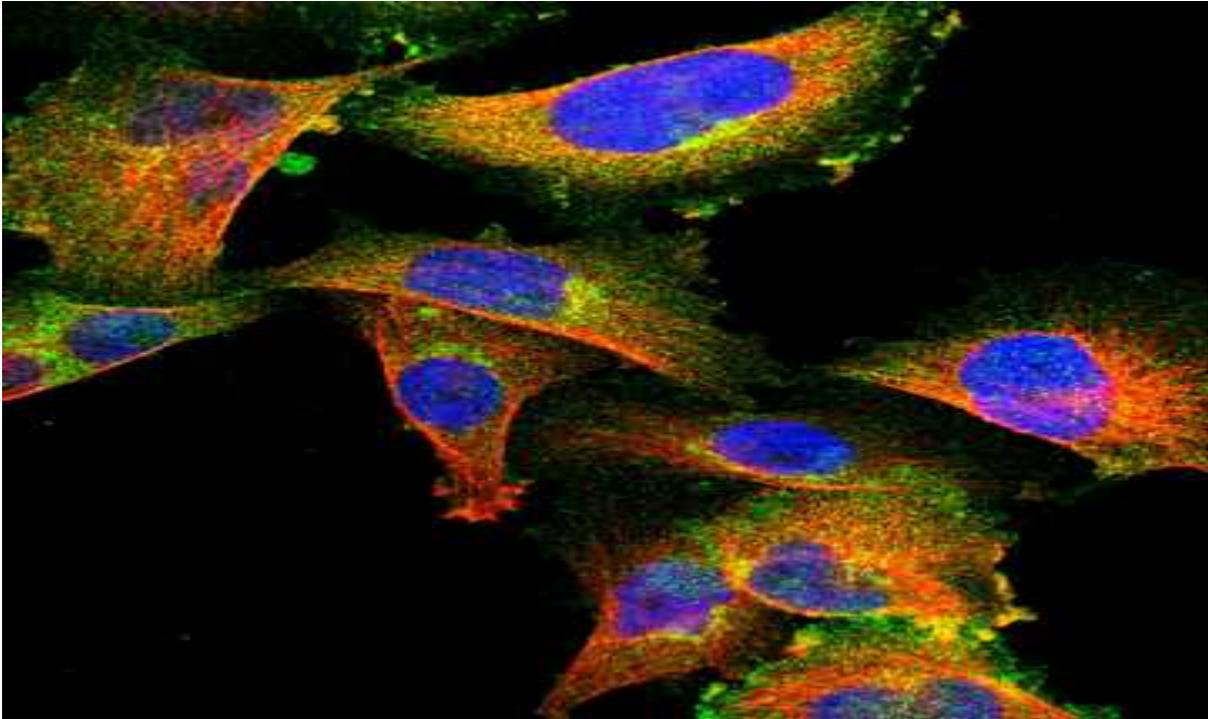


“Quantum Bio-Physics “

Conceptual Outline : the emergence of self-organization phenomena in nano-scale dimension.

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Science & Art :Protein targeted by HPA antibody is shown in green, nucleus in blue, micro-tubules in red and Endoplasmic Reticulum (ER) in yellow. (www.proteinatlas.org)

