

## Genes and Memes

The first part of book discusses the new physics relevant to biology and the vision about Universe as topological quantum computer (tqc).

Second part describes concrete physical models.

1. The notion of many-sheeted DNA and a model of genetic code inspired by the notion of Combinatorial Hierarchy predicting what I call memetic code are introduced. The almost exact symmetries of the code table with respect to the third letter inspire the proposal that genetic code could have evolved as fusion of two-letter code and single-letter code.
2. A model for how genome and cell membrane could act as tqc is developed. Magnetic flux tubes containing dark matter characterized by large value of Planck constant would make living matter a macroscopic quantum system. DNA nucleotides and lipids of the cell membrane would be connected by magnetic flux tubes and the flow of the 2-D liquid formed by lipids would induce dynamical braiding defining the computation.
3. The net of magnetic flux tubes could explain the properties of gel phase. Phase transitions reducing Planck constant would induce a contraction of the flux tubes explaining why bio-molecules manage to find each other in a dense soup of bio-molecules. The topology of the net would be dynamical and  $ADP \leftrightarrow ATP$  transformation could affect it. The anomalies related to ionic currents, nerve pulse activity, and interaction of ELF radiation with vertebrate brain find an explanation in this framework. The number theoretic entanglement entropy able to have negative values could be seen as the real quintessence associated with the metabolic energy transfer, and the poorly understood high energy phosphate bond could be interpreted in terms of negentropic entanglement rather than ordinary bound state entanglement.
4. The discoveries of Peter Gariaev about interaction of ordinary and laser light with genome combined with ideas about dark matter and water memory lead to a model for the interaction of photons with DNA. Dark  $\leftrightarrow$  ordinary transformation for photons could allow to "see" dark matter by allowing ordinary light to interact with DNA.
5. A physical model for genetic code emerged from an attempt to understand the mechanism behind water memory. Dark nuclei which sizes zoomed up to atomic size scale could represent genes. The model for dark nucleon consisting of three quarks predicts counterparts of 64 DNAs, 64 RNAs, and 20 aminoacids and allows to identify genetic code as a natural mapping of DNA type states to amino-acid type states and consistent with vertebrate genetic code.

The third part of the book discusses number theoretical models of the genetic code based on p-adic thermodynamics and maximization of entropy or negentropy. These models reproduce the genetic code but fail to make killer predictions.