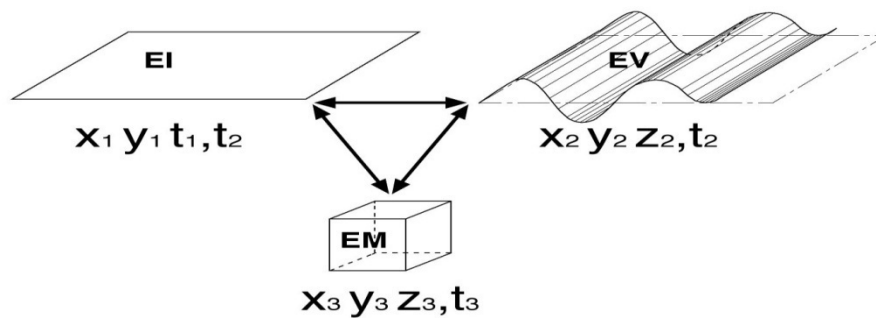


TRIADIC - QUANTUM - ENERGY



"Quantum-Bio -Physics" of Energy Conversions in Science & Art .

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ABSTRACT : The mental change from industrial economy to knowledge economy is fundamentally driven by the 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 the "**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 about the meaning of Information .

"**Information**" from etymology based on **Aristotle** 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 as an 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 , think that "*Information*", enclosed in the form, cannot transmitted 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 interpret a great number of problem 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 the "*self organization of brain structures*" . As a matter of facts "*Functional Magnetic Resonance*" in neurosciences, puts in evidence how simultaneously oscillations of separate areas of 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 to open a new advanced territory of knowledge. Therefore willing to advance the reductionism in science understanding , a new theoretical observer, need to become conscious that he brain functioning belong to an objective character; as a consequence , the arbitrary splitting between subject and object, accepted in mechanical paradigm, results in a very limited objectivity, because avoids to consider, that the subject is an integrated part of observation . This become important for implementing a mental change on the conceptual development, by means of a new original creation of science and new aesthetics styles 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 need 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 about spontaneous "*self –organization* " of the objective brain functioning , we can have a look to a great amount of natural self-organized phenomena in providing to generalize a more deep knowledge of the growth of living system in plants and animals in our planet . Therefore starting from the consideration that the synchronic , *simultaneity of information exchange* is the basis of contemporary need to grow the human conscious knowledge , nowadays become important to understand how, in a new scientific domain, the "*no 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 ***no-local time's simultaneity*** is not the same concept of the *instant*, because *instantaneity* ,is derived by a progressive reduction of time duration ; viceversa simultaneity in time refers to a resonance effect in information exchange that is no 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 the science changing in relation to fundamental revision of perception of the space-time dimensions . In fact Art, before of theoretical Science ,start in the beginning of XX century, to develop cultural movements, as Cubism, Futurism, Dadaism etc.. opening a discussion, right to present days , to represent in the canvas *the simultaneous aspect of multiple point of view*, in order to replace the traditional static perspective based on the Euclidean formalism of space-time.

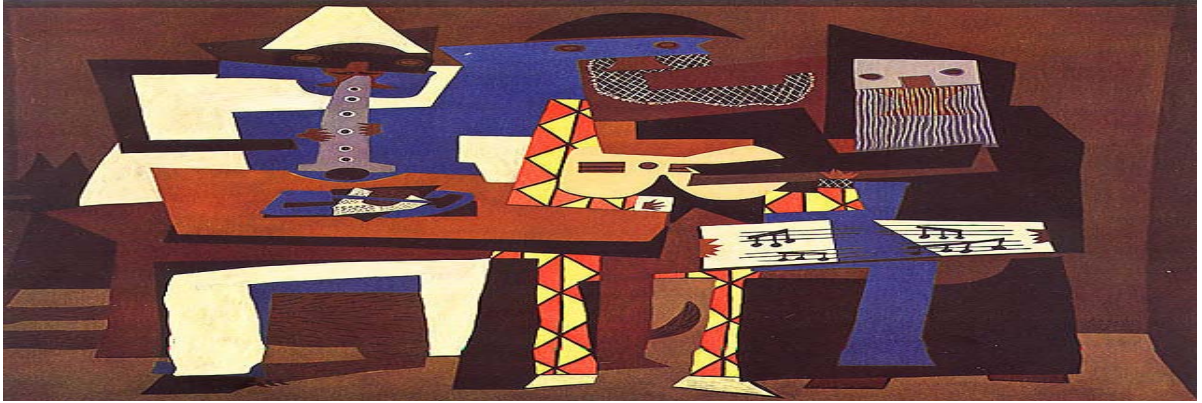


Georges Braque : the Man with a Guitar
(1906)http://www.monthlyherald.com/founders_of__russian_abstract_ar.htm

Quite at the same *times* Albert Einstein (1905) transforms the Newtonian separation of space from time, before considered as different absolute entities, combining both in the four vectors dimensions e.g. into a single construct called the **space-time continuum**, on the basis of the relativistic transformation of time in space and viceversa.

