Strong support for TGD based model of cold fusion from the recent article of Holmlid and Kotzias

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Abstract

The recent article by Holmlid and Kotzias reports details about the superdense phase of protonium/deuterium postulated by Holmlid to explain cold fusion. To my surprise this phase turned out to have the same general characteristics as the dark nuclei identified as magnetic flux tubes carrying dark nuclear strings postulated in TGD based model of cold fusion. The original intuition was that the distance between dark protons inversely proportional to the value of Planck constant $h_{eff} = n \times h$ is about atomic length scale but the assumption that it is very nearly electron Compton length gives a model consistent with that of Holmlid. Besides the linearity of basic structures, the reported superconductivity and superfluidity are also predictions of TGD inspired model. There are also other nuclear physics anomalies and the same model could explain also them. The findings of Holmlid provide strong support for the TGD based view about dark matter playing key role also in TGD inspired quantum biology.

I received a very helpful comment to my blog posting telling about the work of Prof. Leif Holmlid related to cold fusion [C1] (the relation of TGD based model of cold fusion to Holmlid's work is discussed in this chapter and also in the article [L2]). The basis idea of Holmlid is that cold fusion is preceided by a formation of ultradense protonium or deuterium matter for which distance between protons/deuterium nuclei is about 2.3 pm, which is of the same order of magnitude electron Compton length 2.42 pm.

This helped to find a new article of Holmlid and Kotzias with title "Phase transition temperatures of 405-725 K in superfluid ultra-dense hydrogen clusters on metal surfaces" published towards the end of April [C7] (see http://tinyurl.com/hxbvfc7). The article provides very valuable information about the superdense phase of hydrogen/deuterium that he postulates to be crucial for cold fusion.

The postulated supra dense phase would have properties surprisingly similar to the phase postulated to be formed by dark magnetic flux tubes carrying dark proton sequences generating dark beta stable nuclei by dark weak interactions. My original intuition was that this phase is not superdense but has a density nearer to ordinary condensed matter density. The density however depends on the value of Planck constant and with Planck constant of order $m_p/m_{\simeq}2^{11} = 2000$ times the ordinary one one obtains the density reported by Holmlid so that the models become surprisingly similar. The earlier representation were mostly based on the assumption that the distance between dark protons is in Angstrom range rather than picometer range and thus by a factor 32 longer. The modification of the model is straightforward: one prediction is that radiation with energy scale of $1 - 10$ keV should accompany the formation of dark nuclei.

In fact, there are also similarities about which I did not know of!

1. The article tells that the structures formed from hydrogen/deuterium atoms are linear string like structures: this was completely new to me. The support comes from the detection of what is interpreted as decay products of these structures resulting in fragmentation in the central regions of these structures. What is detected is the time-of-flight distribution for the fragments. In TGD inspired model magnetic flux tubes carrying dark proton/D sequences giving rise to dark nuclei are also linear structures.

2. The reported superfluid (superconductor) property and the detection of Meissner effect for the structures were also big news to me and conforms with TGD picture allowing dark supraphases at flux tubes. Superfluid/superconductor property requires that protons form Cooper pairs. The proposal of Holmlid and Kotzias that Cooper pairs are pairs of protons orthogonal to the string like structure corresponds to the model of high Tc superconductivity in TGD inspired model of quantum biology assuming a pair of flux tubes with tubes containing the members of the Cooper pairs. High Tc would be due to the non-standard value of $h_{eff} = n \times h$. This finding would be a rather direct experimental proof for the basic assumption of TGD inspired quantum biology [K3, K4].

3. In TGD model it is assumed that the density of protons at dark magnetic flux tube is determined by the value of h_{eff}. Also ordinary nuclei are identified as nuclear strings [K2] and the density of protons would be the linear density protons for ordinary nuclear strings scaled down by the inverse of h_{eff} - that is by factor $h/h_{eff} = 1/n$.

   If one assumes that single proton in ordinary nuclear string occupies length given by proton Compton length equal to (m_e/m_p) time proton Compton length and if the volume occupied by dark proton is 2.3 pm very nearly equal to electron Compton length 2.4 pm in the ultra-dense phase of Holmlid, the value of n must be rather near $n \simeq m_p/m_e \simeq 2^{11} \simeq 2000$ as the ratio of Compton lengths of electron and proton. The physical interpretation would be that the p-adic length scale of proton is scaled up to essentially that of electron which from p-adic mass calculations corresponds to p-adic prime $M_{127} = 2^{127} - 1$ [K1]. The ultra dense phase of Holmlid would correspond to dark nuclei with $h_{eff}/h \simeq 2^{11}$.

   My earlier intuition was that the density is of the order of the ordinary condensed matter density. If the nuclear binding energy scales as $1/h_{eff}$ (scaling like Coulomb interaction energy) as assumed in the TGD model, the nuclear binding energy per nucleon would scale down from about 7 MeV to about 3.5 keV for $k = 127$. This energy scale is same as that for Coulomb interaction energy for distance of 2.3 pm in Holmlid's model (about 5 keV). It must be emphasized that larger values of h_{eff} are possible in TGD framework and indeed suggested by TGD inspired quantum biology. Amusingly, my original too restricted hypothesis was that the values of n comes as powers of 2^{11}.

4. In TGD based model scaled down dark nuclear binding energy would (more than) compensate for the Coulomb repulsion and laser pulse would induce the phase transition increasing the density of protons and increasing also Planck constant making protons dark and leading from the state of free protons to that consisting of dark purely protonic nuclei in turn transforming by dark weak interactions to beta stable nuclei and finally to ordinary nuclei liberating essentially ordinary nuclear binding energy. In TGD based model the phase transition would give rise to charge separation and the transition would be highly analogous to that occurring in Pollack's experiments [L1] [L1].

It seems that the model of Holmlid and TGD based model are very similar and Holmlid's experimental findings support the vision about hierarchy of dark matter as phases of the ordinary matter labelled by the value of $h_{eff}/h = n$. There are also other anomalies that might find explanation in terms of dark nuclei with $n \simeq 2^{11}$. The X rays from Sun have been found to induce a yearly variation of nuclear decay rates correlating with the distance of Earth from Sun [C2, C6, C5].

1. One possible TGD based explanation relies the nuclear string model [K2]. Nucleons are assumed to be connected by color flux tubes, which are usually neutral but can be also charged. For instance, proton plus negative charged flux tube connecting it to the neighboring nucleon behaves effectively as neutron. This predicts exotic nuclei with the same chemical properties as ordinary nuclei but with possibly different statistics. X rays from Sun could induce transitions between ordinary and exotic nuclei affecting the measured nuclear reaction rates which are averages of all states of nuclei. A scaled down variant of gamma ray spectroscopy of ordinary nuclei would provide an experimental proof of TGD based model.

2. The fact that the energy scale is around 3 keV suggests that X rays could generate transitions of dark nuclei. If so, the transformations of dark nuclei to ordinary ones would affect the measured nuclear transition rates. There are also other anomalies such as those reported by

Rolfs et al [C3, C4], which might find explanation in terms of presence of dark variants of nuclei ordinary nuclei.

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