

# Universe and Neuron: A Study on Physical Process Involved in Consciousness

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**Abstract**-One of the main phenomenons of a single living being is consciousness. Common living being keeps reproduction, growth, metabolism, consciousness and death attributes. Mechanism of consciousness processed in the brain which is neurological structure. The structure of our universe is almost similar to neurostructure. The quantum process, gravitation and gravitational wave with electromagnetic wave process make Universe vibrant and sensitive. Quantum coherence and gravitation-electromagnetic coherence processes the body consciousness of the Universe. The paper proposes an idea on physical process involved in consciousness of Universe.

**Keyword:** Neuron, Physical process, consciousness, quantum process, Quantum coherence.

## 1. Introduction

Universe is a single living organism. Our cosmos is not a fragmented and lifeless machine but is instead a unified and living organism. According to the dialectics of nature, "life is the mode of existence of albuminoidal bodies." (Engels, 1883). In modern version, life is the mode of existence of informational macromolecules such as proteins and nucleic acids. Albuminoidal bodies could be translated as a physical entity based on organic molecules that are produced by living entities, say as an organism. Now, we define, "life is the mode of existence of living organisms". But the question remains, what is a living organism? Living organism is an entity formed by the function integration of several "organs" corresponding to the structure and function, i.e. an organism is an integrated system of interdependent structures and function (A., 1967). Thus, life is collection of integrated organs as molecular structure and machines as producing individuals evolving through natural selections.

### 1.1 Enforcement and activation of life in macromolecular structure

Viruses have been defined by their virions, the viral particles produced during infection. Viruses were first defined as simple entities with a single type of nucleic acid without any metabolic activity. Since some virions can crystallize, viruses were considered as molecular entities not cellular (A., 1967). An organism is made with cell. So, viruses were not usually classified as living organisms. Again the virus and the virion were first criticized by Claudia Bandea who is considered that the intracellular phase in the virus life cycle is the ontogenetically mature phase of the viruses. In this Phase the virus shows the major physiological properties of other organisms: metabolism, growth and reproduction. These are the evidences for living organism. Who inform to enforce the life

within virion itself? The chemical mechanisms induce electromagnetic information in response of metabolism which informs to stimulate the virions with host during infection. This information is for stimulating towards host to take energy for metabolism to grow and reproduce. This growth and reproduction select the individuals through the natural selection. This stimulation towards host during infections is the one of the phenomena of "consciousness". The virions correspond to the mechanism used by the virus to spread from one cell to another during producing information and that to confuse the virion with the virus would be the same as to confuse a sperm cell with a human being. When information and stimulation to be induced in the intra-structure of molecular entities of virions itself, viruses alive. So, consciousness could (for lower organism, stimulation) enforce the life inside the macromolecular entities.

## 2. Brain & body consciousnesses: Quantum electrodynamic coherence

### 2.1 Quantum information and quantum coherence field

Organisms overcome the immediate constraints of thermodynamic in their capacity to store mobilizable energy, which circulates through a cascade of cyclic process within the system before it is dissipated. This enables energy to be readily shared throughout the system, from local to global and vice versa. But how is energy mobilization so well-coordinated. Weak signal originating anywhere within or outside the system will propagate throughout the system and become amplified into macroscopic action. Inter communication can proceed very rapidly on account of the liquid crystalline structure of the cells and the connective tissues. Some virions can also crystallize. Liquid crystals are phases of matter exhibited by certain anisotropic organic materials as they undergo a cascade of transition between the solid and the liquid states (Blinov, 1983). These mesophases possess symmetry and mechanical properties intermediate being those of liquids and of solid crystals. Liquid crystal in organisms includes the amphiphilic of cellular membranes, the DNA in chromosomes, all proteins, especially cytoskeleton proteins, muscles proteins collagens and proteoglycans of connective tissue. This adopt a multiplicity of mesophases that may be crucial for biological structure and function at all levels of organization from processing metabolites is the call to pattern determination in developers and the coordinated locomotion of whole organisms (Gray, 1993). This gave rise to the notion of a morphogenetic field as spatiotemporal domain of activities organized global to form the whole organism. The change of electromagnetic wave coherence according to the orientation of optical axis of the sample of liquid crystal with respect to the polarizers and in response of it,

interference of different spectrum of electromagnetic wave produce signals of information.

