Two Attempts to Understand PK

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Abstract

The question how intentional action is concretely realized is not only a key question in quantum consciousness theory but also in attempts to understand psychokinesis (PK). In TGD framework the mechanisms of intentional action and PK are basically the same, and the article can be seen also as a proposal for how intentional action might be realized in TGD Universe. There are experimental results - such as the experiments of Libet - suggesting that intentional action involves a signal propagating to geometric past where it initiates the desired action. PK experiments with random bit sequences suggest a model based on state function reduction, and the possibility to affect intentionally the probabilities of the outcomes of the microscopic quantum transition with two final states representing the values of bits. The standard view is that the intentional action interferes directly with the microscopic quantum transition. "Too-good-to-be-true" option is that intentional action is able to produce a quantum superposition of bits represented as magnetized regions. In this case a direct experimental proof of PK by comparing the data file subject to intentional action with its copy - and thus involving no statistical procedures - is possible. A detailed mechanism allowing the observer (either operator or experimenter) to affect by intentional action the number of 1s or 0s in a series of bits stored in a data file as magnetized regions is discussed.

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1 Introduction

In quantum theory context one can try to explain retro PK (psychokinesis) and perhaps even PK using quantum measurement theory. It seems however that quantum theory is not enough and feedback loop to past allowing to observer to affect the quantum system generating random number. In TGD framework intentional action based on negative energy signal to geometric past would be a rough manner to state what this feedback to geometric past is. For instance, intentional generation of motor action would involve a negative energy signal - say in EEG frequency range - from the "personal" magnetic body to the brain of geometric past, where it would initiate neural activity leading to motor action.

My attempt to concretize this picture in TGD framework - inspired by an unpublished article by Brian Millar relying on the observational theory of PK first proposed by Walker [1, 2] (for an earlier article discussing his vision see [3]) - led to following two options restricting the consideration on PK in which operator tries to increase or decrease the number of 1:s or 0:s in a random sequence of bits generated by transitions of microscopic quantum system to two alternative final states labelled by bit.

1. For the first option observer (operator of experimenter) performs state function reduction for the quantum superpositions of two states resulting in quantal microscopic process and entangled with bits in data file: one can say that before the reading of the file it contains qubits. This requires further entanglement with observer's quantum states.

   Standard quantum measurement theory alone does not suggest any PK effect since the entanglement with observer does not affect the probabilities of the outcomes of microscopic quantum process. To achieve a non-trivial effect the measurement interaction generating entanglement with the observer must be able to modify the probabilities of the outcomes. This interaction could be called feedback loop in time. This picture seems to me more or less equivalent with that of Brian Millar.

2. "Too-good-to be-true" option would be that the observer's intent transferred backwards in geometric time (feedback loop using the terminology of Brian Mil-

lar) can affect directly also the bits in data file so that they become superpositions of the originally quantum measured (read) bit, and then perform the quantum measurement as above. In this case PK effect could be observed directly by comparing the file subject to PK with its unaffected copy. The size of the effect would be characterized by the induced mixing. Of course, this kind of idea would have looked completely crazy for few years ago and perhaps even now.

The fact however is that quantum entanglement and quantum superposition have been now demonstrated for increasingly larger systems. Of course, the observer-bit interaction might be be extremely weak due to the large energy needed to change the direction of bit classically.

I am a dilettante as a parapsychologist and in order to compare the two options in more detail I have used as background the article "Correlations of Random Binary Sequences with Pre-Stated Operator Intention: A Review of a 12-Year Program" [6] tells about experiments of Jahn and others in which operator tried to affect the RNG output by intentional action: single cycle consisting of an attempt to increase the number of 1s, an attempt to decrease it, and no intention to either direction. Retro PK experiments have been also done: see the articles PK Effect on Pre-Recorded Targets [4] an Addition effect for PK on pre-recorded targets [5] of Schmidt. In these experiments the background philosophy seems to be conform with the first option. There is also a report [7] about an experiment in which chicken was labelled to a robot preprogrammed for months ago to wander randomly around the room: the path of robot was claimed to change so that it stayed near the chicken. Also Libet's experiments [9] support the propagation of intent backwards in geometric time in time scale of about .1 seconds.

