Soliton Perception in the Human Biological System

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ABSTRACT

A soliton is understood as a lone moving wave that propagates with small energy loss of unchanged form. Solitons are located in a physical environment and require its presence as an information medium and therefore cannot propagate in vacuum, which other elementary particles do not require. During transmission solitons do not carry elementary particles, but information itself contained in conformation change, in other words, a change in the aquatic plasma, gas, light environment etc. The human biological system has the ability to induce an electromagnetic field, either through solitons, or during melenin synthesis, which is able to convert a photon into a phonon and vice versa. Induced electromagnetic field causes the emer-gent of the coherent structures and form a chain of hierarchical levels. So this electromagnetic resource provides the mechanism for the non-locality, complexity, and self-consistency (self-maintaining) of biological organisms and ecosystems.

Keywords: Soliton; Spin Wave; Coherent Light; Bioplasma

Historical Development of Solitons

Solitons occur in many fields of physics. The soliton phenomenon was first described in 1834 by John Scott Russell (1808–1882) who observed a solitary wave in the Union Canal in Scotland. He reproduced the phenomenon in a wave tank and named it the «Wave of Translation» (Russell JS [1]). It took a long time before the solitons aroused wider interest by physicists. It was not until the mid-1960›s when applied scientists began to use modern digital computers to study nonlinear wave propagation that the soundness of Russell›s early ideas began to be appreciated. In 1965, N. J. Zabusky from Bell Labs and M. D. Kruskal from Princeton University in the conducted computer experiment were the first to observe the occurrence of solitons in the center. The model was based on the Korteweg-de Vries (KdV) equation and used the finite element method. In 1967, Gardner, Greene, Kruskal and Miura using the backscatter method they received analytical solutions of the KdV equation. In 1973, Akira Hasegawa of AT & T Bell Labs was the first to suggest that solitons can occur in fiber optic fibers. Soliton in optical fiber is formed as a result of mutual compensation of the effects of phase automation and anomalous dispersion. Despite the fact that the soliton theory and its propagation properties were known already in 1895 it, the

first emission of the soliton pulse was demonstrated only in 1980 by Mollenauer, Stolen and Gordon, thus opening a new field of optoelectronics-solitronics, operating in the area of picosecond and femtosecond pulses. Undoubtedly, this new fiber-optic technology has led to significant advances in telecommunications and will continue to be a key area in long-distance signal transmission. It is difficult to precisely define what a soliton is. Drazin and Johnson (Drazin PG, et al. [2]) defined the soliton as a solution to the system of non-linear differential equations that

1. Represents waves of unchanged shape.
2. It is located so that it disappears or reaches a constant value at infinity.
3. It may interact strongly with other solitons, but after the collision it remains unchanged - only phase shift occurs.

Soliton means a solitary, isolated wave. Solitons have their own speed, which depends on their energy. They are clearly located in time and space, even as a result of meeting and colliding with other solitons they keep their existence and usually separate themselves again. In optics, the term soliton is used to refer to any optical field that does not change during propagation because of a delicate balance

between nonlinear and linear effects in the medium. Optical solitons are localized nonlinear excitations, which exist due to the mutual balance of diffraction and nonlinearity (in the case of spatial solitons) or dispersion and nonlinearity (in the case of temporal solitons). Moreover, they can propagate undistorted over indefinitely long distances. Being nonlinear objects, solitons may interact with each other, sometimes elastically, as if they were mechanical particles, or inelastically, when several solitons may merge together or give birth to new solitons after interaction ([Trippenbach M, et al. [3,4]).

Their behavior during a flexible collision depends on the phase difference between them. When they have the same phase, solitons intermingle and then return to their initial propagation velocities. If there is no phase difference between them, these solitons are attracted, they can move away a certain distance, but then they attract again. The collision causes a phase shift and displacement increasing the initial distance between the solitons. When the soliton›s phases are shifted in relation to each other, the solitons are repelled. A similar issue occurs when the phase differences appear, the solitons in the opposite phases repel each other (Brizik L, et al. [5,6]). The works Pougeta i Maugina contributed significantly to the development of the field of solitons (Pouget, et al. [7,8]). In a transparent manner from the mathematical and physical side, the soliton is discussed. It is understood as a single moving wave that propagates with a small loss of energy unchanged, they are localized and require the presence of a physical environment as a carrier of information, therefore they can not propagate in a vacuum, which is not required by other elementary particles. During the transmission, solitons transfer not elementary particles, but the information itself contained in the change of conformation, i.e. in the self-formation of the water, plasma, gas, light, etc. In infinity they seek to zero, or to a certain constant. They can strongly interact with other solitons, but after the collision they return to their original shape, that is they retain their shape and speed. Pouget and Maugina showed the effect of solitons in ferroelectrics, along with electroacoustic interaction, which is conditioned by piezoelectric and electro-curriction. They point to the domain structure of the medium, which determines the size and intensity of the soliton wave. The movement of solitons is affected by the density and thickness of the biological membrane in the cell, because it determines the size of the piezoelectric effect from which the electric field flows, interacting with the solitons. Using the Lax-Wendroff mathematical equations, they illustrate analytical considerations and collision models soliton-antysoliton, collision soliton-soliton, the action of a single solitona in various media. A similar work is presented by (Matuszewski [9]).