The extracellular and intercellular matrices together constitute an excitable continuum for rapid intercommunication permeating the entire organism, enabling it to function as a coherent whole. The existence of this liquid crystalline continuum has been directly demonstrated in all live organization by noninvasive optical imaging technique (Glauber, 1969). It constitutes a “body consciousness” that precedes the nervous system in evolution. This body consciousness is the basis of sentience, the pre-requisite for conscious experience that involves the participation of the intercommunicating whole of the energy storage domain. In the limit of the coherence time and coherence volume of energy storage, intercommunication is instantaneous and nonlocal. Truly, it is a quantum superposition of coherent space-time modes, constituting a pure state maximizes both local freedom and global cohesion in accordance with the “factorizability” of the quantum coherent state (Glauber, 1969). Quantum coherence gives rise to correlations between subsystems which resolves neatly into products of the self-correlations so that the subsystems behave as though they are independent one another. **3.**

### *2.2 Electromagnetic information and electrodynamic coherence field*

One can also picture the organism as a coherent electrodynamic field of many modes, with an uncertainty relationship between energy and phase. (What is Quantum physics? Lecture on Hydron Physics, 1994) Oschman review evidence suggesting that organism liquid crystalline continuum is responsible for the direct current (D.C) electrodynamic field, permeating the entire body of all animals, that (Becker, 1990) and others have detected. The D.C field has mode of semi-conduction that is much faster than nervous conduction. During a perceptive event, local changes in the D.C field can be measured half a second before sensory signals arrive in the brain, suggesting that the activities in the brain may be pre-conditioned by the local D.C field.

Collagens have distinctive mechanical and dielectric properties that render them very sensitive to mechanical pressures, changes in pH, in organic ions which produces electromagnetic fields in response of piezoelectric effect. Proteins in liquid crystals have coherent residual motions, and will reality transmit weak signals by proton conduction, as in forms of electromagnetic coherent waves. This makes intercommunication in the manner of a proton-neural network. Thus, information not only intra but inter communicate also with in inside and outside of body and brain.

### *2.3 Induction of consciousness organism*

These two coherent field, quantum and electromagnetic interacted by their wave function and hence quantum electrodynamic field set up local and nonlocal within the body and the neurons of the brain. Hence, the pure coherent state is an

ideal attractor or the end state towards which the system tends to returns on being perturbed. This abundant evidence of macroscopic activities with collective phases in the spectrum of biological rhythms many of which tend towards integral phase relationships in coherent field generate information to communicate within the system of living organism.

As the times coherence times of living processes span more than 20 orders of magnitude from  $10^{-14}$  sec for resonant energy transfer to  $10^{-7}$  sec for circannual cycles, a pure coherent state for the entire system would be many-mode quantum electrodynamic field with a collective phase over the mode.

Thus we suggest that the wholeness of the organism is based on a high degree of quantum electrodynamic coherence field which generate the information field through the phase correlation. This information intercommunicate in instantaneous and within local and nonlocal. So consciousness is induced and distributed throughout the entire body, brain and neurons. The brain consciousness to be embedded in the body consciousness. Brain and body consciousness mutually inform and condition each other.

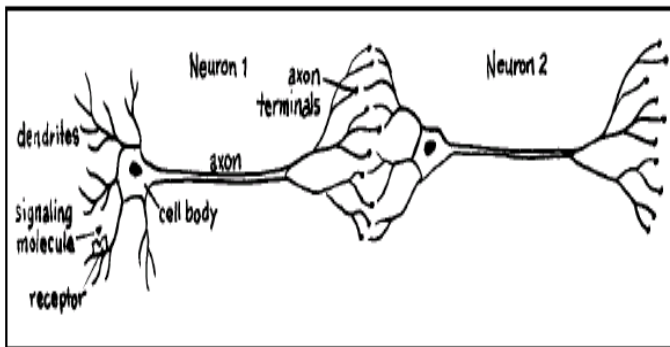
### **3. The macroscopic wave function**

If quantum electrodynamic coherence field is main characteristic of consciousness of the organism, then consciousness will possess something like a macroscopic wave function which is result of superposition of many quantum electrodynamic wave function under various event in molecular domain. This wave function store instantaneous information for living organisms and its gives background domain to induce consciousness. This macroscopic wave function not generated only within living organism but also within space-time of the universe by entire components of the universe called large-scale-macroscopic (LSMS) wave function. Further we will see LSMS wave function induced by unification of Gravito-electrodynamics field, Quantum-gravity field and Quantum electrodynamic fields.