In the sequel I will consider the quantum measurement theory option and the "too-good-to-be-true" option in more detail. I will also discuss a possible mechanism for intentional action changing the direction of bit represented as a magnetized region.

2 Quantum measurement theory option

PK selects the outcome of a quantal microscopic process such as radioactive decay producing a superposition of two states (mapped to superposition of bits by entanglement - qubit in fact) and later to bit by state function reduction. Data file can be said to contain quantum superpositions of bits corresponding to the two outcomes of quantum process and observer (experimenter or operator in PK experiment) entangled with these state pairs in PK experiment and observes/state function reduces the state with click telling whether the outcome was desired. This stage should bring in the effect of intention and change the probabilities for the outcomes. Standard quantum measurement theory does not allow this: experimenter acts as a passive selector of the outcome. Therefore some kind of feedback interaction propagating to geometric past and affecting the probabilities of outcomes in quantum superposition is needed.

If the data are read before experiment state function reduction takes place qubits become bits. One can also copy the file to a second one and check that the two files are identical. In this case standard measurement theory tells that the effect of

observer cannot change the situation and null effect is obtained. This can be of course tested experimentally. Maybe this have been done.

If this option explains the experiment with chicken and robot, the reading of the random number sequence determining the path of the robot before the experiment implies that the labeling of the chicken to robot would have no effect on robot. The interpretation of Libet's findings about neural activity beginning before conscious decision could be that quantum superposition of neural states corresponding to "I do it" and "I don't do it" is generated a fraction of second before the conscious decision which selects either of these options. Does the intentional action propagating to geometric past generate this superposition? Conscious decision "I shall do this or that" would followed by the choice between "this" and "that".

3 "Too-good-to-be-true" option

Suppose that the data file is copied and second copy is read by human observer to guarantee state function reduction (according to the standard quantum measurement theory: in TGD framework state function reduction does not require human observer).

In this case the feedback loop of the observer (operator or experimenter) realized as negative energy signals to geometric past must be able to modify the states of the binary digits directly and induce a superposition of binary digits presumably containing a very small contribution of opposite binary digit for a given original digit. After this state function could take place just as in the experiment above. Now the test would be direct: compare the data file with its copy not subject to the action of observer. Statistical procedures would not be necessary and direct demonstration of PK would become possible.

In chicken and robot experiment the chicken could affect the path or robot even if it the file or its copy have been read by human observer. In Libet's experiment decision "I do it" would first generate quantum superposition of options "I do it" and "I don't do it" ("Should I do it?") and select "I do it".

I do not know whether this option even deserves to be killed. Certainly this should be very easy.

4 How the intention to increase/decrease the number of 1:s or 0:s could be realized?

Can one imagine in TGD framework any mechanism allowing to increase the number of 1:s or 0:s? The basic vision is following.

1. One can consider magnetic fields or their wormhole counterparts accompanying necessarily elementary particles. Ordinary magnetic fields would correspond to single sheeted magnetic flux tubes carrying conserved magnetic flux. Wormhole magnetic fields consist of a pair of flux tubes carrying opposite monopole fluxes at different space-time sheetes and have wormhole contacts at their ends transferring the monopole flux between the sheets. Flux tubes or pairs wormhole magnetic

flux tubes play a key role in TGD inspired quantum biology and proposed also to be a basic space-time correlate of intentional action. In the recent case flux tubes would connect the observer (operator or experimenter) to the device storing the bits. For wormhole flux tubes the flux tubes at the two sheets could have M^4 projections, which do not overlap at all so that bits could interact with either flux tube but not with both simultaneously.

2. If bits are realized as magnetized regions, the magnetic interaction between bits and the magnetic field carried by flux tube (or either of the opposite fluxes associated with the wormhole magnetic field) is a natural candidate for the interaction defining quantization axis of spin, and also for the interaction inducing a small mixing of the bits by Larmor precession induced by a small perturbation of the flux tube magnetic field. This perturbation could be the TGD counterpart of Alfwen wave inducing geometrical oscillation of the flux tube and therefore the direction of the magnetic field. State function reduction after the perturbation has ceases would produce either value of the bit. The strength and duration of perturbation determines how large the probability of bit reversal is.

