

TGD inspired model for the formation of exclusion zones from coherence regions

M. Pitkänen

Email: matpitka@luukku.com.

http://tgdtheory.com/public_html/.

December 27, 2014

Contents

1	Introduction	1
2	TGD inspired model for CDs and EZs	2
3	Is a new source of metabolic energy needed?	3

Abstract

Emilio del Giudice et al have proposed that so called coherent regions (CDs) of size about 1 micrometer in water are crucial for living systems and there is empirical evidence for them. Gerald Pollack and collaborators have discovered what they call exclusion zones with size up to about 200 micrometers. In the sequel a model for the formation of EZs assuming that CDs are their predecessors is proposed. The model involves also hydrogen bonds in an essential manner. The basic prediction is that the formation of CDs requires UV irradiation at energy around 12.06 eV. Solar radiation at this energy cannot propagate through atmosphere as ordinary photons but could arrive along magnetic flux tubes as dark protons.

1 Introduction

There is a talk of Mae-Wan Ho (<https://www.youtube.com/watch?v=QufA1EqUZmU&app=desktop>) in Conference on the Physics, Chemistry and Biology of Water 2014. It is a very nice representation and I learned new facts highly relevant for my own work.

Some background articles might be helpful. Mae-Wan Ho [I3] has proposed that there exists superconducting liquid crystal water aligned with collage fibres. Giudice et al [I1] have proposed that water dynamics is at the root of metamorphosis in living matter: this involves the notion of water coherent region (CD) with size scale of 1 micrometer. I have not considered this notion in TGD framework earlier but TGD strongly suggests that the four Gaussian Mersennes $M_{G,k}$, $k = 151, 157, 164, 167$ with corresponding p-adic length scales coming as $L(k) = 2^{(k-151)/2} \text{times } L(151)$, $L(151)=10$ nm are important in biology: $k = 167$ corresponds to 2.5 micrometers. Pollack and et al [I4, I2] have introduced the concept of exclusion zone (EZ) with size scale of 200 nm and related notion fourth phase of water. TGD inspired model of EZ involves in essential manner dark protons at magnetic flux tubes assignable to EZ [K3, K2].

The main points of Mae-Wan Ho's talk are following.

1. Protons make water a conductor, maybe even superconductor. In TGD framework the statement would be that dark protons flowing along magnetic flux tubes make this possible. Personally I believe that electronic and even ionic Cooper pairs are involved and TGD based model of cell membrane [K1] assumes these super-conductivities relying on the notion of dark matter realizes as $h_{eff} = n \times h$ phases.

2. The water associated with collagen networks appears as superconductor and superfluid in nano-scales. Also this is very attractive idea and if the $h_{eff} = h_{gr}$ condition holds as some arguments suggest, then superfluidity allowing macroscopic quantum coherence with gravitational Compton length having no dependence on the mass of particle becomes possible [K3]. This is due to two facts. First, one has $h_{gr} = GMm/v_0$, where M can be identified as dark part of the Earth's mass, m is the mass of the particle and v_0 is velocity parameter. Secondly, Compton length is inversely proportional to the mass. One of the strange effects involved with superfluidity is fountain effect explained elegantly by macroscopic quantum gravitational coherence: water would effectively defy gravitation: this effect might allow testing of the hypothesis.

Mae Wan-Ho talked about and compared two notions: CDs (coherent domains of water with size of about micrometer postulated by quantum field theoreticians, in particular Emilio del Giudice) and EZs (exclusion domains with size about 200 micrometers discovered by Gerald Pollack and collaborators experimentally). Note that in Zero Energy Ontology (ZEO) I talk about causal diamonds (CDs), which are typically much larger than CDs of Giudice et al.

