

TGD INSPIRED THEORY OF CONSCIOUSNESS

Basic Ideas and Concepts

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Some why's

Why quantum theories of consciousness?

- **Basic problem of quantum measurement theory:** determinism of Schrödinger equation inconsistent with non-determinism of quantum jump. Conscious observer must transform from an outsider to a basic notion of quantum theory.
- **Failure of materialistic philosophy in neuroscience.** Basic problems of neuroscience. Unsuccessful attempts to locate "consciousness module" in brain.
- **Coherent holistic behavior of living matter** impossible to understand if living matter as random molecular soup.

Why existing quantum theory might not be enough?

- **Quantum measurement theory too primitive for needs of consciousness theory.**
- **State function reduction probably relates to free will but does not provide real insights into intentionality and cognition.**
- **The relation between experienced and geometric time poorly understood.**
- **Standard quantum mechanics does not allow quantum coherence in human time and length scales.**
- **Effects of ELF em fields on brain at harmonics of cyclotron frequencies of bio-ions quantal.** Energies of corresponding ELF photons extremely weak as compared to thermal energy. Effects should not be there. For the same reason EEG should not correlate with contents of consciousness and with state of brain.

Quantum jump as moment of consciousness

- **Quantum jump as moment of consciousness.** Analogy with elementary particle physics.
- **New view about the relation of geometric time to experienced time.** Quantum jump sequence defines experienced time. Why the locus for contents of consciousness shifts towards geometric future quantum jump by quantum jump?
- **Resolution of the basic paradox of quantum measurement theory.** Also other paradoxes (What was the initial state of universe?).
- **Hierarchy of Planck constants: fractal hierarchy of quantum jumps with increasing geometric duration = geometric time interval about which conscious experience contains information proportional to the value of Planck constant characterizing the level of dark matter hierarchy. p-Adic time scale hierarchy** [Return](#)

Anatomy of quantum jump.

To the beginning

- **Quantum jump has complex anatomy.** Generation of quantum entanglement by unitary process, state function reduction and state preparation.
- Standard quantum measurement theory relies on von Neumann algebras known as factors of type I. They are replaced with **hyperfinite factors of type II_1** in TGD framework.
- Quantum **measurement has finite resolution.** Only partial reduction of entanglement possible. Characterization in terms of **Jones inclusion $N \sum M$** of Neumann algebras. **M/N** corresponds to the degrees of freedom which are measured at level of selves, **N** those that are not measured and remain entangled. Also conscious experience has finite resolution.
- **Interior of space-time surface represents non-quantum fluctuating zero modes** representing classical degrees of freedom entangled with **quantal degrees of freedom at lightlike partonic 3-surfaces** (state of measurement apparatus entangled with quantal degrees of freedom). Unitary process regenerates also entanglement between these degrees of freedom.

- **Zero energy ontology** states that all quantum states have vanishing conserved quantum numbers and are creatable from vacuum.
- Negative energy states located in geometric future relative to positive energy states. **S-matrix** as unitary matrix representing **time like entanglement** between positive and energy components of zero energy states. ($\text{Tr}(\text{Id})=1$ for hyper-finite factors of type II_1). Also this kind of entanglement is reduced in quantum jump.
- Quantum jump leads to a new state with new S-matrix. Unitary process tend to regenerate this entanglement.

The notion of self

To the beginning

- **Original definition:** Self avoids generation of **bound state entanglement** with environment as long as it stays conscious. **Self sequence of several quantum jumps** which somehow integrate to a unified experience. Moments of consciousness \leftrightarrow elementary particles, self \leftrightarrow bound state of them.
- Self hierarchy. Entire Universe at the top. Infinite hierarchy of Planck constants characterizes the self hierarchy partially. **Self hierarchy identical with dark matter hierarchy?**
- **Everything is conscious but consciousness can be lost by entangling with a larger system.**
- **New definition:** Reduction of the notion of self to that of quantum jump. Quantum jump contains sequences of quantum jumps at shorter time scales. **Self single quantum jump at highest level of hierarchy of quantum jumps defining self.** Bound state of particles is also particle.
- **Human lifecycle single quantum jump at highest level.** We are conscious even during sleep: this allows to know that I existed yesterday.