According to Einstein the famous formula $E = mc^2$, introduces the equivalence of energy (**E**) and the 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, for instance, 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 by Quantum particles (including Photons of visible light), while at the same time the "binding energy" (2) generates the Helium production from 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 *missing of the 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 the "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 correspond to: Δm (**variation of mass**) = BE/c^2 . More 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 the molecular forms", related to any production of new forms in molecular transformation. Specific bonding "BE", can be experimentally known because we need use energy to break the bonds of molecules or more 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 because Energy in the microcosm needs to take in consideration the *Uncertainty Principle (1927)*, that does not permit to know (in the context of *Quantum Mechanics*), the specific intermolecular interactions, that develops "binding energy" in order to get the different forms of the matter. In fact the *wave/particle duality* creates a problem with the *space-time* traditional geometry. So that will be impossible to describe contemporarily, particles as fixed in a place, because at the same time the *Quantum-Particle* subdivides its energy with a complementarily delocalized wave. This contradiction based on the double aspects of *Quantum Energy*, put in evidence 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 the need of a profound conceptual change of *space-time geometry* searching for new aesthetic styles of pictorial representation; so that "cubists and other pictorial movements" try for transposing the *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 the images 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 "simultaneously" of perception of events, in a new aesthetic unitary presentation, in the context of a relative visual reality, in a way to criticize the falsity of the facsimile of reality made through the photo-realism. Such *artistic liberation movements* of the obsolete perspective in pictorial imagining, was focused on a research to overcome the concurrence of the mechanical 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 also by *Rene' Magritte (1935)* ; in fact he put in evidence the breakdown of mirrored forms, in a way that the vision remaining substantially unchanged. This can be considered as an indication that the basic formalism of *space time geometry* remains the same, also after the superficial break of the glass, until that 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* develops 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 no charged particles) and he said: "Entanglement is not one but rather the characteristic trait of quantum mechanics".

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

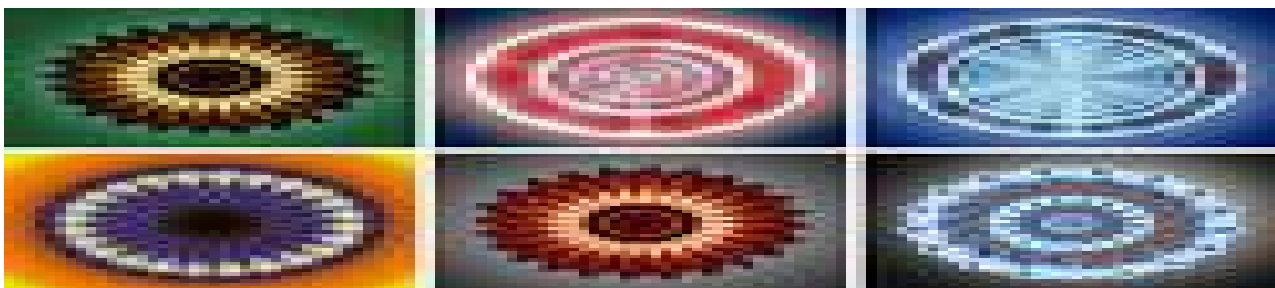
After the stop due to last global war, *science and art* are living in the context of rebuilding economy, so that the long range conceptual interactions between artist and scientists go down opening the technological frontier of productive advancements, so that art and science, during this period, both remains closed in proper disciplinary domain. Today's the "*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 wall of the box are gradually restricted. Until the walls of the box are large the waves are free to vibrate (EV) maintaining the complementarity with the particle (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 of confinement, their energy grows and splits, generating a strong "**Quantum Binding Energy**", until that limit where the superposition of energy, collapse 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 no local wave's energy. As a consequence "EI" is living 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*, it is an apparent *non conservation* problem in relation to the Energy Matter standard idea of mechanical conceptualization of traditional science understanding. In spite of this obviously, it is necessary to include in the Conservation principle the production of also to give a contribution to explain the great quantity of *dark -energy* in the universe this because the "**quantum entanglement**" is a very diffused activity caused by the high probability to clash for random collision 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 in 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 giving by the *product of position (p) and speed (v)*, as it is requested by the *Uncertainty Principle*. As a consequence of the "*Quantum Bio-Physics*" conceptual innovation, it is a consequence of the introduction of (EI), inside of the fundamental forms of energy that now are three: *e.g. Energy Codified as Vibrational Energy (EV), Energy Codified as Matter (EM) and Energy codified as Information (EI)*. Henceforth the Total Energy Conservation need to consider the sum of those three components therefore the <**Triadic Forms of Energy**> are waved together; each has own properties but cannot exist without the other and they all represent a 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 into the Black Boxes

Finally in the context of this **Unified Quantum Energy Theory** , can be experimented two condition of Communication that can be included in the opportunity 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 the 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 possible solution of **self-organization** understanding , by means of creating a deep conceptual change in the way we think *about information processing of communication in biology* in order to provide some of the most important theory of evolution , driven by the **triadic forms of quantum energy**. Certainly in this short approach we get not the chance to how Information Energy potential is responsible of *configuration, conformation, size, shape, etc., conformational stability, chemical catalysis* etc .etc . , while *EV/EM* are responsible of 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 the **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 therefore would be open to develop new strategy for growing future Knowledge Society , which implies that Quantum-Bio Physics will be 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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