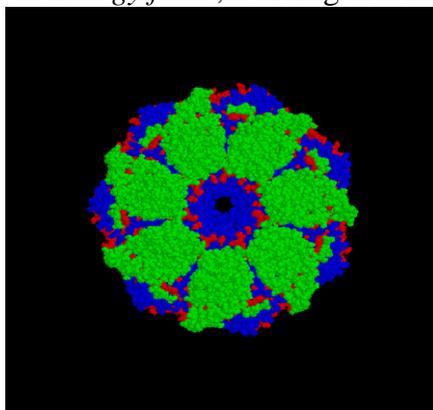
Abstract : *Self-assembly can be defined as the spontaneous organization of individual components into an ordered system-structure .“Self-Organization” dynamics is working in a number of “Quantum Bio-Physics” structural changes, acting without any interference of external agents . Therefore each kind of “Self-organization”, contradicts the mechanistic traditional world view of “bulk-science”. Despite of such conceptual problem the **Q. Bio-Physics** would demonstrate an reasonable strategy to interpret Self-organization in “nano-biology” , taking in consideration the synchronic effect of parallel processing between “local and no-local” co-evolutional information energy exchanges among DNA/RNA/and Protein . Therefore the focus of this paper would open a debate about the “nano-scale” space/time dimension, in order to enhancing a better understanding about the interdependency between complemented transformation activities in living cells. In fact through the “Quantum Entanglement” processes, can be possible to establish an energy conversion between quantum thermal hopping and entangled phonons, to obtain the result of a temporal simultaneity, as the basis of the synchronic co-operation in living cells, as it is necessary to anticipate the forecast of the kinetic trajectories of matter/energy transformations in metabolic systems: as an example of such complex problems of knowledge of life, we start to debate about “protein's folding” in tertiary structure from its primary linear polipeptide construction.*

Folding of Proteins. The understanding of post translational genetic information ,obtained though the folding process of proteins, is one of the grand scientific challenges of **Self-Assembly** processes useful for improving the future forecast and control the specific metabolic functions in living systems. Self-organization of the process by which proteins fold to attain their active sites in a mature conformation, provides a global platform to gain knowledge about the function of biological systems and the regulatory self-organised signal communication, that underpin the natural ability to

adapt to the changing environmental conditions. Therefore the nano- and bio-technologies, based on mimicking the principles of biological complexity of self-assembling, today develops a fundamental strategy of conceptual scientific paradigmatic change, that will result in a more coherent understanding of the origin, evolution and functional properties of living cells. (1)

Protein synthesis is an sophisticated energy consuming process, where any risk of “*mis-folding*” need to be correct without delay, because the functional mutation of proteins in the cell is very dangerous for avoiding the metabolic diseases in every living cell. The correct self folding of proteins is normally assisted by cofactors named “*Chaperons*”, the last works as complemented structures of “*Ribosomes*”, to regulate through the “*Endoplasmatic Membrane*” (**ER**) the performance of the process of protein’s folding , in order to fold the polypeptide chains of amino-acids, and assemble correctly functional groups of proteins to yield active mature protein’s structures. In the case of “*mis-folding*”, other enzymes called “*chaperonins complexes*”, help to destroy immediately the mutant-proteins to avoid serious diseases. The problem that remain to understand, is the organization of signal communication in a way that “**Ribosomes +ER + Chaperones**”, can work in an field of synchronic signal information, forming an highly organized pathway of bio-transformations. (2),(3),(4),(5). Certainly we can observe that such synergy of co-organization, for getting a correct in vivo-folding of the proteins, cannot be work as statistical search of probable conformations, this because it would take an astronomical amount of time and a big ammount of energy will be dissipated, if the properly funtional conformation is choose by trial and error method, while in vivo the protein’s folding works at a rapid rate some times on the range of nano-second scale.

Current studies of ribosomal interactions with *Endoplasmatic Reticulum* (**ER**) (6), demonstrate the importance of the nano-organization of **ER** as “*super lattice network*” of adjacent nano- tubules, vesicles and sacs and cavities, contained in the inner membranes with a granular length of nanoscale dimensions. Today, in the *Post Genomic Era* (8), the understanding of the “**Ribosome/ER/Chaperons**” “self assisted assembly, can be seen in *Quantum Bio-Physics* as a simultaneity of communication in an *Information in Energy field* , working in a nanoscale space-time region.



Science & Art : “**Chaperon**”:
Assisted- self activation // inhibition
of the folding plasticity

Nano Structures –Photon Entanglement and Information Energy Conversion.

