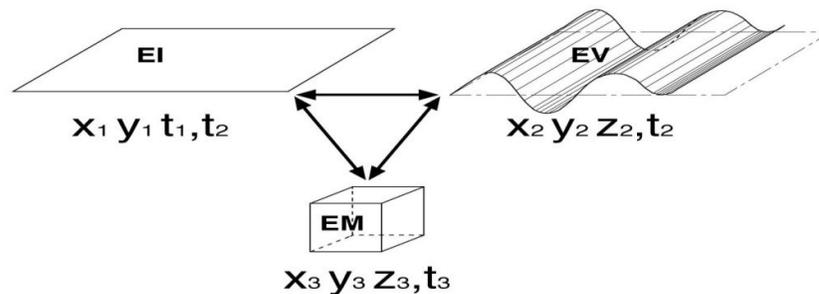


“Quantum-Bio –Physics” of Energy Conversions in Science & Art .

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TRIADIC - QUANTUM - ENERGY



ABSTRACT : The mental change from industrial economy to knowledge economy is fundamentally driven by sharing complementary models of reality between Science and Art in order to develop a new conscious understanding of life. This paper would favor a re-composition of the puzzle of science for going beyond the reductionistic understanding of mechanical paradigm, extremely subdivided in specialized disciplines. In particular, the new trans-disciplinary approach of “**Bio-Quantum Physics**”, would focus the emergence of “**self –organization phenomena**” (1), as a domain of coherence in binding different parts and functions with synchronicity in time coincidence and simultaneity of information exchange.

The principal problem to be revised in order to focus a better understanding of “**Self-organization Phenomena**” is to define a clear approach to the meaning of Information.

“**Information**” from etymology, based on **Aristotle's** conception (384-322 BCE), has the significance of an “*act of informing*”, e.g the activity to **shape matter into form so that information is an anticipation of the form**”. In mechanical science, “*information*” is not considered a preliminary action to be included into a form, but it is considered just as something immediately embodied in the forms of energy and matter. So that on the basis of this concept that directly associates Information and form, the relativistic domain of science, thinks that “*Information*”, enclosed in the form, cannot transmit faster than light. Therefore, as a consequence of the constant speed of light, *the simultaneity of information exchange*, is forbidden and this incompatibility provokes a great difficulty in

interpreting a great number of problems based on the “*self-organization phenomena*”. Therefore a deep conceptual revision of mechanical science, driven by the development of “**Quantum-Bio Physics**”, would start focusing on the “*self organization of brain structures*”. As a matter of fact, “*Functional Magnetic Resonance*” in neurosciences, puts in evidence of how simultaneously oscillations of separate areas of the brain are effectively functioning in an accurate self organization of timing synchronicity. So that experimentally we know that cognitive structures are driven by *self-organized systems* of information exchanges among different functional brain-areas, to generate a consistent construction of reality's scenarios in relation to embodied knowledge, acquired by a learning processes of memorization.

This preliminary consideration about the self-organization of brain functions, permits opening a new and advanced territory of knowledge. Therefore, willing to advance the reductionism in science understanding, a new theoretical observer, needs to become conscious of the fact that the brain's function belongs to an objective character. As a consequence, the arbitrary splitting between subject and object accepted in the mechanical paradigm, results in a very limited objectivity because it avoids consideration that the subject is an integrated part of observation. This become important for implementing a mental change in the conceptual development, by means of a new creation of science and new aesthetics style in the artistic productions. The above growth of consciousness, based on accepting the effective reality, that the subject always is included as an active partner of perception and interpretation, really favors a deep change in the methodology of scientific -research. In fact “*Quantum-Bio Physics*”, cannot be limited to the quantitative language of numbers, but firstly needs to be expressed on the basis of a qualitative rationale to find a large consensus by people, in order to maintain the universality of science thought. Now, after the fundamental consideration of spontaneous “*self –organization*” of the objective brain functioning, we can have a look at a great amount of natural self-organized phenomena to generalize a deeper knowledge of the growth of living system in plants and animals on our planet. Therefore, starting from the consideration that the synchronic, *simultaneity of information exchange* is the basis of contemporary need to grow human conscious knowledge, nowadays becomes important to understand how, in a new scientific domain, the “*non local simultaneity of information communication*”, may be involved in the general interpretation of the emergence of a new conceptualization of *self-organization*. At this proposal, it is useful to underline the **non-local time's simultaneity** is not the same concept as the *instant*, because *instantaneity*, is derived by a progressive reduction of time duration; vice versa simultaneity in time refers to a resonance effect in information exchange that is not in contrast with the finite velocity of light.