Piezoelectricity, priroelectricity, ferroelectricity and semiconductivity are the constant properties of biological structures that determine the structure and function of the biological system and are responsible for different mental states of varying magnitude and intensity (Adamski, et al. [10,11]). Non-linearity is found in ferroelectrics and piezoelectrics, especially in those that are also semiconductors. According to Kielich [12], non-linear optical activity can be induced in these physical structures by electrostriction or absorption (Kielich [12]). Salguerio, et al. [13] reported the mechanism of soliton wave generation and its impact on the waveguide. According to these researchers the waveguide mechanism acting in the fibres of collagen may be responsible for ultrafast communication transfer in the body. Sir Jagdish Chandra Bose in 1924 was the first to predict that in certain special circumstances a lot of particles can arrange themselves «uniformly», positioning spin axes «upwards». This synchronization of spins of many particles (called bosons – Bose particles at the time), allows a number of unusual phenomena to occur, such as «excess liquidity, superconductivity and emission of polarized light.»(Salguerio, et al. [13]). Bose-Einstein condensation is just an example of quantum coherence. As it is «synchronization» of many particles that is being referred to here, we call this phenomenon «macroscopic quantum coherence.» Danah Zohar in his book «The Quantum Self» claims that particles in Bose-Einstein condensation not only act uniformly but also produce a certain whole, and compares them to the voices of the members of a choir, which form the whole composition of singing. Zohar considers the idea that if you stimulate Bose-Einstein condensation of light, then bosons emit polarized light. There are natural cosmic lasers called masers which generate coherent light (Salasnich [14]). Solitons are generated in nonlinear optical centres and Bose-Einstein condensates. Strong waves laser, the degree of non-linearity and high concentration of atoms in a Bose-Einstein condensate influence the formation of multi-dimensional solitons. Currently, the greatest degree of non-linearity is achieved by organic substances in which electrons appear likely to travel long distances. Dimensional solitons owe their existence and permanence to a balance of two forces. Dispersion seeks to cause expansion, while non-linearity seeks to compress solitons. Such a soliton can be obtained, directing the laser beam at appropriately selected half of condensate (Trippenbach, et al. [3,15]).

Soliton Communication and Organization of the Biological System

Albert F. Lawrence & W. Ross Adey (2016) are of the opinion that the phenomena of phonons and excitons along linear molecules can produce non-linear molecular vibrations in the form of soliton waves, which are extremely long-lasting compared to linear oscillations, because solitons occur in the minimum energy state. The authors proposed a model of interaction between excitable tissue and electromagnetic fields based on non-linear waves in the cell membrane. They decided that ionic interaction is needed for this process. Nonlinear waves are characterized by the fact that they do not comply with the superposition principle and the speed of its propagation depends on the amplitude. For the existence of these waves corresponds to non-linearity and dispersion. Pang [16] came to the conclusion based on his research that the external electric field

has an effect on the bioenergetic transport of solitons in collagen. This is done using the electrical properties of amino acids from proteins molecules. From these studies it was concluded that the soliton induction of collagen can act as an optical fiber, causing other nonlinear effects (Inchauspe [17,18]).

Brizik claims that the influence of electromagnetic field (EMF) on molecular solitons can be studied both analytically and numerically. Numerical simulations prove the stability of solitons for fields of high amplitude and enable the study of phonon emissions. Analytical studies concern the quality and frequency of occurrence solitons. This researcher "show that in the spectra of biological radiation effects there are two characteristic frequencies of electromagnetic fields, one of which is associated with intense energy absorption and emission of sound waves by soliton, and the second is related to soliton photodissociation to a delocalized state" (Brizik [19]). Solitons, as self-reinforcing solitary waves, interact with complex biological phenomena such as cellular self-organization. A soliton model is able to describe a spectrum of electromagnetism modalities that can be applied to understand the physical principles of biological effects in living cells, as caused by endogenous and exogenous electromagnetic fields and is compatible with quantum coherence. A bio-soliton model is proposed, that enables to predict which eigen-frequencies of non-thermal electromagnetic waves are life-sustaining and which are, in contrast, detrimental for living cells. The particular effects are exerted by a range of electromagnetic wave eigen-frequencies of one-tenth of a Hertz till Peta Hertz (Geesink, et al. [20]). Brizg advocates the thesis that the electromagnetic field has an influence on the dynamics of solitons. When there is a lack of this field, they are able to emit it with a characteristic frequency, which is determined by the average velocity of the soliton's oscillation. Intensity of metabolism in the biological system forces the radiation of the endogenous electromagnetic field, which leads to the synchronization of soliton dynamics and cargo transport processes. It is a source of cohesion in the biological system. There is a dependence of the intensity of the endogenous electromagnetic field on the metabolic state.