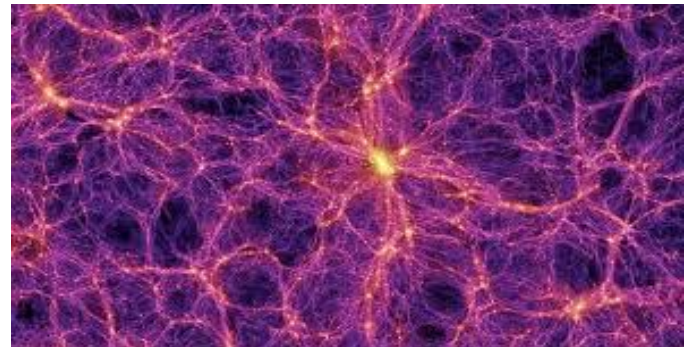
### **4. Comparative study: the structure of neuron and universe**

#### *4.1 Neuron*

Most of the components of neuron are crystalline. The neuron of the nervous system which gives structure to the brain has three fundamental components – the soma, the dendrite and the axon. The soma, or cell body, of contains the nucleus which store genetic material inside itself for the neurons and store information as well as other structure that are common to the living cell of all types. The membrane surrounding the soma and small bumps called “dendrite spines” on the “dendrites” have the capability to receive information from other cells. Dendrites are a branching system as arms of the soma.



**Fig.1:** Neurons Connections



**Fig.-2(b):** The largest N-body simulation based on information received from WMAP follows what become 20 million galaxies over 2 million years in universe. At 20 Mpc thick slice at Z=0.

The “axon” emerges from the soma as a single fiber, usually much longer than any dendrites. The point in the axon nearest the soma is the “axon hillock”. The axon branches into “axon collaterals”, later into small branches called “telodendria”, then finally into small structures as “end feet”. The end feet’s has the capability for transmitting information to another neuron.

#### 4.2 Universe

Universe by its structure has also mainly three components, i). Galaxies and galaxy clusters as cells and tissue of universe respectively, ii). Spiral arms of galaxies as a receiver, and iii). cosmic information grids (CID) as transmitters within universe. Galaxies hold “black hole” at the center as nucleus of cell and as well as other structure like solar systems, nebulas, etc. black hole hold capacity to generate new universe (Zhang, JULY 2009) Spirals arm spinning in an intergalactic field with flow of currents inwards on the plane of galaxy and receives information (A., 1967) CID made by filaments structure of plasma which moves along magnetic field lines and induced current flow. This phenomenon produce magneto hydrodynamic (MHD) waves which transmitting information (Arrhenius, 1972)

#### 4.3 Macro fluid crystalline structure of the universe

Distribution of galaxies is the value of the logarithm of the numbers of galaxies per square degree are found to be distributed at random about the average values. On this fact, Bianchi (and also some other like Kenner) gives anisotropic viscous fluid structure of model (Hervik)

$$\alpha^2 = \frac{K}{3} e^{-3(\omega+1)\alpha} + A^2 e^{-6\alpha} \quad (1)$$

where,  $\square = 1/3 (H_1 + H_2 + H_3)$  is in derived notation and where H is Hubble parameter.  $w = -1$  for vacuum dominated.  $w = 0$  dust dominated. Most of the universe dominated with dust of nebulas, so

$$\alpha^2 = \frac{K}{3} e^{-3\alpha} + A^2 e^{-6\alpha} \quad (2)$$

Where, A is anisotropy parameter as gravitational potential vector. When  $\square = 1$  for which the above equation simplifies, namely  $\square = 1$ . This types of fluid is called a zel'dovich fluid. Thus derivative of Hubble parameter will be

$$H = 3(H_A^2 + \xi H - H^2) + \frac{1-\omega}{2} \rho = 3(H_A^2 + \xi H - H^2) \quad (3)$$