We know that on the basis of the traditional mechanical “*Paradigm of Biological Science*” including *in vivo folding* and the study of protein *mis-folding*, till today is closed in a conceptual paradigm where it is not easy to understand the synchronic activities that nature realises to obtain the correct functional folding based on a simultaneity of signal communication among *DNA-RNA-Proteins* .In fact biology traditional conception is limited to describe the path in which *DNA/RNA Ribosomes* produces a linear sequence as polypeptide of amino-acids and illustrate how an self-activation is assisted by a series of *Chaperons* to obtain a correct protein’s folding, in order to be functional to organize the life timing, till to the programmed “*apoptosis*” of each living cells. (9).

Future trends of *Bio-Quantum Physics* research need to identify how the unique properties of bio-nanostructures as the *Endoplasmic Reticulum (ER)*, permits to realize in vivo, through a confinement in the energy cavitations (i.e. nanotubes, or other nano matrices) a “*quantum entanglement*” effect, producing an energy conversion of heat signals in a field able to generate a “simultaneity” of information to support a synchronic coherent activity among “*Ribosome/ ER/ Chaperons*“, in a way to get the best correct folding of proteins .

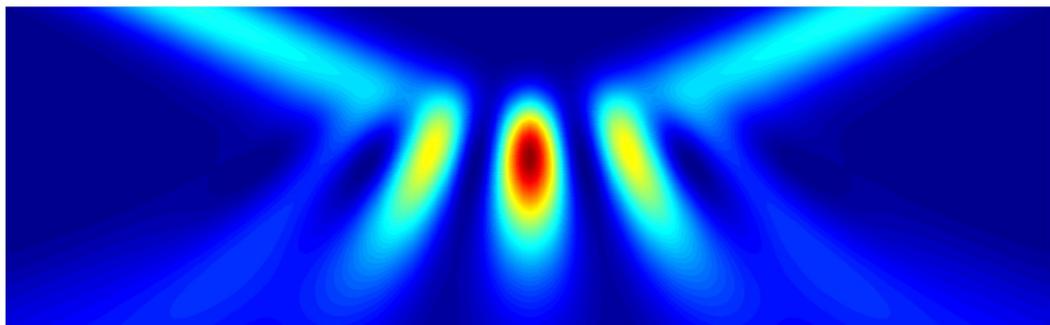
Recent experimentally studies demonstrate that in nano-structure the hopping of heat passing through nanotubes of about 20-100 nm, produces a conversion of heat-energy reducing the thermal conductivity. In fact adjacent nanotubes works as a superlattice material that organises the flow of phonons decreasing the mean free-path amplitude of heat diffusion in respect to typical resistance of the bulk material (10)

Furthermore “*Quantum-Entanglement*” of “*confined Q. particles*” is investigated by the “*Q. Bio-Physics*” theory in the context of the renormalization of the four-vector of space/time, getting a topological transition in bi-dimensional field units of “*information energy* as” that is the basis of simultaneity in “*quantum teleportation*”. (11)

Therefore it is probable that the *Q. Entanglement* can allocate bi-dimensional diagrams of an *information energy field*, that become an essential instructions for sharing the correct protein’s folding based on protein-protein *coherent signalling interactions*, so essential for the living self-assembly function of a cell.

Further studies about self-organization phenomena in *Bio. Q. Physics* , will have an opportunity to discuss at the meeting in Florence (14-NOV-2008) on the issue:

“The emergence of self-organization phenomena in nano-scale dimension . (12).