The synchronization of the electrosolite dynamics results in tuning their radiation frequencies to specific relations taking place in biological cells. Through this endogenous electromagnetic field, solitons become coherent in action. The total intensity of such a coherent field is proportional to the square of the number of solitons (Brzik, et al. [21,22]). Brizg advocates the thesis that the electromagnetic field has an influence on the dynamics of solitons. When. there is a lack of this field them, they are able to emit it with a characteristic frequency, which is determined by the average velocity of the solitons oscillation. Intensity of metabolism in the biological system forces the radiation of the endogenous electromagnetic field, which leads to the synchronization of soliton dynamics and cargo transport processes. It is a source of cohesion in the biological system. There is a dependence of the intensity of the endogenous electromagnetic field on the metabolic state.

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Carol G. Jung, teaches the thesis about the synchronism of psychic phenomena without the participation of a causal factor. Synchronicity is defined as the appearance in parallel lines of two phenomena, events or mental states having a common meaning that are not related to each other causally. The term synchronicity is used not only to describe psychic phenomena, but also to describe the interdependence of natural phenomena, for example the convergence of shapes, patterns, sea waves, clouds, spider web, hurricanes, whirlpools, etc. The zone of synchronous phenomena includes according to Jung: dreams, disorders, mental illnesses, myths, rituals, religious phenomena, magical paranormal - telepathy, scientific and artistic intuitions, different states of consciousness, created under the influence of psychoactive substances, or under the influence of other techniques activating these states of consciousness (Jung [27]).

Physical-Electronic Properties of Melanin in the Human Biological System

Melanin, in terms of its electronic and physical aspects, is characterized by the following features: Melanin protects the skin from the damaging effects of ultraviolet (UV) rays. It has the ability to partially absorb and dissipate UV in the skin. It also acts as an antioxidant, i.e. removes free radicals formed under the influence of sunlight (Prota [28]). Melanin are present in every stage of human development. These substances accumulate in cells between the cell nucleus and DNA genetic material, in order to protect the genetic code from damage by UV rays (Prota [29]). Melanin plays an important role not only in the skin but also in the eye and ear. In the eye, melanin has such biological structures as: iris, ciliary body, retinal epithelium and choroid. In the human biological system there is also neuromelanin in the brainstem, the substantia Nigra in the brain, the pituitary gland and the pineal gland, which acts as an antioxidant. The substance Nigra, controls conscious movements and produces dopamine, which regulates moods, its depression leads to Parkinson›s disease (King 2001). Melanin show ability selective vulnerability to phonons - this

means that cells containing melanin have the ability to selectively absorbed phonons (Sarna, et al. [30]).

1. Can fulfil the function of phonons photon transmitter and vice versa (Mc Ginnes, et al. [31]).

2. Melanin is a piezoelectric - under the influence of an alternating electric field emits an acoustic wave.

Melanin and neuromelanin absorb and convert electromagnetic energy in acoustic energy. This process may also occur in the opposite direction, during which the spin fields are produced which solitons are to be found (Adamski [26]). The transformation of light quanta into an acoustic wave, or a photon into a phonon becomes a carrier of information for psychobiological structures in the human body. Exhibits paramagnetic properties of melanin (Schultz, et al. [32]); Melanin is also treated as transforming electricity into electromagnetic energy. In addition, all melanins of the biological system exhibit diverse physical properties such as absorption, disappearance of light and sound, the binding of organic chemicals, storage of liquids and gases (Bruno Nicolas [33]).

The author of this paper thinks that spin and soliton waves provide a picture that is different than what electromagnetic waves do, when received by the eye. Existing science only accepts the operation of electromagnetic waves. It can be concluded that what we have here is a second medium that creates a structure of the image of the world and is responsible for the development of human personality (Adamski [34]). Inchauspe in his works (2015), (2016) shows that during acupuncture, solitons are created. It can be concluded that a similar phenomenon occurs in acupressure and in the sense sense of touch. Quantum Psychology explains the nature of mental processes in the light of quantum processes, describes the organization of systems in a cybernetic and information manner, explains human behavior in a quantum field relationship, assigns a significant role to non-linear processes of consciousness and unconsciousness, recognizes that the human psyche is managed by biocomputers and a cosmic Internet. The consciousness it the emission of coherent light interacting with solitons in bio plasma. It is postulated that in the human biological system transformation is carried out of photons into phonons and vice versa and of photons into solitons, which processes constitute an act of consciousness. The human biological system is an autogenic source of biophotons and bio solitons, which together with laser light, are responsible for human mental states (Adamski [35]). In current psychology, there is no room for solitons and spin functions dealt with by quantum physics. In his deliberations the author adopted the following definition of consciousness. Awareness is the dynamic structure of team quantum processes in the brain bioplasm that is in synergy with the biocomputer simulation directed by the emission of coherent light, modulated by the solitons and spin wave (Adamski [36]) [37-53].

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