The first version of this chapter was written for almost two decades ago
and some interpretations have changed since then. It was argued that two
purely TGD based concepts: topological field quantization and wormhole BE
condensate are fundamental for the understanding of biosystems. There is
not reason to modify this claim. The ideas about the physical
interpretation of wormhole contacts have however developed since then
dramatically: in the recent formulation of the theory wormhole contacts
define basic building bricks of elementary particles. Hierarchy
of Planck constants assigned with dark matter is second new notion and this
might allow to see wormhole BE-condensates as BE-condensates of dark
variants of ordinary particles.

\vm{\it 1. Basic concepts}\vm

Quantum classical correspondence suggests that gauge charges and p-adic
coupling constant should have space-time counterparts. The first problem is
to define precisely the concepts like classical gauge charge, gauge flux,
topological condensation and evaporation. The crucial ingredients in the
model are so called CP_2 type extremals. The realization that $\#$
contacts (topological sum contacts and $\#_B$ contacts (join along
boundaries bonds) are accompanied by causal horizons which carry quantum
numbers and allow identification as partons leads to a solution of this
problem.

The partons associated with topologically condensed CP_2 type extremals
carry elementary particle vacuum numbers whereas the parton pairs
associated with $\#$ contacts connecting two space-time sheets with
Minkowskian signature of induced metric define parton pairs. These parton
pairs do not correspond to ordinary elementary particles. Gauge fluxes
through $\#$ contacts can be identified as gauge charges of the partons.
Gauge fluxes between space-time sheets can be transferred through $\#$ and
$\#_B$ contacts concentrated near the boundaries of the smaller space-time

sheet.

It has become clear that the notion of $\#_B$ contact might require a
modification. There are reasons to argue that boundary conditions do not
allow space-time surfaces to have boundaries but are replaced by 2-fold
coverings obtained by gluing two space-time sheets along their
boundaries together. The 3-D light-like orbits of wormhole contacts at
which Minkowskian signature of the induced metric changes to Euclidian,
have replaced boundaries and $\#_B$ contacts could be either magnetic flux
tubes with Minkowskian metric or Euclidian flux tube like regions.

\vm{\it 2. Model for topologically quantized magnetic fields}\vm

Topological field quantization replaces classical magnetic fields with
bundles of flux tubes parallel to the field lines; flux tubes are
cylindrical 3-surfaces with outer boundary. In particular, {\it
\blockquote{wormhole
magnetic fields}} having charged wormholes situated at the boundaries of
the flux tubes as their sources, are possible and are vacuum
configurations in the sense that they do not contain ordinary matter at
all. Since wormholes are very light particles, they can suffer BE
condensation, and   the resulting structure is macroscopic quantum
system.

The recent view about particles suggests that wormhole BE-condensates are
BE-condensates of particle with non-standard and large value of Planck
constant. Magnetic fluxes and their braiding play key role in the TGD
inspired model of topological quantum computation in living manner. This
suggests that wormhole magnetic fields and more general structures of the
same kind could realize quantum physicist's version about the computer
scientist's dream about universe consisting of Turing machines emulating
each other.

\vm{\it 3. Models for Comorosan effect, phantom DNA effect, and
homeopathy}\vm

It is shown that the concept of wormhole magnetic fields suggest a model of {\it Comorosan effect} and {\it phantom DNA effect}. Homeopathy could be explained in terms of the mind-like space-time sheets mimicking the properties of the drug and left to the solution in the repeated dilution of the drug. Wormhole magnetic fields provide a quantum mechanism of control from distance, say of the control of the behavior of cell organelles by cell nucleus as well as a model for the memory of bio-system in terms of integer valued winding numbers identifiable as quantized momenta of wormhole supra currents. Wormhole magnetic fields can also represent defects of electron and neutrino super conductors and serve as a templates for the topological condensation of ordinary matter. The fact that wormhole flux tubes are {\it hollow} cylinders, is in nice accordance with this idea (microtubules, axonal membranes, etc. are hollow cylinders).

\vm{\it 4. TGD inspired model for psychokinesis}\vm

A model of psychokinesis (PK) based on the concept of wormhole magnetic field is proposed. The basic philosophy is that PK is not just some isolated exotic phenomenon but only a special case of the voluntary control of bodily motions, which we all routinely perform. The only difference is that the range of voluntary control extends over the boundaries of the body in case of PK. The conclusion is that PK phenomena must involve classical long range fields, which give for bio-systems spatial extension larger than what is visible (that is hands with which to grasp on external object!). According to TGD inspired theory of consciousness, cell, and even DNA can be conscious, and perform choices. Thus the model should also provide understanding about small scale bio-control such as the (possibly voluntary!) control of the motion of cell organelles performed by cell nucleus. There is also alternative approach to the understanding of psychokinesis based on the possibility of creation of space-time sheets having negative time orientation and negative classical energy density and one could consider the possibility that poltergeist effects could involve this mechanism. Many-sheeted

space-time
concept makes possible also psychokinesis based on levitation: what
is
needed that subsystem is able to topologically condense to a
sufficiently
large space-time sheet carrying very weak gravitational fields.

%\end{abstract}