

# Bio-Systems as Self-Organizing Quantum Systems

The quantum theory of self organization represents a rather old layer of TGD inspired theory of consciousness.

1. Self organization is a non-deterministic process and corresponds to the evolution of conscious entities - selves - to asymptotic self-organization patterns via quantum jumps. This requires macroscopic quantum coherence.
2. Space-time surfaces are analogous to Bohr orbits and the failure of the classical non-determinism in the conventional sense of the word makes it possible to interpret space-time surfaces as representations of both quantum states and sequences of quantum states assignable to the sequences of quantum jumps. The huge vacuum degeneracy of Kähler action implies spin glass degeneracy in 4-dimensional sense providing maximal resources to represent information about external world by mapping its states to its own internal states. Space-time sheets would be four-dimensional statues gradually carved by a sequence of quantum jump to a shape representing asymptotic self-organization pattern.
3. Magnetic body is the intentional agent controlling the biological body. The fractal hierarchy of copies of standard model physics involving in particular a hierarchy of electro-weak bosons and gluons with increasingly longer weak/confinement length scale is an essential piece of the story. The concrete quantum model for how intentions are transformed to actions provides additional insights to quantum self-organization.
4. The new view about time and energy justifying time mirror mechanism involving sending of negative energy phase conjugate photons to geometric past is crucial for the models of long term memory, intentional action, and remote metabolism.
5. The model of self organization involves cyclotron radiation from the cyclotron transitions assignable with the Bose-Einstein condensates of charged bosons at the magnetic bodies and Josephson radiation from Josephson junctions assignable to the cell membrane and also other layer like structures (electrets).
6. The vision about life residing in the intersection of real and p-adic worlds is central for the approach. In particular, the existence of number theoretic entanglement entropy, which can have negative values, makes possible to identify a measure of conscious information and negentropic entanglement replaces metabolic energy feed as the basic prerequisite of life.

Zero energy ontology and hierarchy of Planck constants complete this vision. Zero energy ontology justifies time mirror mechanism and explains how arrow of subjective time emerges. Dark matter hierarchy implies macroscopic quantum coherence, inspires vision about bio-catalysis and quantum computation in living matter, explains evolutionary leaps, and suggests generalization of the notion of genome and new realizations of genetic code.

The topics of the book are following. The first chapters explain the vision about biological self organization in TGD framework. The last chapters of the book discuss quantum control and coordination in living matter according to TGD.