

TGD Inspired View About Remote Mental Interactions and Paranormal

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Contents

1	Introduction	4
2	Brief Summary Of The Basic Vision Around 2003 Compared With The Recent Situation	4
2.1	TGD Inspired Theory Of Consciousness	5
2.2	TGD Inspired Quantum Biology	7
3	Basic Questions And Basic Ideas	9
3.1	Basic Questions	10
3.2	Key Ideas Of The TGD Inspired Model Of Remote Mental Interactions	11
3.3	Some Examples Of Remote Mental Interactions Interpreted In TGD Framework	13
4	Parapsychological Phenomena	14
4.1	Extrasensory Perception, Precognition, And Other Parapsychic Effects	14
4.2	Psychokinesis	15
4.2.1	A possible model for psychokinesis with non-machine targets	15
4.2.2	TGD based general view about PK	16
4.2.3	Machine-mind interactions	17
4.2.4	Could Shnoll effect and statistical effects of psychokinesis have common mathematical description?	19
4.2.5	Telekinesis and electrostatics	19
4.3	Healing As Rejuvenation?	21
4.3.1	Negentropic entanglement as Qi?	22
4.3.2	Healing as regeneration of negentropic resources?	22
4.3.3	How topological light rays and magnetic flux tubes relate to healing?	23
4.4	Near Death Experiences	23

5	Conscious Hologram And Remote Mental Interactions	28
5.1	Big Vision	28
5.2	Sketch For What Could Happen In A Typical Remote Viewing Experiment	30
5.3	About The Physiological Correlates Of Anomalous Cognition	31
5.4	Local Sidereal Time, Geomagnetic Fluctuations, And Remote Mental Interactions	31
5.4.1	Support for the role of magnetospheric consciousness	32
5.4.2	Is there an ELF signal from the special direction masked usually by the geo-magnetic noise?	32
5.4.3	What is the origin of the interstellar magnetic field?	33
5.4.4	Connections with other effects?	34
5.5	Could Magnetic Flux Tubes Make Possible Effective Holograms?	35
5.6	Two Attempts To Understand PK	36
5.6.1	Quantum measurement theory option	37
5.6.2	“Too-good-to-be-true” option	38
5.6.3	How the intention to increase/decrease the number of 1: s or 0: s could be realized?	38
5.6.4	Summary	41
6	TGD Inspired Model For OBEs	41
6.1	OBEs, Autoscopy, Heautoscopy, And Other Strange Experiences	41
6.1.1	Phenomenological characterization	41
6.1.2	OBEs induced by electric stimulation	41
6.1.3	Explanations of OBEs and related experiences	42
6.2	Questions	42
6.2.1	Where the information processing giving meaning to what is seen is carried out?	42
6.2.2	Are OBEs “only” hallucinations?	43
6.2.3	Does OBE originate from an actual sensory stimulus?	43
6.2.4	Why does electrical stimulation induce OBEs?	43
6.3	Dark Matter Hierarchy, Zero Energy Ontology, Negentropic Entanglement, OBEs .	44
6.3.1	Basic ingredients of the TGD inspired model	44
6.3.2	Dark matter hierarchy	45
6.3.3	Zero energy ontology and causal diamonds	45
6.3.4	Negentropic entanglement	46
6.3.5	OBEs in more general framework	47
6.4	A More Detailed Model For OBEs	47
6.4.1	Do bio-photons result from the de-coherence of dark photon beams?	47
6.4.2	What is the mechanism of out-of-body hearing?	48
6.4.3	Where are the sensory receptors giving rise to the primary sensory experience? .	48
6.4.4	What is the mechanism causing the kinesthetic sensations during OBEs? . .	48
6.4.5	What is the mechanism making possible to see internal organs?	49
6.5	The Role Of The Magnetic Body In The Case Of Other Brain Functions	50
6.5.1	Dreams and hallucinations and magnetic body	50
6.5.2	The relationship of EMDR experiences to OBEs	50
6.5.3	Third person aspect of conscious experience	50
6.5.4	Feedback to primary sensory organs via reflection from magnetic body . . .	50
6.5.5	Does imagination involve feedback via magnetic body?	51
6.5.6	Sensory memories and magnetic body	51
6.6	Psychedelics Induced Experiences And Magnetic Body	51
6.6.1	Some background about psychedelics	52
6.6.2	Could instantaneous communications in cosmic scales be possible in TGD Universe?	54
6.6.3	Why information molecules containing aromatic rings should be so important? .	55
6.6.4	Psychedelic-receptor complex as plug-in to cosmic internet and a new perspective on remote seeing?	55
6.6.5	Still about the mystery of DMT	57

