

# 1 The notion of magnetic body

1. The notion of magnetic body is outcome of topological quantization implying that physical system has field identity: field body or magnetic body having onion-like fractal structure and size much larger than that of physical system. Secondary p-adic scale associated with particle gives a lower bound for the size scale of magnetic body and for electron Earth size scale is in question.
2. Magnetic body consists of flux quanta such as flux tubes and sheets identified as 3-surfaces. These 3-surfaces cannot have boundary since boundary conditions for preferred extremals do not seem to allow boundaries except possibly in the case of massless extremals. Therefore 2-fold coverings of Minkowski space with two sheets glued along their boundaries are needed. These sheets could be two massless extremals (ME) or ME and magnetic flux tube.
3. Flux tubes carry conserved Kähler magnetic charges. It seems that they must be monopole fluxes (at least for elementary particles) in which the cross section of the flux tube is closed 2-surface. This is impossible in Maxwell's theory but possible in TGD since  $CP_2$  has non-trivial homology with Kähler field being an instanton field carrying identical electric and magnetic charges.
4. MB is is central notion in TGD inspired quantum biology.
  - (a) MB makes living system kind of Indra's web. MB is assumed to carry dark identified as ordinary particles characterized by non-standard value of Planck constant coming as integer multiple of ordinary Planck constant:  $h_{eff} = n \times h$ .
  - (b) MB is excellent candidate for coding not only structure but also function of living system since in ZEO MB is 4-D field pattern so that maxima of Kähler function correspond to preferred 4-D field patterns: "behaviors".
  - (c) Phase transitions changing  $h_{eff}$  change the lengths of flux tubes: this provides a mechanism by which reacting molecules find each other in molecular soup. EEG can be understood in terms of communications between magnetic body and biological body. Replication of 3-D magnetic body can serve as space-time template for ordinary replication of DNA, cell, and even larger structures braiding and reconnection of magnetic flux tubes makes possible topological quantum computation and representation of memories and topological quantum computation programs as 1-braids or 2-braids involving knotting of string world sheets in space-time.
  - (d) In ZEO the most probable 3-surfaces are pairs of them at opposite boundaries of CD: means that most probable temporal patterns, behaviors are predicted. Folding of proteins, behaviour patterns, and morphogenesis are examples.