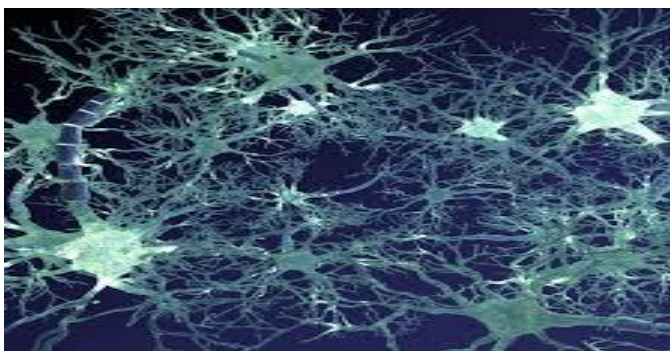
Integration leads to

$$H = \frac{\xi}{2} + \hat{H} \frac{e^{6Ht} - \hat{C}}{e^{6Ht} + \hat{C}} \quad (4)$$

$$\text{Where, } \hat{H}^2 = \frac{\xi^2}{4} + H_A^2$$

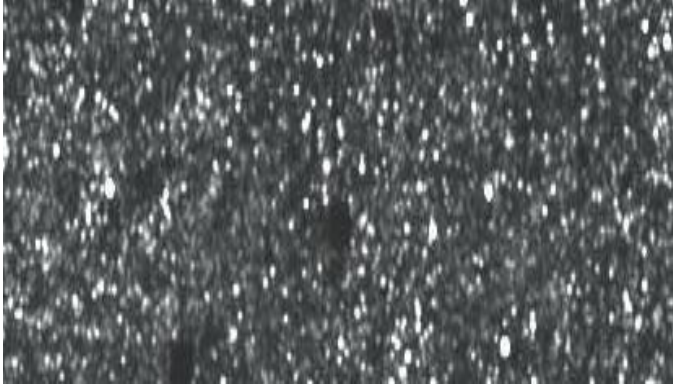
and  $\hat{C}$  is an integration constant. Equation (4) explains the fluid (liquid or gas) structure of universe.

At given temperature the second law of thermodynamics allows one to predict the crystalline structure in the derivations of the Gibb’s potential, changes in the crystal structure at the critical temperature. The fact that in Friedman models, Einstein’s theory cannot determine the geometry of the universe but gives three alternative,  $K = 0$  or  $K = \pm 1$  is deeply rooted in the fact that all three model have same microscopic equation of state. Thus, the distribution of galaxies over different spatial geometrics is very



**Fig. 2(a):** Simulated image of nervous system to calm the powerful network for transmitting energy and information

similar to the distribution of atoms over different lattices. This crystal symmetric satisfied the galaxies in Friedman models are distributed over space with distinct but continuous symmetry properties as Bianchi symmetries (Bayin).



**Fig.3:** Galaxies distribution of about 710,000 galaxies in the area of 14.7 square degrees.

Thus, Bianchi and other fluid model of structure of universe leads to not perfect but almost crystalline structure of universe. This fluid crystalline structure containing galaxies and clusters of galaxies, with solar system and plasmatic gas as in nebulae, these components makes universe “macro fluid crystalline structure” (MFCS).

## 5. Consciousness in the universe

Our views of reality, of the universe, it depend itself on consciousness which defines existence of universe. This existence of it's to be experience by universe itself.

### 5.1 Superimposed coherence wave function throughout the universe - Generate information for consciousness

As similar, the optical axis of the sample as in all living organisms, MFCS change the orientation of it optical-gravity axis which change polarizing state. The waves of quantum electrodynamic field and quantum gravity field make relationship between coherence intensity under polarizing with MFCS. MFCS behaves as “multirefringence” and its degree of alignment emits information within entire universe. Intensity and contrast of coherent field gives correlated informational relationship.

$$I = -\sin^2(\theta_2 - \theta_1) \sin 2\theta_1 \cos 2\theta_2 \sin^2(\phi_1/2) + \sin^2(\theta_2 - \theta_1) \sin 2\theta_1 \cos 2\theta_1 \sin 2\theta_2 \sin^2(\phi_2/2) + \cos^2(\theta_2 - \theta_1) \sin 2\theta_1 \sin 2\theta_2 \sin^2(\phi_1 + \phi_2)/2 - \sin^2(\theta_2 - \theta_1) \sin 2\theta_1 \sin 2\theta_2 \sin^2(\phi_1 + \phi_2)/2 \quad (5)$$

Thus concurrent quantum electrodynamic, quantum gravity and other activities in order to see how they could give to rise of orientated effected information.

