Tesla still inspires

M. Pitkänen
Email: matpitka6@gmail.com.
http://tgdtheory.com/.

October 3, 2019

Abstract

Tesla's work still inspires researchers ready to challenge prevailing dogmas. Over-unity energy production has been repeatedly claimed by free energy researchers to occur in some systems. Zero energy ontology (ZEO) allows to solves the basic paradox of quantum measurement theory in TGD framework and leads to a theory of consciousness. In ZEO classical energy is conserved exactly but at quantal level lack of compete temporal de-localization makes non-conservation possible, and ZEO indeed could explain over-unity effects. ZEO allows both directions of time, and this leads also a universal mechanism of error correction in quantum computation: one can say that Nature does it itself. Applications to biology are particularly interesting.

1 Introduction

Tesla has served as a source of inspiration for free energy researchers decade after decade. The claims assigned with Tesla and free energy are not consistent with the prevailing belief systems, and it is very interesting to look whether they could make sense in TGD framework predicting a lot of new physics. I have even written a book studying these claims systematically (see http://tinyurl.com/yxf3z8lx). The book is written about two decades ago and TGD has developed a lot after than and it is interesting to take a glimple at it with the recent understanding of TGD.

In the following some claims assigned with Tesla and free energy research are summarized.

1. Tesla explained his observations with scalar waves. Maxwellian electrodynamics does not however allow massless photons with vanishing spin. Tesla also believed on aether but to my view Tesla was here a child of his time.

   The recent view (2019) is that scalar waves are not possible as single-sheeted structures in TGD framework. Many-sheeted space-time could however allow effective scalar waves as two-sheeted structures realized as a pair of massless extremals (MEs) representing waves of opposite polarization propagating in the same direction. From the point of view of test particles the effect of MEs is indeed like that of a scalar wave. This variant of scalar wave could explain the findings claimed by Tesla. Also the analogs of light waves propagating with arbitrary small velocity and even of standing waves make sense as pairs of MEs with opposite momentum directions.

2. The notion of free energy is different from the standard notion of free energy appearing in thermodynamics. Over-unity effects assigned also with Tesla are a typical claim. In strong form it would mean non-conservation of energy and academic community concludes that since energy is conserved, these claims are crackpot non-sense. In weaker form the claims would mean transformation of heat to work with efficiency larger than the upper bound predicted by Carnot law.

   Second law however kills hopes about perpetual motion machines based on this kind of over-unity effects. Second law assumes fixed arrow of time. There exists however strong empirical evidence for the possibility that the arrow of time can change - phase conjugate waves are the key example. This led Fantappie [J1] to propose the notion of syntropy as entropy

in reversed time direction. Second law in reverse time direction could also allow an error correction mechanism in quantum computation: Nature itself would do it. Phase conjugate waves are indeed known to perform error correction.

Quantum TGD relies on zero energy ontology (ZEO). ZEO allows both arrows of time and a temporary change of the arrow of time could make possible to break the standard laws of thermodynamics at least temporarily and in short enough scales. ZEO indeed plays a key role in TGD inspired quantum biology and quantum theory of consciousness.

3. Recall that Tesla reported strange findings in electronic circuits subjected to sudden pulses created by putting switches on or off. Could it be that these pulses were accompanied by macroscopic quantum jumps changing the arrow of time and inducing over-unity effects and breaking of second law in the standard sense? I considered this possibility for a couple of decades about (see `http://tinyurl.com/yxt6vfd3`). Could one think of taking this possibility seriously and replicating the studies of Tesla?

In the sequel I will consider the issue of energy conservation in ZEO. Classically energy is well-defined and conserved in TGD Universe. But what about energy conservation in quantum sense? ZEO involves delocalization of states in time and this could allow energy conservation only in some resolution determined by the scale of the increment of time in given state function reduction inducing a shift of the active boundary of CD farther from the passive one.

2 ZEO, over-unity, and error correction in quantum computation

ZEO suggests possible mechanisms for over-unity energy production and quantum error correction in quantum computation.

2.1 Energy is conserved classically in TGD but what about conservation in quantum sense in ZEO?

ZEO guarantees classical conservation laws. What about the situation at quantum level? Could the energy associated with the positive energy part of zero energy state increase in quantum transitions and lead to over-unity effects? In principle, conservation laws do not prevent this quantally.

1. Recall that zero energy states [K1] [L1] are identified as superpositions of pairs (a, b) formed from states a and b having opposite total quantum numbers and being assigned with the opposite boundaries of causal diamond (CD). The states at the passive boundary B of CD are not affected whereas the states at the active boundary A are affected by a sequence of unitary time evolutions also shifting A farther away from B (in statistical sense at least).

   Each unitary evolution induces a de-localization of A in its moduli space and "small" SFR induces its localization (including time localization meaning time measurement). This sequence would approximately conserve the energies of the states in the superposition. This in the approximation that their energies are large in the energy scale $\Delta E = \hbar_{eff}/Deltat$ defined by the time increment Δt in single unitary time evolution. Large value of h_{eff} makes the conservation worse for a given Δt. Unitarity together with the approximate energy conservation implies that the average energy is approximately conserved.

2. Negative energy signals sent from A to its geometric past and received at B in remote metabolism would correspond to "big" SFR. If the notion of remote metabolism giving effectively rise to over-unitary effect is to make sense, the approximate energy conservation should fail in "big" SFRs in quantal sense. For this to be the case, the first unitary evolution of B followed by "small" SFR energy conservation should be a bad approximation. This does not however seem plausible if one assumes energy conservation for the next state function reductions. What could be so special in the first state function reduction?