Following the above clarification, it is very interesting to underline the intuitive ability of art to forecast science changing in relation to fundamental revision of perception of the space-time dimensions. In fact Art, before theoretical Science, started in the beginning of the XX century, to develop cultural movements, such as Cubism, Futurism, Dadaism etc., opening a discussion, right to present days, to represent on the canvas, *the simultaneous aspect of multiple points of view*, in order to replace the traditional static perspective based on the Euclidean formalism of space-time.



Georges Braque : the Man with a Guitar
 (1906)http://www.monthlyherald.com/founders_of__russian_abstract_ar.htm

Quite at the same *time* Albert Einstein (1905) transformed the Newtonian separation of space and time, considered previously as different absolute entities, combining both in four vector dimensions e.g. into a single construct called the **space-time continuum**, on the basis of the relativistic transformation of time in space and vice versa.

According to Einstein, the famous formula $E = mc^2$, introduces the equivalence of energy (**E**) and relativistic mass (**m**), so that we know that matter can become energy and so that each energy flow has a mass, and takes it everywhere it goes. Therefore from *Einstein relativity*, 'matter' is to be considered a condensed energy (**EM**), because "mass" and vibrational Energy (**EV**) in some particular conditions are interchangeable. In fact, through the forced overlapping of masses, as it happens in the Solar fusion of hydrogen, the nuclear reaction produces a great explosion of **EV**, composed of Quantum particles (including Photons of visible light), while at the same time the "binding energy" (2) generates the Helium production of two Hydrogen atoms. "Binding Energy" (**BE**) in general, is the energy that keeps parts of matter together in a way that effectively is a manifestation of the "In Form Action" embodiment, made in the specific case of nuclear reactions, through the *absence of mass*. In fact, the mass defect of the nucleus of atoms, is able to transform the forms of atoms from Hydrogen to Helium, by means of producing "binding energy". In this case, related to sub-atomic particles, the amount of "BE" can be calculated through the Einstein Formula of restricted relativity and corresponds to: Δm (**variation of mass**) = BE/c^2 . In general, we know that every time that happens, an Energy/Matter interaction giving in bio-chemical bonds transformations, we can observe an energy conversion producing an appropriated "Binding Energy", as it is necessary to keep the atoms together in the formation of molecules. Therefore, the production of "BE" can be seen as an "Information embodiment in molecular forms", related to any production of new forms in molecular transformations. Specific bonding "BE", can be experimentally known because we need use energy to break the bonds of molecules or in general, to remove the connections among different binding parts; but it is a pity that, it will not be easy to make a priori calculations about specific "BE", this is because Energy in the microcosm needs to take into consideration the *Uncertainty Principle* (1927), that does

not permit knowing (in the context of *Quantum Mechanics*), the specific intermolecular interactions, that develop “*binding energy*” in order to get the different forms of matter. In fact, the *wave/particle duality* creates a problem with *space-time* traditional geometry, so that it will be impossible to describe contemporarily, particles as fixed in place, because at the same time the *Quantum-Particle* subdivides its energy with a complementarily de-localized wave. This contradiction based on the double aspects of *Quantum Energy*, causes the need to rethink the formal aspect of Energy in relation to the space-time configuration.

Again it is important to underline that In the same epoch of the foundation of *Quantum Mechanics*, modern artists focused on the need for a profound conceptual change in *space-time geometry* and searched for new aesthetic styles of pictorial representation; so that “*cubists and other pictorial movements*” tried transposing *three-dimensional space into flat images* in order to show the effect of different temporal moments of multiple separate views. For example, founders of Cubism operate a deep reconstruction of image representation, so that in some of their pictures, represented figures appear as overlapped and intersected in an analytical composition of various viewpoints of observation. In particular, “*analytic and synthetic Cubism*” looks to interpret the “*simultaneity*” of perception of events , in a new aesthetic unitary presentation, in the context of a relative visual reality, in a way that criticizes the falsity of the of the obsolete perspective in pictorial imagining, it was focused on research to overcome the concurrence of the mechanical the representation of films and television reflecting as a mirrored imagining the external environment.



