

Some aspects of TGD and TGD inspired theory of consciousness

In this talk I briefly describe the key ideas of Topological Geometrophysics and of TGD inspired theory of conscious experience.

How TGD emerged?

Topological geometrodynamics (TGD) emerged as a possible solution to the energy problem of General Relativity.

TGD can be also regarded as a generalization of the string model, and a proposal for quantum theory of the known gauge interactions and gravitation.

The first key notion is the identification of space-time(s) as 4-surface(s) in 8-D space $H = M^4 \times CP_2$: here M^4 is the flat Minkowski space of special relativity theory and CP_2 is the complex projective space having 4 real dimensions.

This choice allows us to understand standard model symmetries and quantum numbers and geometrize standard model interactions. This involves a generalization of the string model. Point-like particle is replaced with a 3-surface whose orbit defines a 4-D space-time region.

Basic implications are the geometrization of standard model fields and symmetries. Many-sheeted space-time and topological field quantization leading to the notions of field body and magnetic body have deep implications in all scales, since the length scale reductionism is replaced with fractality. The implications are especially important in quantum biology.

Quantum TGD as a geometrization of quantum physics

Quantum TGD can be seen as a generalization of Einstein's geometrization program. Not only classical fields but the entire quantum theory is geometrized.

In a nutshell, quantum TGD can be a generalization of wave mechanics obtained by replacing point-like particles with 3-D surfaces in H which by holography are almost equivalent with 4-D surfaces.

An essential element is zero energy ontology (ZEO) replacing the standard ontology of quantum theory and classical physics. General coordinate invariance implies holography so that the space-time surface as an almost deterministic time evolution becomes a fundamental object analogous to Bohr orbit. Physical states are quantum superpositions of the space-time surfaces.

Causal diamond CD as intersection of future and past directed light-cones replaces quantization volume in quantum field theories. Space-time surface connect the opposite boundaries of CD.

TGD inspired theory of conscious experience as a generalization of quantum measurement theory

TGD inspired theory of consciousness can be regarded as a generalization of quantum measurement theory. One could say that physics is extended to a theory of conscious experience.

The basic problem of quantum measurement theory is the conflict between the determinism of unitary time evolution and non-determinism of state function reduction (SFR). Free will

in turn represents an insurmountable problem for classical physics which is deterministic and this is the probable reason for why the physicalistic world view has denied it.

In ZEO, SFR occurs between quantum superpositions of space-time surfaces inside CD and is consistent with the determinism of the classical field equations. TGD predicts two times and two causalities: geometric time and the deterministic causality of field equations and subjective time and the causality of free will realized as SFR.

One can say that SFR defines moment of consciousness as a basic building brick of subjective existence whose essence is change, the replacement of quantum reality with a new one.

One can distinguish between opposite light-like boundaries of CD as passive and active boundaries. Nothing changes at the passive boundary during the sequence of "small" SFRs (SSFRs) whereas the active boundary is shifted to the future and also the 3-D states at it change. This defines an arrow of time. In "big" SFR the passive and active boundaries change their roles and the arrow of time is changed.

Self can be identified as a sequence of "small" SFRs, having "weak" measurements as quantum optics counterparts. In a "big" SFR as a counterpart of ordinary quantum measurement, self "dies" and reincarnates as time reversed self. The findings of Libet about active aspects of consciousness support the notion of BSFR.

For material related to TGD see https://tgdtheory.fi/public_html/ .

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