The notion of time in TGD Universe

1. The notion of time has several problematic aspects e.g.

   (a) experienced time has no future unlike geometric time

   (b) the causality for experienced time corresponds to that for free will whereas the causality of geometric time corresponds to that of "field equations" and allows no free will

   (c) there is no understanding about how the arrow of time and temporal localization of contents of sensory experience emerges

   (d) neuroscience forces to question the naive beliefs about time (experiments of Libet)

2. These problematic aspects could relate to the basic problem of quantum measurement theory: the non-determinism of state function reduction is in conflict with the determinism of Schrödinger equation

3. These problems might find resolution in TGD framework if zero energy ontology is accepted meaning that

   (a) the notion of wave function in the moduli space of causal diamonds (CDs) is introduced

   (b) state function reduction occurs at either end of CD (positive or negative energy of zero energy state being accompanied by a localization of moduli space wave function to a fixed light-cone boundary. This predicts that the arrow of time can change temporarily at some level of self hierarchy - say in living systems

   (c) in repeated state function reductions to the same boundary of CD the wave function in moduli space of CDs is subject to dispersion meaning that the average temporal distance between the tips of CD increases and gives rise to experience about time flow. This is a new element not present in standard measurement theory

   (d) intentional action could involve signals sent to geometric past making possible to initiate reaction already in geometric past explaining Libet's strange findings

   (e) remote metabolism relying on sending of negative energy to a population reverted laser like system serving as energy storage becomes possible

   (f) memory recall could be understood as communications with geometric past using time reversed negative energy signals