If one assumes that magnetic interaction is in question, the most natural choice for the representation of bit is as magnetized region of data tape with direction of magnetization determining the value of the bit. This restriction can be criticized but will be made in the following.

1. The energy needed to turn the bit must be above thermal energy but the minimization of energy costs requires that this energy is not much above it and is therefore larger than 5×10^{-2} eV which by the way is also the order of magnitude for the energy gained by elementary charge in the electric field of cell membrane. This energy is considerably smaller than metabolic energy quantum with nominal value of .5 eV. Therefore metabolic energy of observer could provide the energy needed to turn the bit. Note that p-adic length scale hypothesis strongly suggests a hierarchy of metabolic energy quanta coming as octaves.

2. Classically the effect of the small perturbation of the external magnetic field on spin is Larmor precession [10] due to the torque $\tau = -\mu \times B$. A simple model is obtained by assuming that the magnetic moments in magnetized region is simply the sum of elementary magnetic moments of (say) electrons, which in magnetized state are parallel: $\mu = N_e \mu_e$, where N_e is the number of electrons in the magnetized region defining the bit. The mutual interaction of spins forces them to have same direction so that they are not free.

   Classical torque is time derivative of angular momentum and one has total angular momentum $J = (Nm/ge)\mu_e$, where g is so called g-factor not too far from unity. This gives $dm\mu_e/dt = \mu_e \times B$, $mu_e = (ge/m)s$, where s is the spin of the electron. The situation reduces to single electron level and the oscillation of the magnetized regions takes place with the Larmor frequency $\omega = egB/2m$ of electron.

   This model is of course highly oversimplified but gives a good idea about what happens. The Larmor frequency of electron is given by $\omega = egB/2m$ and in the "endogenous" magnetic field of .2 Gauss proposed to explain [12] the effects of

ELF em fields on vertebrate brain [8] (2/5 of the nominal value of the Earth's magnetic field) is $f = 6 \times 10^5$ Hz. One expects that the flux tube magnetic fields and their perturbations are considerably weaker so that the perturbation gives rise to a rather slow change in the direction of the magnetic moment classically.

At quantum level the evolution of the magnetic moment reduces to a unitary evolution of electron's spin by standard Hamiltonian defined by magnetic interaction energy $E = -\mu \cdot B$ and if perturbation acts only a finite time the final state contains a small contribution from opposite value of spin.

3. If all magnetized regions representing bits interact simultaneously with flux tube, the net effect to the spin/ bit average is zero since the probabilities for the inversion of magnetic moment are same for the values of bit. Therefore it is not possible to realize the intention to increase or reduce the total number of 1s/0s in this manner.

4. Wormhole magnetic fields provide a possible solution to the problem. If the M^4 projections of the two flux tubes involved do not overlap energy minimization favors the attachment of the magnetized region with the flux tube for which the energy $E = -\mu \cdot B$ is smaller - that is negative. Since the fields of flux tubes are in roughly opposite directions, bits 1 and 0 tend to condense at different flux tubes. Hence a small short lasting perturbation associated with either flux tube can only reduce the number of 1s or 0s but not both and it would be possible to realize the intention "reduce the total number of 1:s or 0:s" equivalent with the intention "increase the total number 0:s or 1:s". This if the observer's intention boils down to a selection of the wormhole flux tube carrying the perturbation so that wormhole flux tubes would represent bits at the fundamental level.

The consideration of the energetics for the flip of the magnetization direction brings in naturally the hierarchy of effective Planck constants $\hbar_{eff} = n\hbar$ implied by the vacuum degeneracy of Kähler action [13] [15].