### 5.2 Gravitoelectrodynamics coherence field Information

Gravitation wave have two independent polarization  $h_+$  and  $h_x$  polarized by spinning massive bodies in the universe. This polarization of the waves contains orientated information (Satya Prakash, 1915). The wave of changing the magnetic fields through the plasma in space time, it induced the magneto hydrodynamics waves. Here, without electrical field space time becomes a perfectly conducting medium when the magnetic fields and the plasma move together. But independently hot plasma produced electrical field also. Electron plasma spiraling at nearly the speed of light in a magnetic field and emitting synchrotron radiation. (Peratt, 1992). Interstellar and inter galactic hot plasma and also relatively low temperature plasma emit radiation of low energy, such as visible and radio waves. Plasma induced ionic current when aligned along magnetic field line makes helical orbits around and along the field line. Thus dynamic electric and magnetic field produced which set up electromagnetic waves.

This type of plasma makes dynamic plasma filament structure up to very long distance. These filaments structure to be seen in galaxies within entire universe. The filament makes CID when axis of filament changes, the electromagnetic wave polarized and transmitting information between intra and inter galactic solar and nebulae region.



**Fig.4:** Interconnection between two galaxies through transmission of electromagnetic polarized wave.

Polarization through the MFCS of two wave, electromagnetic wave and gravitation wave, electromagnetic field unified with gravitational field in space-time in action of plasma dynamo and spinning mass. This phenomenon gives

$$\nabla \cdot E_G = -4\pi G_p \quad (6)$$

$$\nabla \cdot B_G = 0 \quad (7)$$

$$\nabla \times E_G = -\frac{1}{2c} \frac{\partial B_G}{\partial t} \quad (8)$$

$$\nabla \times \frac{1}{2} B_G = -\frac{4\pi}{c} j + \frac{1}{c} \frac{\partial E_G}{\partial t} \quad (9)$$

Which are the Maxwell equations for the gravito electromagnetic (GEM) field.

$$\text{Where, } E_G = -\nabla \phi - \frac{1}{2c} \frac{\partial A}{\partial t} \text{ and } B_G = \nabla \times A$$

The dynamic magnetized plasma and spinning mass in space-time of universe form a complex unified wave function of GEM within whole universe and hence they superimpose with each other which produce GEM coherence field. Changing phase correlation of this coherence field in response of polarizing and scattering through MFCS store information and transmitted to make consciousness in the universe.

### 5.3 Quantum - Gravity coherence field Information

The quantum particles which exist under atomic scale and also bosonic and fermionic scale can exist into two or more states or locations simultaneously, where such a multiple coexisting superposition of alternatives would be describe mathematically by a quantum wave function. Another quantum property is nonlocal entanglement in which separated component of a system becomes unified, the entire collection of components being governed by one common quantum wave function. Entanglement and non-locality of quantum systems behave as if they can affect each other (same wave function of two or more quantum particle which initially superimposed) instantaneously, even when they are extremely remote from each other. Quantum superposition of bit states can be interconnected with one another through entanglement. Thus “non local entanglement” is main concepts studied in quantum information. The bosonic particle graviton which take parts to creates gravitational fields to be proposed in the “one gravitation criterion” which was gravitation scheme, though not motivated via specific general relativistic principle, unified with standard quantum particles and in account of physical threshold provide quantum-gravity superposed states (R, 2000). Thus, wave function of this superposed states, at high temperature zone like supernova, gives phase and amplitude correlation when it interfered with such like another quantum-gravity wave function. This correlation induced coherent field and store information to approach the consciousness universe. This superposed quantum-gravity wave function extremely increase the field of non local entanglement them of quantum entanglements. Such quantum-gravity coherence over the entire state involved in the superposition and it is taken delay.  $\tau = \hbar/E_g$  on the average. Where  $\hbar = h/2\pi$ ,  $h$  is planks constant and  $E_g$  is the gravitational self-energy of the difference between two mass distribution of the superposition.

During superposed of coherent field beat frequencies produces under quantum-gravity coherent behavior. Basic frequency would be the average  $(E_1+E_2)/2h$  of the two corresponding to the average energy  $1/2 (E_1+E_2)$ , but this would be modulated by a much lower beats that is the difference between the two mathematical identity.