7	Connection To The Work Of Researchers In Forefront	59
7.1	Simon Shnoll	59
7.2	Michael Persinger	61
7.3	William Tiller	61
	7.3.1 Experimental arrangement	61
	7.3.2 Direct effects of the intentional action	62
	7.3.3 “Conditioning” of the laboratory	62
	7.3.4 TGD based model for intentional imprinting	63
7.4	About the double-slit experiment of Dean Radin	63
	7.4.1 Experiment	63
	7.4.2 Arguments of skeptic	64
	7.4.3 TGD based model	64

Abstract

I have proposed a general vision about what remote mental interactions and related phenomena could be in TGD Universe around 2003. A lot of progress that has taken place since then, and this motivates the reconsideration of this vision. The general vision is that both biology, consciousness, and remote mental interactions and related phenomena labelled as paranormal are predicted to share the same basic mechanisms, and that the proposed vision provides basic concepts and the language allowing to speculate and build simple models. One cannot of course take the proposed models too seriously at the level of details.

The new ideas that have emerged since 2003 are summarized and parapsychological phenomena are discussed at general level. Also some applications of the basic vision are discussed. The notion of conscious hologram is discussed from the point of view of remote mental interactions. The notion of magnetic body is in decisive role as it is also in the understanding of quantum biology in TGD framework. TGD inspired model for OBEs relying on the notion of magnetic body is summarized. The idea is that OBEs could correspond to sensory experiences assignable to magnetic body rather than real body. Also the connections with the work of other researchers, such as Shnoll, Persinger, and Tiller are discussed briefly. The challenge of testing the vision is also considered.

1 Introduction

The latest TGD inspired articles related to quantum biology, quantum mind, and remote mental interactions were published in JNLRMI around 2003. Several new ideas related to basic TGD, TGD inspired quantum biology and theory of consciousness have emerged during the subsequent 8 years. The article *Evolution of TGD* [L9] provides a short summary about the development of idea. The general vision is that both biology, consciousness, and remote mental interactions and related phenomena labelled as paranormal are predicted to share the same basic mechanisms, and that the proposed vision provides basic concepts and the language allowing to speculate and build simple models. One cannot of course take the proposed models too seriously at the level of details.

My original intention was to write just single article trying to give a summary about the progress of quantum TGD first and after that I will discuss the implications for quantum TGD based view about biology, consciousness and remote mental interactions and related mysteries. It however turned out that book would provide a more concise a more appropriate way to represent the overall view. One cannot of course take the proposed models too seriously at the level of details.

This is the first part of an article devoted to remote mental interactions. In the first part of the article I will summarize the new ideas that have emerged since 2003, the basic problems and basic ideas, and what parapsychological phenomena are at general level. There is also a more detailed representation at my homepage [K42] as a chapter of a book.

In the second part of the article I will discuss some applications of the basic vision. The notion of conscious hologram is discussed from the point of view of remote mental interactions. The notion of magnetic body is in decisive role as it is also in the understanding of quantum biology in TGD framework.

TGD inspired model for OBEs relying on the notion of magnetic body is summarized. The idea is that OBEs could correspond to sensory experiences assignable to magnetic body rather than real body. Also the connections with the work of other researchers, such as Shnoll, Persinger, and Tiller are discussed briefly. The challenge of testing the vision is also considered.

The appendix of the book gives a summary about basic concepts of TGD with illustrations. Pdf representation of same files serving as a kind of glossary can be found at <http://tgdtheory.fi/tgdglossary.pdf> [L11].

2 Brief Summary Of The Basic Vision Around 2003 Compared With The Recent Situation

To get perspective it is perhaps good to briefly summarize the basic vision about TGD inspired model for biology and consciousness as it was around 2003 according to the articles published in JNLRMI (see <http://tinyurl.com/me77ur>). The recent view about TGD inspired theory of consciousness is described in the chapter *Matter, Mind, Quantum* of the book "TGD Inspired

Theory of Consciousness” [K21]. The general vision was that both biology, consciousness, and remote mental interactions and related phenomena labelled as paranormal are predicted to share the same basic mechanisms, and that the proposed vision provides basic concepts and the language allowing to speculate and build simple models. One cannot of course take the proposed models too seriously at the level of details.

Several new ideas and concepts have emerged since 2003.

The most important ones are following.