SCIENCE& ART : <http://idefix.physik.uni-freiburg.de/~breuer/QInfo.htm>

Biblio On Line

- (1) - Cells : <http://www.tvdsb.on.ca/westmin/science/sbi3a1/cells/cells.htm>
- (2) – Protein Synthesis : <http://www.hupe.hu/szerv/tanszekek/inf/im/oktat/SEJTBJO/feherjeszintezis/prosynth.html>
- (3)- Protein Folding : http://www.sfu.ca/~leroux/class_L03.ppt#1 ;
http://www.nature.com/nature/journal/v426/n6968/fig_tab/nature02261_F2.html
- (4)- RIBOSOMES: <http://sun.menloschool.org/~cweaver/cells/e/ribosomes/>
- (5) - Nucleoplasmin: <http://www.portfolio.mvm.ed.ac.uk/studentwebs/session2/group5/nucleo.htm>
- (6)- Endoplasmic reticulum <http://www.tvdsb.on.ca/westmin/science/sbi3a1/cells/endo.htm>
- ER-Structural changes : <http://www.biologie.uni-hamburg.de/b-online/er/movie2.htm>
- (7) – ER interactivity : <http://cellbio.utmb.edu/cellbio/rer2.htm>
- (8)- Era Post-Genomica : http://www.edscuola.it/archivio/lre/era_post_genomica.htm
- (9) - Apoptosis ; <http://www.edscuola.it/archivio/lre/apoptosis.htm>
- (10) - Energy Conversion at Nanoscale:<http://ieeexplore.ieee.org/iel5/4154162/4139311/04154256.pdf>
- (11) - Entanglement theory : <http://www.wbabin.net/science/manzelli1.pdf>; http://www.edscuola.it/archivio/lre/entangled_theory.htm
- (12) – The New Measure of Humanity: <http://www.wbabin.net/manzelli3.pdf>

SELF-ORGANIZATION and ENERGY CONVERSION -Quantum -Bio-Physics (II – part)

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Simultaneity in mirror's perception: overcoming the aesthetic of object isolation.

Self-organization plays a crucial role in energy conversion as for instance in natural photosynthesis , where micro world interact on a macro-scale of matter /energy interactions to combine light-harvesting of solar energy to get its transformation into chemical energy. (1)

A general problem for controlling the *self-organization* is to find a long-range process able to coordinate information exchange to get a synchronic activity between different cooperating molecular structures. So that the problem of all forma of “*information exchanges*” is now a critical barrier of scientific understanding of energy conversion .

Certainly all processes of self organization becomes active out of side of the equilibrium thermodynamic conditions, so that to predict and control the future organization of any kind of dynamic changes, it become necessary to advance the comprehension of the role of *information exchanges* in defining *Self-Organization* properties that control the *Energy Conversion*.

Speaking about *information* need a preliminary clarification about the different conception referred to the term “*information itself*”. A first distinctions from the point of view of the observer is briefly outlined by a duality of conceptual associations **a)** information can be considered as a kind of encoded energy or **b)** information can be thought as embodied in the form of matter. In this way of thinking the *information* is suitable to be recognized through appropriated receptors.(2)

Differently, from the point of view of *Self-organization* systems, active “*in-formation flow*” , need to be considered as something that precede any possibility to take a new form of energy (e.g. an energy conversion) or tacking a transformation of matter. Therefore an active “*in-formation flow*”, need to be defined and elaborated as a fundamental level of energy.(3) The last definition can be conceived if we focus our attention about the “*passive and active information exchanges*” .

In fact, if *information* is encoded in vibration- energy or embodied in forms matter, in both such cases the communication of information can be obtained through the *energy transmission or the transfer of matter* , from a location to another of the Euclidean space-time. Another way is to be considered when *in-formation flow* becomes the active generator of the *self-organized patterns of energy conversion and/or matter transformations* ; in that case become necessary a new approach on reasoning in science, no more related to the arbitrary dichotomy between observer and the external observables.

It is a pity that contemporary understanding of nature is often limited by the mechanic - paradigm of observably, that it is no based on a explicit interpretation of what means observing on the basis of the effective *eyes/brain* capability of observation. The best strategy to go beyond the mechanical reductionism is the contemporary research driven by the *trans-disciplinary* approach searching for the completeness of *Quantum Bio-Physics* in order to find a more complete the correspondence between human intelligibility and that of the physical world (4) It is important to

remember that in Quantum Mechanics (QM), the fundamental argument is that *quantum phenomena* have no fixed values until they are observed; but the QM admits that other *not observable forms can exist*; if some new experiments can confirm that, some hidden values are not completely indeterminate (i.e., not explained at a deeper level), so that it become probable to conceive a new paradigm where exists a *more elevated level of consciousness* that creates an extension of objective reality.