$a = -E_1t/h$  and  $b = -E_2t/h$   
 to represent the quantum gravity wave function for the two energies

$$e^{ia} + e^{ib} = 2e^{i(a+b)/2} \cos\left(\frac{a-b}{2}\right).$$

We can choose phase for the location state basis  $\square_{AH(1)}$  and  $\square_{AH(2)}$ , where A and H is notation for cosmological and quantum factor on which phase for the location state depends. We take two wave functions.

$$\begin{aligned}\psi_1 &= (\phi_{AH(1)} \cos\theta + \phi_{AH(2)} \sin\theta) e^{ia} \\ \psi_2 &= (\phi_{AH(1)} \sin\theta - \phi_{AH(2)} \cos\theta) e^i \\ \psi &= K_i \psi_1 + C_i \psi_2\end{aligned}$$

Where,  $K_i$  and  $C_i$  are complex constants satisfying

$$|K_i|^2 + |C_i|^2 = 1$$

In terms of the location state  $\phi_{AH(1)}$  and  $\phi_{AH(2)}$ , we find

$$\psi = \phi_{AH(1)} (K_i e^{ia} \cos\theta + C_i e^{ib} \sin\theta) + \phi_{AH(2)} (K_i e^{ia} \sin\theta - C_i e^{ib} \cos\theta) \quad (10)$$

We calculate the time dependent probabilities that a measurement to distinguish between the two location states by taking the squared moduli of the coefficients of  $\phi_{AH(1)}$  and  $\phi_{AH(2)}$  would give us

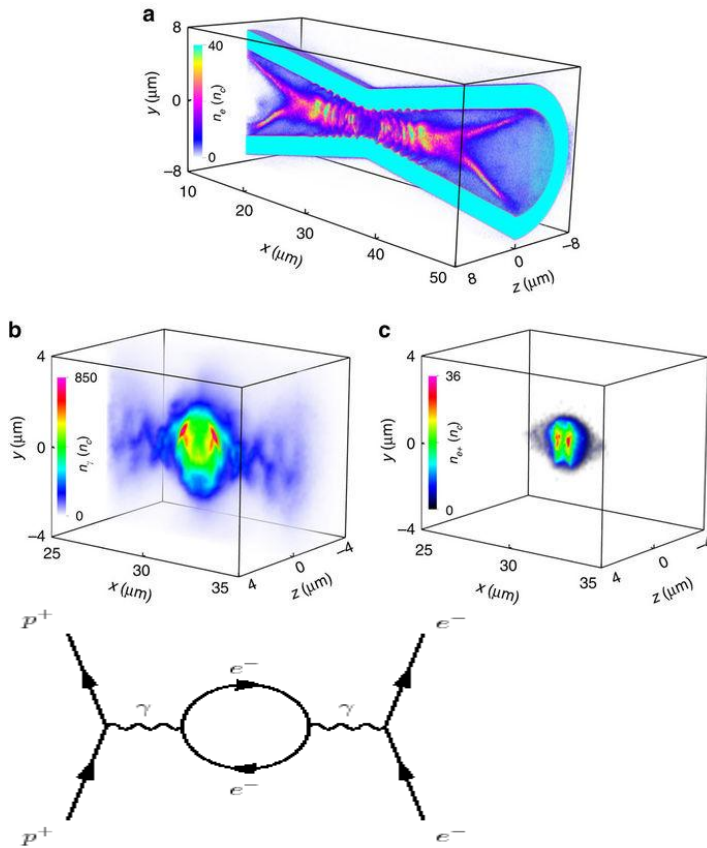
$$X_1 = |K_i|^2 \cos^2\theta + |C_i|^2 \sin^2\theta + (K_i C_i e^{i(a-b)} + C_i K_i e^{i(b-a)}) \cos\theta \sin\theta \quad (11)$$

$$X_2 = |K_i|^2 \sin^2\theta + |C_i|^2 \cos^2\theta - (K_i C_i e^{i(a-b)} + C_i K_i e^{i(b-a)}) \sin\theta \cos\theta \quad (12)$$

Where,  $X_1$  and  $X_2$  are two location states. Thus quantum gravity superposed wave function for coherent field relate to the that of quantum gravity entanglements which can affect each other two location in form of non-locality at an instantaneously without or infinitely small time lagging. The information transmitted and communicated through entire universe at once. Thus all components as organs of universe inter connected with communication of information by "qugranglment" which named is obtained by quantum gravity entanglements. So that, it might be possible universe feels conscious experience by itself.