1. ZEO giving justification for notions like negative energy photons propagating to the geometric past and the notion of causal diamond (CD) providing embedding space correlate for the notion of self and predicting a hierarchy of fundamental time scales and predicting a connection between biology and elementary particle physics.
2. Hierarchy of Planck constants (see <http://tinyurl.com/y7c8e6x8>) [K13] giving rise to phases behaving as dark matter and suggesting the identification of living matter as ordinary matter controlled by dark matter in this sense.
3. The identification of ATP as a correlate of negentropic entanglement (see <http://tinyurl.com/yd7j9f5j>) and information theoretic interpretation of metabolism [K18].

2.1 TGD Inspired Theory Of Consciousness

The article *TGD inspired theory of consciousness and biosystems as macroscopic quantum system* (see <http://tinyurl.com/yaxe23ce>) [L4] describes the basic assumptions and ideas TGD inspired theory of consciousness and of quantum biology. The basic vision is essentially now although some simplification has taken place and the picture has become more detailed.

1. TGD inspired theory of consciousness can be regarded as an extension of quantum measurement theory by raising the observer from a status of something external to the Universe able to only induce state function reductions (in von Neumann’s view) to something described by quantum physics. The crucial almost paradox like problem is the conflict between the determinism of Schrödinger equation and non-determinism of state function reduction. Similar closely related problems relate to the relationship between experienced time and the geometric time of physicist. Whatever the theory of consciousness is, it must solve these problems.
2. Quantum jump as a moment consciousness, self as sequence of quantum jumps somehow integrating to a flow of consciousness, self hierarchy, and the identification of sub-selves as mental images of self, represent the basic identifications. It seems possible to reduce self hierarchy to a hierarchy of quantum jumps: higher levels of self hierarchy would be analogous to bound states of elementary particles and self hierarchy would relate closely to the corresponding hierarchy at the level of physics.
3. Quantum classical correspondence requires space-time correlates for selves. Space-time sheets are natural correlates of selves at space-time level. At embedding space level so called causal diamonds (CDs) introduced after 2003 in the context of zero energy ontology define this correlates. At the level of “world of classical worlds” (WCW) the correlate is sub- WCW assignable to the CD.

The notion of many-sheeted space-time forces to modify the notion of sub-system. Flux tubes connecting space-time sheets are natural correlates for entanglement. It is possible for space-time sheets without flux tube connections to contain topologically condensed space-time sheets which are connected by flux tubes although space-time sheets. This would correspond to a situation in which two selves are un-entangled but possess sub-selves which are entangled. The notion of finite length scale resolution is essential for this definition to make sense. This leads to the idea about sharing of mental images by quantum entanglement producing what might be called stereo consciousness.

4. The possibility of quantum jumps and state function reductions occurring in quantum parallel manner is also something new and also relates to the many-sheeted space-time: see the article

Biosystems as macroscopic quantum systems (see <http://tinyurl.com/y7m9g4n6>) [L1]. The quantum jumps taking place at the scales of sub-selves and their sub-selves could give rise to the experience of a flow of subjective time. One must be however very cautious with this concept: it is not possible to be conscious about not being conscious so that continuous flow of subjective time might be an illusion perhaps created by the model of self as a continuous narrative. At the fundamental level there might not be continuous narrative. Already dreams represent states of consciousness in which this narrative is only piecewise continuous.

5. The identification of quantum jump as relating entire deterministic *quantum histories* as analogs of solutions of Schrödinger equation solves the problems related to the conflict of non-determinism of state function reduction and determinism of Schrödinger equation and classical field equations which in TGD framework define an exact part of quantum theory. Quantum measurement theory involves also the notion of classical variables. These can be identified as zero modes which by definition do not contribute to the metric of WCW and are therefore not quantum fluctuating variables. The entanglement between zero modes and quantum fluctuating degrees of freedom must be fundamental element of state function reduction and also sensory perception and conscious choice.
6. p-Adic physics as physics of cognition [K25] is a central element of this picture and forces a generalization of number concept. Reals and p-adic numbers characterized by prime $p = 2, 3, 5, \dots$ are completions of rationals and one can glue reals and p-adic numbers and their extensions along rationals and common algebraics to form a book like structure. The notion of adèle (see <http://tinyurl.com/yc6zy7sf>) - well-known to mathematicians - seems to catch quite well this vision [K26].
7. *Negentropy Maximization Principle* (NMP) [K22] defines the basic variational principle of TGD inspired theory of consciousness and states that the gain of conscious information in quantum jump is maximal. There are variants of NMP depending on what one means with quantum theory.
 - (a) For the ordinary definition of entanglement entropy this means that the two systems involved become un-entangled. Interpreting the density matrix as fundamental observable this gives standard quantum measurement theory.
 - (b) The introduction of hyper-finite factors of type II_1 strongly suggested by the fact that WCW spinors correspond to this kind of von Neumann algebras leads to a further modification of measurement theory since state function reduction to a one-dimensional ray of Hilbert space is not possible in general but always happens to an infinite-dimensional sub-space (in the ordinary sense of the word). The state spaces can of course contain factors of type I for which ordinary measurement theory applies.
 - (c) For rational or even algebraic entanglement coefficients the entanglement entropy can be defined using p-adic norm for some p-adic prime p and can be negative and always is for certain primes p . Entanglement would carry genuine information and is expected to be stable under NMP. This leads to the vision about negentropic entanglement as a basic characteristic of living systems.