1. Inside EZ the water forms layered structure consisting of hexagonal layers and the stoichiometry is $H_{1.5}O$ so that every fourth proton must be outside EZ (proton is not accompanied by electron if charge separation takes place: EZ is indeed negatively charged so that one obtains different pHs inside EZ and in its exterior). This state is experimentally heavier than ordinary water.
2. So called tetrahedral or 4-coordinated water is assigned with CDs. CDs and EZs could correspond to two different p-adic length scales in TGD framework. This state would be less dense than ordinary water. Both CD and EZ contain plasma of almost free electrons. CDs are excited to 12.06 eV just .5 eV below the ionizing potential 12.56 eV. .5 eV which is the nominal value of metabolic energy quantum - probably not an accident.

In the sequel a model for the formation of EZs assuming that CDs are their predecessors is proposed. The model involves also hydrogen bonds in an essential manner. The basic prediction is that the formation of CDs requires UV radiation at energy around 12.06 eV, which would be solar radiation arriving along magnetic flux tubes as dark protons.

2 TGD inspired model for CDs and EZs

I try my best to summarise some very interesting points of the talk and develop in more detail TGD inspired model for EZs and their formation, and the TGD view of metabolism leading to a prediction of new form of metabolism involving dark UV photons from Sun.

1. The splitting of ordinary water H_2O to $2H^+ + 2e^- + O$ is a key step in photosynthesis. In particular, it produces oxygen without which we cannot survive. The splitting process involves two ionizations. The ionisation energy of the first electron 12.56 eV and in ultraviolet much above the metabolic energy quantum around .5 eV. How the splitting of water can be achieved at all? This looks like a very real problem!
2. CDs/EZs could be the solution to the problem. Inside CD the energy for the splitting of water is much smaller due to the fact that electrons are almost free as already mentioned: if the splitting energy equals to the so called formation energy, it is about .41 eV for CD: nothing but the metabolic energy quantum! Also at the interface of EZ just above the boundary of EZ the electronic states are excited and only an energy of .51 eV - known as formation energy - is needed for the splitting. This suggests that metabolic energy quanta are used to generate EZs and/or CDs in the fundamental step metabolism. Also irradiation at these energies generates CDs/EZs.
3. My layman logic says that formation energy for EZ must correspond to the energy needed to increase the size of /EZ by a minimum amount. In TGD model this would mean creating one proton-electron pair such that electron remains inside the EZ, whose size thus increases

and proton becomes dark proton at dark magnetic flux tube. This step would be also a key step in the splitting of water. Splitting of water and growth of EZ would be essentially the same process. In the case of CD it would seem that charge separation takes place inside CD in the splitting and proton can go outside.

What comes in mind that the formation of CDs requiring large excitation UV energy of 12.06 eV precedes that of EZs. After the formation of CD and almost free electrons only metabolic energy quantum per proton is required to kick single proton to dark magnetic flux tube. This would conform with the fact that CD radius is about 200 times larger than that of CD meaning that volumes are related by a factor $8 \times 10^6 \simeq 2^{23}$. The formation of EZ would transform tetrahedral water to the hexagonal $H_{1.5}O$ and suck protons to dark protons at magnetic flux tubes. If this picture is correct, the proper identification of formation energy for CD would be as absorption energy for CD equal to 12.06 eV and in UV. Recall that bio-photon spectrum extends to UV and dark photons with this energy could be responsible for the formation of CDs. This would add dark photons transforming to bio-photons to the picture.

The formation of EZ can be seen as pulling out one ordinary proton from ordinary water just above the surface of the EZ and making it dark proton at a magnetic flux tube assignable to the EZ and perhaps connecting it to neighboring EZ for form a quantum coherent network. Dark proton would serve as a current carrier and make water a conductor and perhaps even super-conductor. Even superfluidity can be considered.

4. The metabolic energy quantum .5 eV can be also assigned with hydrogen bond. Could the process of generating dark proton and increasing the size of EZ by one electron involve cutting of the hydrogen bond binding the proton to the water outside. If so then the only thing keeping the excited water inside CD as a coherent phase would be the bond energy of hydrogen bonds! Maybe this is too simplistic.