3. Why the energy conservation made approximate by the finite size of CD and finite duration of unitary evolution, should fail badly in some situations? According to the number theoretic vision [K2], "small" SFRs preserve the extension of rationals defining the adele and therefore also $\hbar_{eff}/\hbar_0 = n$ identifiable as the dimension of the extension. $\hbar_{eff}/\hbar_0 = n$ can however change $n_{old} \to n_{new}$ in "big" SFRs forced to occur when "small" SFRs preserving n_{old} are not anymore possible. If a large increase of h_{eff} occurs in the "big" SFR, the $\Delta E = \hbar_{eff}/Deltat$ increases if Δt is still of the same order of magnitude. The approximate energy conservation could fail badly enough to make possible remote metabolism.

4. In the subsequent SFRs energy conservation should however hold true in good approximation. The values of Δt should be large in the subsequent "small" SFRs, and Δt should scale as $\Delta t \propto n$ to guarantee that ΔE remains the same. As a quantum scale Δt analogous to Compton length is indeed proportional to n. In the first reduction one must have of $n = n_{old}$ but in the subsequent reductions one must have $n = n_{new}$ to guarantee energy conservation in the same approximation as before.

   To sum up: in the first "small" SFR one should have $\Delta E \propto n_{new}$ and $\Delta t \propto n_{new}$. Can one really deduce this from the basic TGD?

5. ZEO suggests that evolution [**?**] means a continual increase of the size of CD so that arbitrarily small CD could eventually grow to even cosmic size (whether this occurs always or whether zero energy state can become pure vacuum at both boundaries of CD remains an open problem). CD with a cosmic size should however have huge energy. This would not only require non-conservation of energy in quantal sense but also its increase in statistical sense at least. Why should the energy increase?

   The increase would relate directly to the basic defining property of ZEO. Preferred time direction means that the transfer of quantum numbers, in positive energy with fixed sign, can take place only from the active boundary of CD to the passive boundary in "big" SFR. This allows interpretation as remote metabolism implying increase of the magnitude of energy.

2.1.1 Criticism

Quite recently (towards end of 2019) I found a more precice formulation for the intuitive notion of remote metabolism, which strongly suggests that energy is conserved in ZEO. There is a decomposition to system and the energy energy source: call them A and B. Intuitively, A receives energy from B by sending negative energy to B. What does this really mean?

1. A "big" state function reduction reversing arrow of time takes place: this would correspond to sending negative energy signal to past. The energy of A+B in the final time reversed state at new passive boundary of CD would be shared in new manner such that one can say that A has received from B the metabolic energy.

2. Energy would be conserved. I have also considered the interpretation that the total energy of the system associated with CD increases [K1]: since CD itself breaks Poincare invariance, it seems that one cannot exclude this. However, the Poincare invariance is realized at the level of moduli space for the positions of the either boundary of CD, and one can assume energy conservation. Even the wave functions at the boundary of CD can be taken to be in the representations of Lorentz group acting as its isometries. Plane waves correspond to wave functions in the moduli space for the boundary of CD keeping second boundary fixed.

3. To make this more precise one must define metabolic energy more precisely by introducing the hierarchy of Planck constants and the fact that the increase of h_{eff} of sub-system keeping other parameters constant increases it energy. Second law means that A tends to loose energy due to the decrease of h_{eff} for its sub-systems. This is true also for the time-reversed state but in opposite direction of geometric time so that with respect to standard direction of time the energy increases. This would provide extremely general purely thermodynamical mechanism of remote metabolism.

2.2 Could Nature provide an error correction mechanism for quantum computation?

Error correction has turned out to be major problem in the attempts to construct quantum computers. It is believed to be necessary because quantum entanglement is extremely fragile for the standard value of Planck constant. In TGD the situation changes. Large values of h_{eff} increasing the time scale of entanglement are possible and reversed time evolutions in quantum sense imply second law in reversed time direction meaning spontaneous reduction of entropy in the standard time direction. Nature itself would provide the needed error correction mechanism perhaps applied routinely in living systems (for instance, to correct mutations of DNA and transcription and translation errors).

To sum up, this picture is extremely interesting from the point of view of future technologies. One can even challenge the cherished law of energy conservation at quantum level (classically it remains exact in TGD Universe). Could one consider the possibility that the energy of system could be increased by the evolution by "big" state function reductions increasing the value of h_{eff}? Could one at least temporarily reduce entropy by inducing time evolutions in opposite time direction? TGD strongly suggests that these mechanisms are at work in biology. Maybe energy and iquantum nformation technologists could learn something from living matter?

REFERENCES

Neuroscience and Consciousness

[J1] Fantappie L. *Teoria Unitaria del Mondo Fisico e Biologico*. Di Renzo Editore, Roma, 1942.

Books related to TGD

[K1] Pitkänen M. Construction of Quantum Theory: More about Matrices. In *Towards M-Matrix*. Online book. Available at: `http://www.tgdtheory.fi/tgdhtml/tgdquantum.html#UandM`, 2012.

[K2] Pitkänen M. Philosophy of Adelic Physics. In *TGD as a Generalized Number Theory*. Online book. Available at: `http://www.tgdtheory.fi/tgdhtml/tgdnumber.html#adelephysics`, 2017.

Articles about TGD

[L1] Pitkänen M. Re-examination of the basic notions of TGD inspired theory of consciousness. Available at: `http://tgdtheory.fi/public_html/articles/conscrit.pdf`, 2017.