Pablo Picasso The three Musicians (1921) :
<http://www.uoregon.edu/~jvansise/picasso/jvansisepicasso.htm>

Finally, a deep critic of reflection of immediate formal structure of perception models, used by communication technology, was made by *Rene' Magritte (1935)*. in fact, he put in evidence the breakdown of mirrored forms in a way that the vision remained substantially unchanged. This can be considered as an indication that the basic formalism of *space-time geometry* remains the same. Until a superficial breaking of the glass, the traditional logic of mechanical perception will be continuously reproduced by information-technology, implementing a continuous rebuilding of “*veristic*” traditional images . (4)



Rene' Magritte : The Key to the Fields (1935)

www.abcgallery.com/M/magritte/magritte15.html

At the same times (1935) , Erwin Schrödinger developed a critique of the orthodox Copenhagen interpretation of *Quantum Mechanics*, thinking about the possibility that the Quantum particles can be overlapping as in the confinement of the nucleus of atoms, generating a new "**Quantum Binding Energy**" during the space-time transformation. Schrödinger nominates "**Entanglement** " this overlapping or intrigue, among *Quantum Particles* (Photons, Phonons, and also free atoms and other uncharged particles) and he said: "Entanglement is not one, but rather the characteristic trait of quantum mechanics".

This intuition finds a large opposition from the reductionism of the mechanical interpretation of science that does not accept the fundamental conceptual change substantially based on not accepting the arbitrary splitting between the subject and the object in observing external world.

After the delay due to last global war, science and art exist in the context of rebuilding economy, so that the long range conceptual interactions between artist and scientists opens the technological frontier of productive advancements, so that art and science, during this period, both remain closed in a proper disciplinary domain. Today's "*Quantum Entanglement*" (3) is an event that is going to change the understanding of the *spontaneous self- organization phenomena* in nature. Therefore aiming to develop the interpretation of this *quantum effect*, we propose to think about what happens when two *Quantum Particles* are closed in a box and the walls of the box are gradually restricted. While the walls of the box are large, the waves are free to vibrate (EV) maintaining complementarity with the particles (EM), then the two Q. Particles have their own individuality. But if the box is restricted both particles intrigue together (producing an *entanglement* of their states). Besides, with the growing confinement, their energy grows and splits, generating a strong "**Quantum Binding Energy**", until that limit where the superposition of energy collapses, producing the *disentanglement* associated with the emission of a potential field of pure "**Information Energy**" (EI). Hence, the **Information Energy**, is generated for quantum confinement, and defines a field of *quantum potential*

energy, that is the basis of each possible *simultaneous resonant-action*, throughout all the extension of the “**EI**” field. The *Information Energy “EI”*, is generated for quantum confinement. “*EI*” generation, is a *transient quantum phenomena*, obtained through the entanglement action of confinement in which the mass of the quantum particle converts into pure non-local wave's energy. As a consequence, “EI” is living in a new two-dimensional topology of space- time. In fact, the production of “Information Energy” can be conceived as to have similar properties to those of “dark energy”. It is necessary to underline that the production of “EI”, as pure field of *Information energy* is an apparent *non-conservation* problem in relation to the Energy Matter standard idea of mechanical conceptualization and understanding of traditional science. In spite of this obviously, it is necessary to include in the conservation principle, the contribution toward explaining the great quantity of *dark –energy* in the universe. This, because the “**quantum entanglement**” is a very diffused activity caused by the high probability for random collisions of Q. Particles. As a consequence, **Information Energy** is to be considered a fundamental form of the Universal Energy because the *entanglement of confined Q. Particles*, really is a very large occasion in the context of the dynamic interactions of the Universe. In fact, through the superposition of Q. Particles “**EI**” is becoming to extend its energy in a flat space and in a context of bi-dimensional time coordinates that correspond to a field with coordinates **(x,y,t1,t2)** ; therefore “**EI**” potential field is considered “**dark** “, surely because it is not detectable through mechanical measurements given by the *product of position (p) and speed (v)*, as required by the *Uncertainty Principle*. As a consequence of the “*Quantum Bio-Physics*” conceptual innovation, it is a consequence of the introduction of **(EI)**, inside the fundamental forms of energy that now are three : e.g . *Energy Codified ar Vibrational Energy (EV)* , *Energy Codified as Matter (EM)* and *Energy codified as Information (EI)*. Henceforth Total Energy Conservation needs to consider the sum of those three components. Therefore, the **<Triadic Forms of Energy >** are waved together; each has own properties but cannot exists without the other and they all represent an unique entity in changing the complemented dynamics of the Universe in this context of **Triadic Quantum Energy conservation** :