I have proposed earlier that hydrogen bonds are short magnetic flux tubes, which can suffer h_{eff} increasing phase transition. These flux tubes could in turn experience reconnections with U shaped large h_{eff} flux tubes and get connected to the dark web. Mae-Wan Ho also tells that the transfer of proton from covalent OH bond to the middle of hydrogen bond happens with a considerable probability. Could this step precede the increase of h_{eff} and reconnection? This would give a connection with hydrogen bonding about which Mae Wan-Ho also talked about. These naive models of course cannot be correct in detail but give hopes about fusion of existing chemical thinking and new quantal notions.

5. A process bringing in mind the formation of EZs occurs as one perturbs molecular bio-systems - that is feeds energy into it. The system "wakes up" from "winter sleep", the globular proteins, which are in resting state with hydrogen bonds at their surface forming kind of ice layer unfold and protein aggregates are formed. Molecular summer begins and ceases when the energy feed is over. Cellular winter begins again. Maybe cellular summer is just temporary formation of EZ layers around the protein involving melting of hydrogen bonds and generation of dark protons making system conscious!

3 Is a new source of metabolic energy needed?

What remains to be understood is the process generating CDs: where could the UV photons with energy 12.06 eV come? Clearly a new form of metabolism is involved and the only source of energy seems to be the Sun!

1. Solar radiation cannot however provide UV photons as ordinary photons since UV radiation at these wavelengths is absorbed by the atmosphere. In TGD framework a reasonable candidate for dark radiation with energies in UV range is dark cyclotron radiation with energy $E = h_{eff} \times f$: biophotons would be produced in the transformation of dark cyclotron photons to ordinary photons.
2. Could part of solar UV radiation transform to dark UV photons at magnetic flux tubes of even size scales larger than that of Earth predicted by the model of EEG and arrive along them

through the atmosphere? The presence of a new source of metabolic energy is in principle a testable prediction: is the energy feed from the visible part of solar radiation really enough to cover the metabolic energy needs? Here one must however take into account the fact that the UV energy would be received by water. The water from which CDs are eliminated would not allow photosynthesis.

To sum up, if the proposed picture is correct photosynthesis involves formation of EZs and cellular respiration the inverse of this process. As discussed earlier, the purpose of metabolic processes would be basically generation and transfer of negentropic entanglement assignable to large h_{eff} states.

REFERENCES

Biology

- [I1] Tedeschi Alberto Emilio Del Giudice, Paola Rosa Spinetti. Article: Water Dynamics at the Root of Metamorphosis in Living Organisms. *Water*. <http://www.mdpi.com/journal/water>, 2:566–586, 2010.
- [I2] Q. Zhao G. H. Pollack, X. Figueroa. Molecules, water, and radiant energy: new clues for the origin of life. *International Journal of Molecular Sciences*. https://www.researchgate.net/publication/9066816_Long-range_forces_extending_from_polymer-gel_surfaces, 10:1419–1429, 2009.
- [I3] Mae-Wan Ho. Super-Conducting Liquid Crystalline Water Aligned with Collagen Fibres in the Fascia as Acupuncture Meridians of Traditional Chinese Medicine. *Forum on immunopathological diseases and therapeutics*. <http://dl.begellhouse.com/journals/1a654bf03faf67ac,744ec0d724b32947.html>, 3(3-4):221–236, 2012.
- [I4] G. H. Pollack J.-M. Zheng. Long-range forces extending from polymer-gel surfaces. *Physical Review E*. https://www.researchgate.net/publication/9066816_Long-range_forces_extending_from_polymer-gel_surfaces, 68:031408–, 2003.

Books related to TGD

- [K1] M. Pitkänen. *TGD and EEG*. Onlinebook. http://tgdtheory.fi/public_html/tgdeeg/tgdeeg.html, 2006.
- [K2] M. Pitkänen. Quantum Mind, Magnetic Body, and Biological Body. In *TGD based view about living matter and remote mental interactions*. Onlinebook. http://tgdtheory.fi/public_html/pdfpool/lianPB.pdf, 2012.
- [K3] M. Pitkänen. Quantum gravity, dark matter, and prebiotic evolution. In *Genes and Memes*. Onlinebook. http://tgdtheory.fi/public_html/genememe/genememe.html#hgrprebio, 2014.