Quantum model for EEG

1. Basic ideas and concepts:

   (a) Basic new element in the model is magnetic body (MB): organism+environment → organism+environment+MB.

   (b) MB has fractal onion-like structure having very large layers about minimal size of causal diamonds (CDs) associated with elementary particles.

   (c) Size scale of CD corresponds to secondary p-adic time scale T for particle. For electron one has T= .1 s,which corresponds to the Earts's circumference and to 10 Hz alpha frequency.

   (d) Dark photons identified as cyclotron photons generated at MB, as photonsof Josephson radiation at Josephson junctions defined by cell membranes, and photons emitted by microtubules acting as quantum antennas.

2. Functions of EEG:

   (a) communications to magnetic body from cell membrane by positive energy signals

   (b) Control of biological body by magnetic body using negative energy signals arriving via flux sheets traversing DNA strands.

3. Biophoton intensity fluctuations correlated with those of EEG, which suggests that biophotons result in energy conserving transformationof dark EEG photons to ordinary ones.

4. A generalization of EEG to fractal hierarchy of EEG like spectra is highly suggestive and would reflect the onionilike structure of MB and structure of organism.

5. How Josephson radiation could code for sensory input?

   (a) At microcopic level cylindrical Josephson junction formed by lipid layers of cell membrane reduces to Josephson junctions formed by various proteins defining receptors, channels and pumps.

   (b) The frequency of Josephson radiation is given by $f_J = ZeV/h_{eff}$ and for $h_{eff} = n \times h$ it can be arbitrarily low. For $h_{eff} = h$ f_J would be about 10^{12} Hz.

   (c) The energy $E_J = ZeV$ of Josephson radiation is just above the thermal energy at physiological temperatures for electron Cooper pairs with Z=2 so that that the signal is not masked by thermal noise and metabolic costs are minimized.

   (d) Nerve pulse activity modulates mem brane potential and there are also more refined modulations not requiring nerve pulse. Voltage modulations induce frequency modulation of Josephson radiation thus coding the sensory input.

6. How magnetic body receives the signal and responds to it?

   (a) The receiving part of magnetic body is assumed to be tube with varying thickness and thus value of B that is cyclotron frequency f_c of BE condensate ion or ionic Cooper pair.

   (b) The receival occurs at resonance: $f_J = nf_c$ so that that different values of $f_J$are received at different parts of tube. Signal is coded to a "sen- sation" moving along the tube back and forth.

   (c) This give rise to coding as "whale's song". Also human speech when listened as slowed down version suggests strongly frequency modulation.

   (d) The cyclotron phase transitions or phase tranin which h_{eff} is reduced and p-adic prime increases such that net effect on flux tube size vanishes reduce the intensity of B by flux conservation. Radiation with very near to harmonic of cyclotron frequency is emitted and defines the response of MB as signals to DNA eventually inducing genetic activity.

   (e) MB also provides feedback at harmonics of cyc lotron frequencies superposing to membrane poten tial.

7. How cyclotron frequencies f_c of ions at magne tic flux tubes could correspond to Josephson frequ encies?

   (a) One has $f_c \propto 1/A$ (A is the mass number of ion) and $f_J \propto 1/h_{eff} \propto 1/n$. Taking $n = 2^k A$ one would obtain resonance coding.

   (b) The Josephson radiation could be generated solely by electron Cooper pairs and dark ions could appear only at magnetic body. Neural activity would modulate these carrier frequencies.

   (c) For $B_{end} = .2$ Gauss (Blackman's findings) this predicts spectrum of specific EEG frequencies as cyclo tron frequencies: for proton one would have $f_c = 300$ Hz.

   (d) The band structure of EEG should correlate with cyclotron frequencies of biologically important ions.

   (e) Must metaphor can be realized quite concretely. EEG as decomposition to octaves with resonances frequencies at 2.5,10,20,40, 80 Hz and one can even consider the analog of music scale defined by cyclotron frequencies of basic ions with f_c in 10-20 Hz and by discrete set of values for membrane potential. The frequency modulations realizing right brain sings left brain talks metaphor can be understood.

8. Music metaphor has gained new support from gravimagnetic anomaly claimed by Tajmar er al.

   (a) Music metaphor together with the assumption that h_{eff} is proportional to mass number A, or even to mass of the particle, suggests that cyclotron energies identifiable as bio-photon energi es are universal and do not depend on charged particle mass. The spectrum of values for B_{end} would correspond directly to the spectrum of bio-photon energies analogous to frequencies of the music scale.

   (b) Visible portion of the spectrum would define the lowest octave and UV energies the higher octaves. All these energies energies are molecular and atomic transition energies so that molecules would be the instruments and the music would be realized also as various bio-chemical reactions.

   (c) Each biophoton energy would correspond to a collection of cyclotron frequencies for molecules able to make tran sitions with that energy. This would provide a new mechanism of bio-catalysis besides the reconnection and contraction of magnetic flux tubes.

   (d) The gigantic gravimagnetic Thomson field claimed by Tajmar et al to explain an anomalously large mass of Cooper pairs obtained by measuring Thomson field could be understood in terms of the identification $h_{eff} = h_{gr} = GMm/v_0$. $h_{eff} = h_{em}$ can also hold true and for ATP synthase the value of h_{em} is consistent with $h_{em} = h_{eff} = h_{gr}$. h_{eff} and thus the number n of sheets depends on the masses or charges at the ends of the flux tube. One implication would be that dark EEG photons decay to bio-photon with universal energy spectrum reflecting directly the spectrum of endo- genous magnetic field. Similar spectrum was deduced earlier from a quantum model for hearing. The endogenous magnetic B_{end} = .2 Gauss could correspond to the minimum value of B_{end} .