1. For ferromagnets the Weiss mean field theory predicts that in absence of external magnetic field both magnetization directions have same energy. External magnetic field splits the degeneracy. One could say that the if one regards the magnetized region as big spin, both spin directions have same energy and external field - now emerging from the observer as flux tubes - removes the degeneracy and defines direction for the quantization of spin. The mean field theory of Weiss [11] based on the expression of free energy as function of magnetization as $F = aM^2 + bM^4 - HM$ is minized and gives M as function of $H = B/\mu$ representing the external magnetic field. For $H = 0$ one obtains remanent magnetization and clearly both signs of remanent magnetization correspond to the same free energy. This theory is of course thermodynamical theory and it is not clear whether it applies to the recent situation (zero energy ontology quantum theory at least formally a "square root" of thermodynamics).

2. The energy needed to turn the spin of single free electron (for ferromagnet electrons have strong exchange interaction and are not free) must be above thermal energy but the minimization of energy costs requires that this energy is not much

above it and is therefore larger than 5×10^{-2} eV, which by the way is also the order of magnitude for the energy gained by elementary charge in the electric field of cell membrane. For electron Curie temperature is 843 K, which corresponds to thermal energy $E \sim 6 \times 10^{-2} eV$. This energy is considerably smaller than metabolic energy quantum with nominal value of .5 eV. Therefore metabolic energy of observer could provide the energy needed to turn the spin direction of single electron (note that there is a strong exchange interaction with other electrons). p-Adic length scale hypothesis allows to consider a hierarchy of metabolic energy quanta coming as octaves.

3. Suppose that magnetized region behaves like single big spin so that the magnetic field of flux tube manages to change the directions of all spins simultaenously so that the contribution of exchange interactions is not affected and the change in the energy of the system in external field is due the change of single electron energies only. The large value for the number N_e of electrons gives for the total energy needed to turn the bit $E_{tot} = N_e geB/m$. For micrometer sized region N_e is of order $N_e = 10^{12}$ for one conduction electron per atom. The magnetic field associated with the flux tube is expected to be much weaker than the remanent magnetization of order 1 Tesla. For $B = 1$ nT one would have $E_{tot} = .3$ eV, which is of the order of metabolic energy quantum. The electronic cyclotron frequency is in this field 30 Hz and in EEG range.

4. Magnetic flux tubes are identified as carriers of dark matter and dark photons. This suggests that dark photons representing metabolic energy quanta are involved with the effective value of Planck constant $\hbar_{eff} = N_e \hbar$ (for TGD based view about dark matter see [13] and [15]), and that the transition can be regarded as an absorption of single dark photon turning the entire magnetized region. In terms of singular covering of the imbedding space, dark photon can be regarded as a pile of sheets of covering of space-time sheet each containing single ordinary photon. These photon space-time sheets should be somehow attached to the electrons of the magnetized region.

5. The attempt to imagine how multisheeted photon/magnetic flux tube interacts with the conduction electrons responsible for ferromagnetism, forces to ask whether also they are dark with the same value of effective Planck constant and reside at various sheets of the singular covering having the size of the magnetized region. Only the first sheet associated with the double sheeted structure describing electron would multifurcate and second sheet would carry external magnetic field, and perhaps also the TGD counter part of the Weiss mean field interpreted as effective description of quantum mechanical exchange forces and having order of magnitude of 100 Tesla. Weiss mean field could allow an identification as return flux of the magnetic field generated by the multi-sheeted electron state. If so, the multifurcations of space-time sheets predicted by the vacuum degeneracy of Kähler action and predicting hierarcy of effective Planck constants comings multiples of $\hbar$, would play a crucial role in the condensed matter physics. Also the TGD inspired model of fractional quantum Hall effect [14]) encourages to consider this possibility seriously.

The signature for the many-electron states associated with multi-sheeted covering is a sharp peak in the density of states due to the presence of new degress of freedom. In ferromagnets this kind of sharp peak is indeed observed at Fermi energy [11]. Sheets of multi-sheeted covering could also carry Cooper pairs and this could give rise to effective Bose-Einstein statistics of Cooper pairs. In TGD photons emerge from fermions as wormhole contacts with throats carrying fermion and antifermion. This raises the question about realizability of Bose-Einstein statistics in Bose-Eintein condensation. If Bose-Einstein condensate corresponds to multi-furcation of space-time sheet, one obtains Bose-Einstein statistics effectively.