### 5.4 Quantum electrodynamics coherence field information

One of the other bosonic particles (photon) interact with fermionic particles (electron), this interaction produced virtual pair of electron-positrons and virtual photon for infinitely small time (Feynmann). These virtual particles produced unified characteristics of quantum wave function and electrodynamics wave function and set up unified field called “quantum electro electrodynamics” fields.



**Fig.5:** Density distribution of (a) electron (b) photon and (c) positron at 5 GeV generated by laser in near critical-density plasma (Open article, Dec. 2016, Nature Communication, Xing Long Zhu, et al) and in right Feynman diagram of virtual pair production of electron-positron photon interaction.

When electromagnetic field is introduced into a free quantum theory of charge particles in space-time through the minimal substitution rule which action has property that the gauge invariance of the free photon action is preserved by the interacting theory. Thus, the information of any event happened in space-time to be preserved and transmitted local and nonlocal in response of that interaction which change the fields  $\psi'(x,t)$  of the charged particle by a space-time-dependent (STD) phase,

$$\Psi'(x,t) \rightarrow e^{-i(e/c)A'(x,t)} \psi(x,t) \quad (13)$$

Where,  $A'$  is the factor that charged particles correlated with a STD phase. This wave function change by the space-time derivatives of the field

$$\nabla \psi'(x,t) \rightarrow e^{-i(e/c)A(x,t)} [\nabla - i(e/c)\nabla A(x,t)] \quad (14)$$

Where,  $A$  is time dependent gauge fields can be converted into virtual photon and pair field. Under the action of this interaction theory (using simple transformation rule) add the field lagrangian the gauge-invariant photon expression,  $L_\gamma(x)$ , and the charged quantum particle expression,  $L_e(x)$ ,

$$L(x) = L_\gamma(x) + L_e(x) \quad (15)$$

Where, notation  $\gamma$  and  $e$  are to indicate photon and electron respectively. We arrive at the lagrangian of the unified electrodynamics field.

$$L(X) = \psi'(x) [ (iD - m) \psi(x) - \frac{1}{4} F_p^2 ] \quad (16)$$

Where,  $D \equiv (\nabla - i\frac{e}{c}A)$  and  $F_p$  is force field generated by particles. Thus, equation unified the quantum field of fermions and electrodynamics field of bosons.

So, information of any happened event under production of virtual boson and fermions in the space-time to be preserved by the quantum electrodynamics wave function and superimposed with other with correlation of STD phase, these correlations communicate the event in language of coherent wave function within entire universe. This wave function generates micro-information for consciousness of universe.

## 6. Conclusion

The whole is never statics, it is constantly dying and reproducing, decaying and renewing, breaking down to be build up again. The same cycle of disintegration and reintegration occur whether one is looking in the universe as in living organism. This cycle interchanges and inter-transforms the energy among different components of universe which produce metabolism for the whole universe. Events occurring during process of universe's metabolism produce information. This information is induced in response of changing of phase-correlative wave function of three field during universe's metabolism, GEM Coherence Field, Quantum Gravity Coherence Field, Quantum Electrodynamics Coherence Field. Thus, coherent activities leave trace, as coherent interferences, in the universal space-time is feed backs on the past and present evolution of the universal components in itself. The coherence field and energy interchanges in metabolism of universe. In consequence to this, it approaches the stream of consciousness out of which individuates its psyche. The psyche has so much common with the living organism that many of the most perceptive biologists and psychologists have proposed as vital life processes. In our idea, coherent information field which approaches to consciousness for universe is important physical process form set of psyche. So, we do recommend that all physicists and other intellectuals should study consciousness of universe under integrated study of applied science and technology. They should review that consciousness of universe to be studied under metaphysics.

## Acknowledgements

We thank to Mr. Arun Sharma for discussion on Gibb's Potential, Dr. S.P. Singh and Mr. Ajay Verma of Meerut Institute of Technology, Meerut.

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