A fascinating experiments for enhancing *Quantum Bio-Physics* is the “*entanglement of Quantum wave-particles*”, firstly conceived by Erwin Shroedinger in his booklet “*What is Life*” (1935), and after experimented by Alain Aspect (1982), In fact the “*entanglement effect*” show an spontaneous down conversion of energy permits to get an “*simultaneity*” of information-communication. (5),(6),(7)

Under some circumstances, as the *coherent-resonance in a cavity*, an ultraviolet photon can spontaneously splits into two lower-energy infrared photons; for instance it is known the case of blue photons that undergoes though ‘*down-conversion*’ inside a crystal to form two lower-energy red photons that are entangled together. Besides confinement of Q. energy in a *nano-cavity (or dot-cavity)*, lowering the degrees of freedom, works as resonator generating the superposition of Q. waves associated to the Q. particles; therefore the *entanglement effect* produces a dense-coding information based on a “*no-local field*” of super-dense information.(8)

The above *entangling effect* of wave/particles, is the main resource in *quantum information processing*, with powers that exceed those of classical communication and computation. So that recently “*Q. Entanglement*” becomes is the basic resource of energy conversion for “*Teleportation in Q. communication*”. (9)

Therefore we can subdivide *information communication* in two subsets: **a)** - the first is the traditional transmission of encoded energy, within the limit of the speed of light, between to different space locations, **b)** - the second belong to a long distance *simultaneity of communication* of dense coding energy, that it is generated by the *entangled effect*, producing a parametric down conversion of information energy. (10)

The crucial difference between the two subsets is that **a)-** in the first case, information as recognisable form of codified energy, can be transferred like signal exchange, after a previous interaction through a *direct local contact*, between energy and matter, **b)-** while in the second case the information energy represents an extraordinary probability of exchanging energy at large distance, *simultaneously through an Q. entanglement effect*, without a need of having a previous direct contact or mechanical collisions. Those information subsets, are both *natural ways to exchange information*, in that both exists to get *synergy of information exchanges nature*. This conclusion is of grand importance in developing *Quantum-Bio Physics* in relation o the understanding of living organisms. Suffice it is to understand that importance, is to say that all life exist on our planet, in *two forms of exchanging of information*, **1)-**the *super-dense- encoded simultaneity of no local exchange of information energy*, and **2)-** the *embodied information in DNA, as Genetic Material*, transmitted through the usual processes of biological inheritance conservation in a living being. (10) As a consequence the *Quantum-Bio-Physics* can develop a *paradigm shift* driven by a new relationship between the *different forms of information* in order to enhance the general knowledge of the self-organization of life beyond our known mechanical boundaries of Science. (11)