As such this model says nothing specific about the temporal direction of the intentional action although it is clear that the situation is four-dimensional in accordance with basic assumptions of TGD inspired theory of consciousness and with zero energy ontology. Most naturally, the negative energy signal to the geometric past could induce a magnetic perturbation propagating along either flux tube.

5 Summary

Both models are consistent with the general vision discussed by Brian Millar and thus leave open the question whether it is experimenter or operator, who is responsible the PK effect. Experimenters are not completely objective robots, and successful experimenters could have a dream about demonstrating PK convincingly whereas the operators are chosen in "Big Pot" approach randomly. Skeptic experimenters trying to replicate the experiment would tend to produce null result. Experimenters could prove PK by producing it themselves (not my original suggestion)! Taking this seriously, one faces the question whether similar situation could prevail also in other experiments than those of parapsychology.

References

[1] E. H. Walker, Application of the quantum theory of consciousness to the problem of psi phenomena, 1973. In Roll, W.G, Morris, R. L., Morris, J. D. (Eds), Research in Parapsychology, 1972, pp. 51-53. Metuchen, NJ. : Scarcecrow Press.

[2] E. H. Walker, Foundations of paraphysical and parapsychological phenomena, 1975. In Oteri, L. (Ed.), Quantum Physics and Parapsychology pp. 1-44. New York: Parapsychology Foundation.

[3] Brian Millar, The observational theories: A primer. European Journal of Parapsychology, 1978.

[4] H. Schmidt, PK Effect on Pre-Recorded Targets. The Journal for the American Society for Psychical Research, vol 70, 1976. `http://www.fourmilab.ch/rpkp/retro.html`.

[5] H. Schmidt, Addition effect for PK on pre-recorded targets. Journal of Paraspcychology, vol 49 , 1985. `http://www.fourmilab.ch/rpkp/addition.html`, 1985.

[6] R.G. Jahn et al, Correlations of Random Binary Sequences with Pre-Stated Operator Intention: A Review of a 12-Year Program. http://www.princeton.edu/~pear/pdfs/1997-correlations-random-binary-sequences-12-year-review.pdf, 1997.

[7] J. Bryant, Sheldrake on Presentiment & Psychokinesis. http://www.thebirdman.org/Index/Fight/Fight-SheldrakeOnPresentiment&Psychokinesis.html, 1999.

[8] C. F. Blackman. *Effect of Electrical and Magnetic Fields on the Nervous System*, pages 331–355. Plenum, New York, 1994.

[9] B. Libet. Readiness potentials preceding unrestricted spontaneous and preplanned voluntary acts. http://cornea.berkeley.edu/pubs/ccog_2002_0580-Klein-Commentary.pdf, 1982.

[10] Larmor precession http://en.wikipedia.org/wiki/Larmor_precession.

[11] Ferromagnetism. http://www.tcd.ie/Physics/Magnetism/Lectures/5006/5006-5.pdf, 2007.

[12] M. Pitkänen. Quantum Model for Nerve Pulse. In *TGD and EEG*. Onlinebook. http://tgdtheory.com/public_html//tgdeeg/tgdeeg/tgdeeg.html#pulse, 2006.

[13] M. Pitkänen.

Does TGD Predict a Spectrum of Planck Constants?. In *Towards M-matrix*. Onlinebook. http://tgdtheory.com/public_html/tgdquant/tgdquant.html#Planck, 2006.

[14] M. Pitkänen. Quantum Hall Effect and the Hierarchy of Planck Constants. In *p-Adic Length Scale Hypothesis and Dark Matter Hierarchy*. Onlinebook. http://tgdtheory.com/public_html/paddark/paddark.html#anyontgd, 2006.

[15] M. Pitkänen. Updated View about the Hierarchy of Planck Constants. Prespacetime Journal, vol 3, issue 11, 2012. http://prespacetime.com/index.php/pst/issue/view/34.