles, otherwise does not create such feelings etc.

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