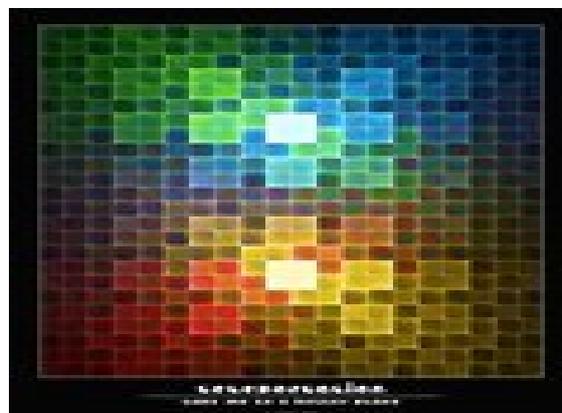
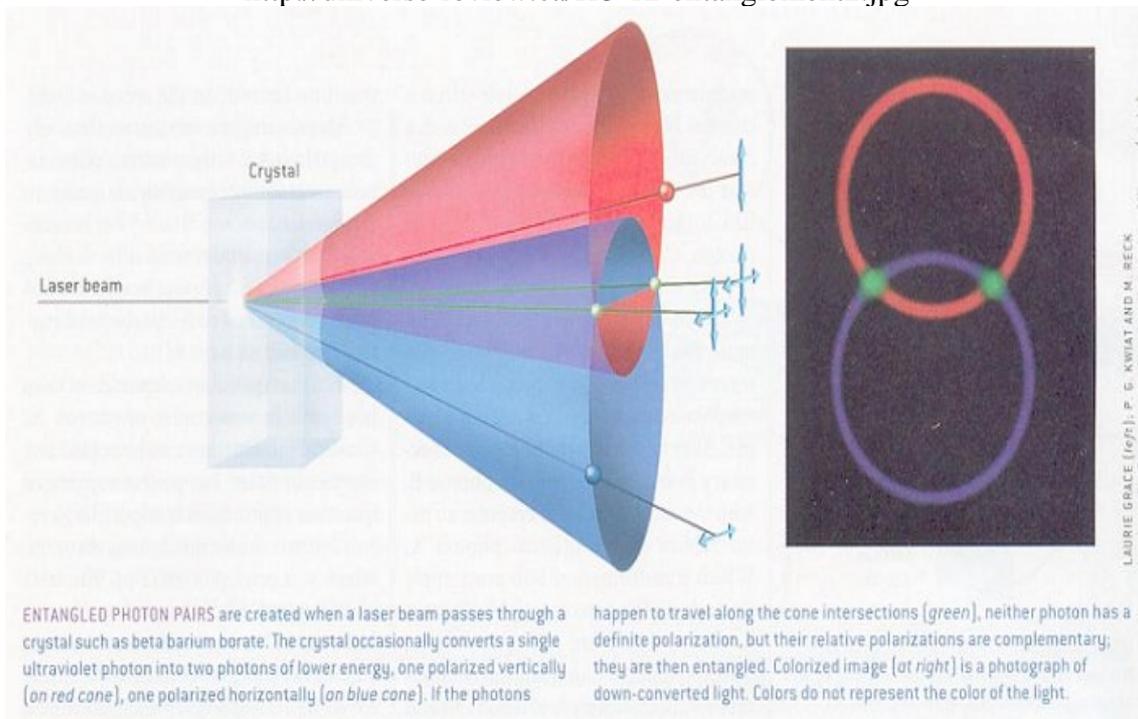


Teleportation is magic od scientific ?

BIBLIO ON LINE

- (1)- Self-Organization complexity: <http://www.calresco.org/>
- (2)- **Duality of Information** ; http://www.gseis.ucla.edu/faculty/bates/articles/NatRep_info_11m_050514.html
- (3) - *Science of Quality*: http://www.edscuola.it/archivio/lre/science_of_quality_1.htm
- (4) - *Intelligibility of Nature* : http://www.edscuola.it/archivio/lre/intelligibility_of_nature.pdf
- (5)- Quantum Entanglement : <http://www.osa-opn.org/OpenContent/Feature1.aspx> ;
http://www.iqc.ca/laboratories/peg/photonic_crystals.php
- (6)- Entanglement : http://guide.dada.net/educazione_alimentare_interventi/2007/11/312932.shtml
<http://www.wbabin.net/science/manzelli20.pdf>
- (7)- Beyond Entanglement : <http://www.wbabin.net/science/manzelli16.pdf>
- (8)- Quantum dot : http://en.wikipedia.org/wiki/Quantum_dot ;
<http://ieeexplore.ieee.org/Xplore/login.jsp?url=/iel5/5/4357935/04357938.pdf?arnumber=4357938>
- (9)- Teleportation : http://en.wikipedia.org/wiki/Quantum_teleportation
- (10) – DNA-ANTENNA : http://www.edscuola.it/archivio/lre/bioquantum_physics.htm
- (11) – Quantum Bio-Physics : http://www.edscuola.it/archivio/lre/quantum_bio_physics.pdf

