

In this article three developments in TGD are discussed. These developments emerged in a "wrong context".

The first discovery was the realization that $M^8 - H$ duality in zero energy ontology implies a fractal generalization of Hubble's law. It emerged in a work related to TGD inspired quantum biology, where gravitational Planck constant $h_{gr} = GMm/\beta_0$ (M and m are masses and β_0 is velocity parameter) introduced by Nottale plays a key role. This already also led to a partial understanding of Hubble tension: the value of β in cosmic scales is very near to 1 but its values differ slightly in long and short cosmic scales.

The second discovery emerged while developing a TGD based model for Allais effect, which has no explanation in the context of general relativity or Newtonian gravitation. The work led to the question concerning the interpretation of the velocity parameter β_0 appearing in the formula of the gravitational Planck constant h_{gr} introduced already by Nottale. The gravitational field bodies of the Earth and structures of cosmological size scale are characterized by $\beta_0 = v_0/c \simeq 1$ and cannot correspond to a velocity of matter for a matter flow. Solar system characterized by $\beta_0 \simeq 2^{-11}$, which cannot correspond to light-velocity in the general relativistic framework.

The solution of the problem came from a prediction of TGD, which emerged already 47 years ago during the first year of TGD. TGD predicts warped space-time surfaces which are flat like Minkowski space M^4 (no gravitation) and have vanishing gauge fields. They have Poincare symmetry but have reduced light-velocity due to the warping. Light-like geodesics of M^4 are replaced by light-like geodesics of $M^4 \times S^1 \subset H = M^4 \times CP_2$. Warped space-time surface can explain the Allais effect, in particular the dramatic reduction of the parabolic oscillator frequency in terms of reduced light velocity. The notion of warping generalizes: one can speak of warped Hamilton-Jacobi (H-J) structures for which the hypercomplex structure of M^4 and complex structure of CP_2 are mixed in the sense that M^4 H-J structure is replaced with that of a warped space-time surface.

The third development led to a more detailed understanding of how the CP_2 type extremals emerge from the H-H principle, which for ordinary H-J structure allows only Minkowskian space-time regions. The earlier view about CP_2 type extremals as blow-ups finds a nice description in terms of H-H principle and twisted H-J structure made possible by the warping of M^4 as tilting towards $M^4 \times S^1$, where S^1 is a geodesic circle of CP_2 .