(EI) +(EV)+ (EM) = K (constant) , therefore any variation (**w**) of total Quantum Energy can be an expression of three equations working in simultaneity (5)

1) +w EI = - w EV- w EM that correspond to the “Principle of Fertility of Information” in Living Systems.

2) + w EV = - w EM - w EI working for instance in the dynamics of the stars

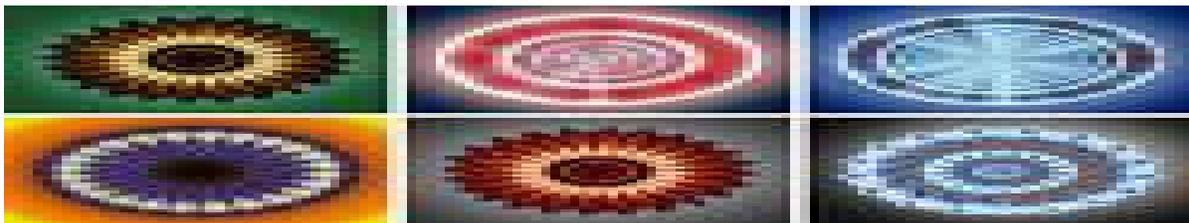
3) + w EM = -w EV - w EI working for instance in the Cosmology in the Black Boxes

Finally, in the context of this **Unified Quantum Energy Theory**, two conditions of Communication that can be included to understand the **self-organization phenomena**.

a) The highest phase of simultaneity of communication is based on the existence of a free “**EI**”, that is referring to the two bits of space-time coordinates **(X,Y,T1,T2)** ; **b)** The lowest phase of transfer of information communication trough Embodied “**BE**” coming from each **EV/EM** interactivity, that is referring to the Euclidean space-time coordinates

(X,Y,Z, T). Therefore any success of **self-organization phenomena** depends on the contemporaneity of both strategies of communication, both functioning as a whole , **a)** through the information transfer of information recognizable by the molecular forms, and/or , **b)** through the simultaneity of the contemporaneous bi-locative resonance effect of pure information Energy (**EI**)

In this way “**Quantum Bio-physics**” is going to rethink energy forms conversions in the Universe from the ground up, giving new a possible solution of **self-organization** understanding, by means of creating a deep conceptual change in the way we think *about information processing in biology* in order to provide some of the most important theorys of evolution, driven by the **triadic forms of quantum energy**. Certainly in this short approach we do not get the chance to know how Information Energy potential is responsible for *configuration, conformation, size, shape, etc., conformational stability, chemical catalysis etc .etc . ,* while EV/EM are responsible for chemical reactivity, spectral properties, heat of formation and hence of the flux to do mechanical work and so on. Besides I would like to remember that a great help to the **contemporary mental change** is today coming from **digital art** through exploring how today's most scientific advanced fields can be represented in visual art exhibitions, starting from the virtual shows on the following issues : of order from chaos, fractals, nano-science, genetics, molecular science interactivity and the wavelets or frequency of sound (7)



In Conclusion today we live in a new revolutionary period in science & art and the ON-NS&A group of research (see : www.egocreanet.it) would favor that this opportunity would therefore be open to develop new strategy for a growing future Knowledge Society, which implies that Quantum-Bio Physics will open a great opportunity to develop new science and artistic strategies especially for young creative people in the coming years and decades of the XXI century. (8)

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