<http://universe-review.ca/I13-12-entanglement2.jpg>



Simultaneity in optical teleportation
news.deviantart.com

Paolo Manzelli <march/26/2008 Florence>

Quantum Bio Physics III: Self Organization in Nature- Case Studies



The self-organization of flowering in time and space - Paolo Manzelli

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The beautiful flowering of plants is one of the most important phenomena in the living cyclic development of nature. Classical studies have highlighted the importance of signals of *photo-period* (perceived in the leaves), in stimulating flowering time. More recently, biologists identify a *plant-gene T*, producing a *protein (FT)*, that work as a molecular switch off working as a key-mediator of signals for inducing the “Flowering” time- developmental pathway . (1)

Knowing what the molecular switch is not in itself sufficient to understand the complex phenomena of *plant's flourishing*, it become clear the necessity to better understand what is the field of energy that is activated by the *molecular switch on/off*, in order to trigger together various events made during the flowering plants, in a synchronic coordination the various processes of *self-organization*, that are associated with photosynthesis and photo-periodicity .

This short article would be useful for understanding such co-ordination phenomena and to comprehend, how the flowering temporal activity, depends to the *nano-scale events*, related to the dynamics of the light-harvesting process of photosynthesis in leaves. In fact current studies suggests that *nano-tubules and related nano filamentous elements*, play a fundamental role as functional pathways in an every greater variety of sub-cellular structures growth and living functions. In fact the importance of *micro-tubules and micro-filaments*, can be searched in the activity of synchronizing the spatial and temporal regulation of morphogenetic events in higher plants, in order to control various factors of cell's division and differentiation through of a synchronic regulation. Therefore leaves and plant stems co-operate for generating flowers developmental synchronicity are depending by the activity of some nano- structure interfaces, that are extremely important for plant survival and performance.



<http://www.flickr.com/search/>

Moreover, current thinking refers about “*quantum entanglement*” activities in many factors of natural co-operation, in a way to better to understanding how the *Entanglement//Disentanglement* process can be an important resource for quantum information processing in relation to a *de-localised field* in which can occur simultaneity on the basis of an *distributed and shared available information* . (2)

Given that interactions create and modify the space and time structure, the *quantum-entanglement* interactivity, is capable to turn out the traditional space time *quadric-vector*, in a structured based on two dimensional “*information energy*” field (I) . This energy field is created through the cavities of micro-tubes through an strong interference, caused by the enrichment of the limit of the Q. waves “*shock compression*”, in a way to transform the *quantum information* carried by the interaction, into mixed entangled states of phonons. So that that *via the process of entanglement*, a component of space is annulled , on the basis of a coherent *negative interference of Q. waves* in nano-tubules. Therefore throughout the *entanglement* occurs a significant alterations of the structure of wave-fronts; so that a component of the three-dimensional space is erased for destructive interferences of quantum waves. The above imposing interactive distortion, permits to duplicate the time in a new dimension of *retroactive timing amplification* of mutual pulses, normally functioning around *pico- and femto- second timescales*. In that way it become possible that *protein (FT)* , works as a molecular switch on/off, activating *entanglement//disentanglement* effect, so as to utilize the *simultaneity of communication* of active *information energy (I)* and to get the function of triggering “*FT*” as a key-mediator, for inducing the *Flowering time- developmental response* . In this contest of *flowering activity*, everywhere in different plants , the *information energy field (I)* operates as a *no local field, as a mean to favour a distributed shared information* ,available for common reference, to any cooperative agent, with the purpose of modulate in a coherent synchronism for each *self –organization process*, based on internal and extra-cellular signals cooperation , that would be *mediated by a molecular switch on/off devices*.

In conclusion, as is the case study of *flowering of plants*, nature make use of the activation process of *quantum –entanglemen- effect* to give rise to an extensive system of *simultaneous information energy (I)* , to be able to *coordinate the timing of events in cyclical or non-linear self-organization* in order to *characterise the continuous change of the periodic renewal of life*.

BIBLIO IN LINE

- (1)- Flowering : <http://jxb.oxfordjournals.org/cgi/content/full/57/13/3415>
- (2)- Disentanglement : <http://www.wbabin.net/science/manzelli28.pdf>



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