Contents of consciousness of self

To the beginning

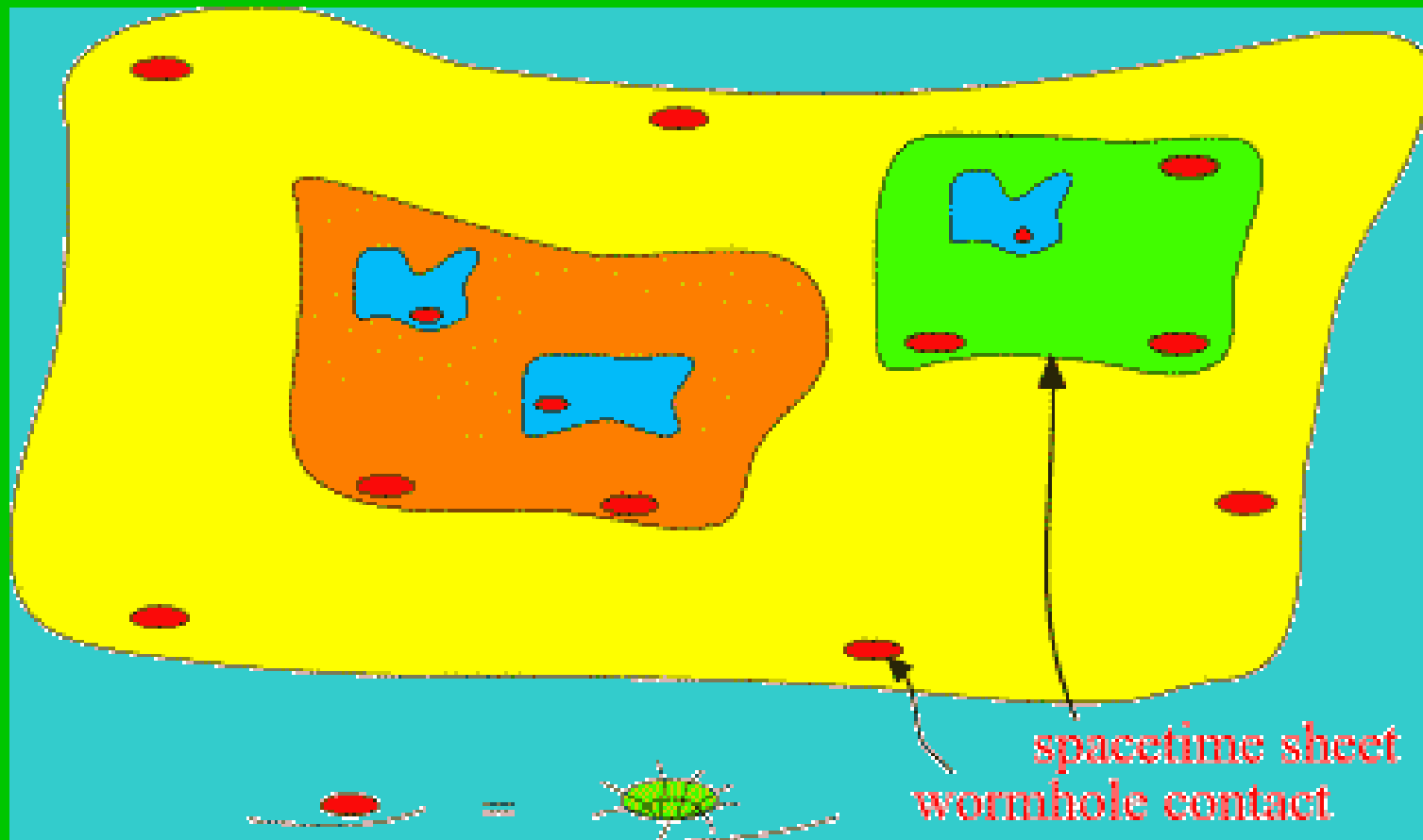
- **Subselves experienced as separate mental images.** Explains why we can remember a temporal sequence of phone numbers.
- **Subself a mental image which is a statistical average over mental images of subself.** Spatial and subjecto-temporal averaging. The entropy assignable to the mental image increases and mental image ages. Could second law of thermodynamics characterize subjective experience rather than reality?
- **The sequence of lower level quantum jumps creates the experience about flow of time** although there is only single quantum jump at highest level.
- **Contents of consciousness** about the region defined by **space-time sheet** defining self. Subselves correspond to sub-space-time sheets.
- **Do sensory selves correspond to partonic 2-surfaces:** our experience represents world as 2-dimensional!

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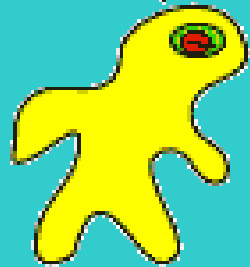
- **Sharing and fusion of mental images.** Generalization notion of entanglement inspired by many-sheeted space-time. Two space-time sheets which are disjoint can have subsheets which are connected by join along boundaries bond. Selves can have subselves which are fused together. Contents of consciousness are not completely private. Pool of shared mental images making possible social behavior and language.
- Stereo vision as example: right and left visual fields represent mental images which fuse together to stereo vision. Same happens to the consciousness of us at the level of collective consciousness and gives rise to objective multidimensional view about human condition.
- “Length scale dependent” notion of **resolution of conscious experience.** The entanglement of sub-selves is not seen in the resolution used by selves. Finite resolution of conscious experience can be described in terms of Jones inclusion $N \supset M$. For subselves representing the mental images the resolution is better. Selves form abstractions by averaging over subselves.

General ideas of qualia

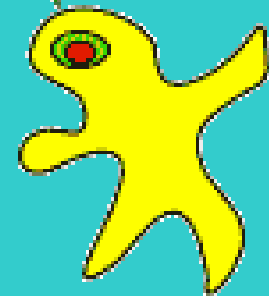
- Quantum numbers label quantum states. **Qualia correspond to increments of quantum numbers in quantum jump.** Also increments of (non-quantum fluctuating) zero modes could correspond to qualia: geometric qualia.
- Classification of qualia according to the character of quantum number.
- Visual colors as example. **Visual color could correspond to QCD color!** Increments of color quantum numbers correspond to basic color qualia. Primary colors. Complementary colors.
- Quantum model for **sensory receptor**. Amplification of quantum jump needed. Bose-Einstein condensates at plates of "capacitor". Discharge gives rise to macroscopic quantum number increment at plates. Does this explain why living matter is full of electrets? Cell membrane basic example?



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