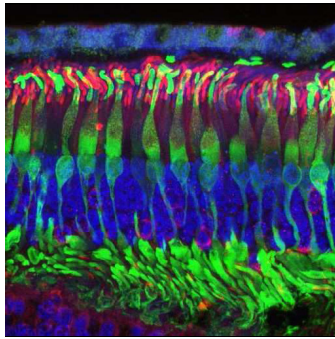


## TRANSDUCTION OF SENSORY SIGNALING

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Photon & Phonon's Transduction

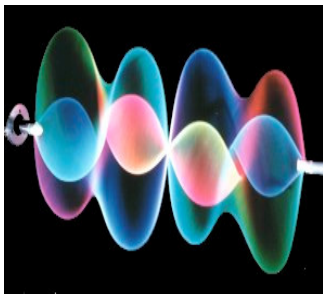
Sensory receptors are the interface between the environment and the nervous system, and the present approach in “Bio-Quantum Physics” is producing a re-examination of “*transduction apparatus*” of sensory receptors. In fact sensory information, such as that carried by light, sound, are stimulated by quantum particles, such as photons of light in the retina and phonons of sound wave/particles in the cochlea. The sense receptors operate a transduction of sensory stimuli in codified signals to transmit information to the brain in order to reveal the nature of the outside world.

To understand detecting such “transduction” through specialized receptors, it is important to understand the importance of Bio-Quantum Physics. (BQP). As a matter of fact, BQP supports the macro- and micro-cosmos correlations in a more complete view as it is effectively embodied in the nature of the sense receptors, which are able to capture stimulus from Quantum particles with a high specificity and sensitivity.

In BQP are no exceptions in the mechanics receptor of cell's membranes, which are able to detect, odour, touch and movement. In fact, the foundation of any receptor's system is based on the “**transduction**” of some quantized forms of energy, generated through stimuli excitation, codified signalling of information in conformity with the working functions of some centralized elaboration of information signals and having some complex operational functions like the brain. Hence BQP is focused on the change of Quantum Properties and confinement of quantum particles when trapped into specialized sensing receptors, e.g. through particular conditions of space time restrictions, where there is an increasing emergence of “*entangled quantum states*”.

Erwin Schroedinger , coined the expression “**entanglement**” to describe the non-local interdependency between the wave-particles in a quantum system. (E. Schrödinger, 1935, "Discussion of probability relations between separated systems", Proceedings of the Cambridge Philosophical Society 31, p. 555.).

BQP finds in the “**entanglement coherence**”, a theoretical solution to the general principles of transposition of an energy input to sensory receptors in codified signalling pathways of communication between the senses and brain. (1)



## SENSORY INFORMATION BY MEANS OF ENTANGLED WAVE PARTICLES

To understand how “**entanglement**” works to codify sensory information, it is necessary to remember that the Photon and Phonons can be entangled in coupled pairs of Q. particles. In fact they do not obey the “Exclusion Principle” of Wolfgang Pauli (1925), that forbids two electrons, in an atom to belong to the same quantum state configuration in the same space and the same time. (2)

Thus, the entangled pairs, co-existing in the same four-vector of space-time, will be coupled by means of a closed system of the sensory receptors, because they work as a restricted space-time system of wave particles. The coding of sensory information happens when the entangled Q. pairs are “*dis-entangled*”, this because they cannot be confined and squeezed together in a short space for a long time. The four-vector of the Q. pair breaks down into *four sub-units*, through a “*parametric down conversion of space-time coordinates*” into fundamental “*information signals*” carrying fundamental “information energy” (I). The last can be included as an expression of the lowest quantized energy level or “*Zero point Energy*” ground state energy of an empty space. (3) Each vector sub-unit in fact, represents a signal corresponding to a “*propagating mode of the ground state field of information energy.*” The inference that brings into being the “**parametric down conversion**” in signals of Information Energy can be simply described as follows :

The stimulus to sensing receptors is carried by two Q. particles ( Ph1 and Ph2 ) ; their status can be written with the following Cartesian Coordinates (Ph1)=  $\langle x1, y1, z1 + t1 \rangle$  ; (Ph2) =  $\langle x2, y2, z2 + t2 \rangle$

When the two wave Q. particles are confined in a reactive networking of a sensor, they become equal to zero (  $z1-z2 = 0$  ). Therefore, the entangled pairs (E 1.2) become flat in space and work in a two dimensional time duration. Therefore the four dimensional space vector of the entangled-pair can be expressed as follows: (E1-2) =  $\langle x1-x2, y1-y2, x1-y2, y2-x1 \rangle$ . These coordinates, owing to the instability of the entangled state, can be decomposed into four sub-units, working as super correlated parallel vector functions during the (t1+t2) timing duration. These sub-units of quantized space-time, can be characterized as a “*super dense codification of synchronised signalling-packets of information energy*” .

<i>Schema</i>	<i>-</i>	<i>Parametric</i>	<i>down</i>	<i>conversion</i>	<i>in</i>	<i>parallel</i>	<i>"information</i>	<i>energy</i>	<i>signals"</i>
→	$\langle x1-x2 \rangle$	vector	unit	correspond	to	the	first	symmetric	signal ( 1.1.)
→	$\langle y1-y2 \rangle$	vector	unit	correspond	to	the	second	symmetric	signal ( 0.0.)
→	$\langle x1-y2 \rangle$	vector	unit	correspond	to	the	third	asymmetric	signal ( 1.0.)
→	$\langle y2-x1 \rangle$	vector	unit	correspond	to	the	fourth	asymmetric	signal ( 0.1.)

This model of transduction of space-time vectors into codified signals as carriers of “information energy”, is generated by means of the dynamics of “**entanglement/dis-entanglement**” of Q. Pairs of wave particles in order to allow the transfer at distance of information energy signals to some centre of elaboration or reiteration of the information collected through sense receptors.

The above theoretical explanation can be developed in a more complex approach during the research trans-disciplinary project that EGOCREANET would like to develop on the SCIENCE of QUALITY, at an international level, in the future. Certainly this approach would be useful to involve a scientific rationalization of some experimental sciences, as for instance the “**Needle-Puncture Surgery**” that until now belongs to practical medicine without having a basic theoretical structure of interpretation outside of the old conception of “Vital Energy” .



Entangled Colours : by Frantisek Kupka, 1912

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