At space-time level one can also say that the - in general discrete- intersections of real and p-adic partonic 2-surfaces consisting of rational (or more generally, points in some extension of rationals) defined cognitive representations in the intersection of cognition and matter. This discretization would directly correspond to the fact that all cognitive representations have finite resolution and are necessarily discrete: computation represents a basic example of this. At more abstract level the partonic 2-surfaces represented by algebraic equations making sense both in real and p-adic sense can be said to belong to the intersection of matter and cognition and represent living systems. Quite surprisingly, the art of algebraic geometry which typically involves counting the numbers of rational points of algebraic surfaces would directly relate to fundamental biology!

The basic implication of this vision is the necessity to re-consider the existing views about the relationship between subject and geometric time. I summarized the ideas about time as they

were around 2003 in the article *Time, space-time, and consciousness* (see <http://tinyurl.com/yavkn2q7>) [L5]. There were several poorly understood issues and some of these issues are still far from well understood.

1. What is the precise relationship between geometric time and experienced time? How the experience about continuous flow of time emerges? (Is it an illusion: one cannot be conscious about being not conscious, dark moments of visual perception). What induces the arrow of psychological time inducing the apparent arrow of geometric time? Why the contents of sensory experience are restricted to so narrow a time interval whereas the contents of memory come from much larger space-time region. Note that the interpretation of the correlate of self as 4-D space-time regions provides a new vision about memory.
2. In the article *TGD inspired theory of consciousness* (see <http://tinyurl.com/y9bne6cc>) time-like entanglement and signals proceeding in the reversed direction of time was suggested to provide the basic mechanism of memory, intentional action, and (remote) metabolism. Libet's paradoxical findings about strange time delays of consciousness provide the basic support for this vision. The challenge is to give a more precise mathematical content for the notion of negative energy signal propagating backwards in time. Phase conjugate laser wave was proposed as its physical analog. The basic question is to understand how the arrow of geometric time emerges so that one can use these terms.

In TGD framework the notion of many-sheeted space-time challenges the notion of subsystem. One must also give a more precise mathematical content to the notions of U-process, state function reduction, and state preparation.

1. Quantum jump should consist of unitary process characterized by a unitary matrix U followed by a state function reduction in turn followed by state preparation. State function reduction should be a cascade like process proceeding from top to bottom as a splitting of systems to pairs of unentangled subsystems until negentropic or bound state character of entanglement does not allow splitting anymore [K22]. The identification of the unitary process U and U -matrix remained however open questions at that time. ZEO leads to a rather detailed minimal vision about what happens in quantum jump [K5].
2. What happens in quantum measurement? Non-quantum fluctuating zero modes of "world of classical worlds" (WCW) correspond to classical degrees of freedom in TGD and are excellent candidates for classical variables of quantum measurement - such as direction of the point of some "meter". With these zero modes quantum fluctuating degrees of freedom must entangle before state function reduction and measurement must induce state function reduction eliminating entanglement unless it is negentropic. Does state function reduction follow from macroscopic character of zero modes in the sense that there would be analogy with spontaneous magnetization which also selects single direction of magnetization rather than their quantum superposition.

And what is the role of cognition interpreted in terms of p-adic space-time sheets? Is p-adic-real algebraic entanglement carrying negentropy involved? At what level the state function reduction inducing a sequence of state function reductions in the sequence of entangled systems does take place: does the primary reduction take place at the level of cognition?

Their answers to these questions are still more or less guess work.

2.2 TGD Inspired Quantum Biology

Many ideas about basic mechanisms of quantum biology already existed around 2003. Mention only the notion of magnetic body and the hypothesis that living matter resides in the intersection of real and p-adic worlds implying that negentropic entanglement (see **Fig.** <http://tgdtheory.fi/appfigures/cat.jpg> or **Fig. ??** in the appendix of this book) is a fundamental characteristic of living matter.

The assumption that living matter is ordinary matter controlled by dark matter - identified as a hierarchy of macroscopic quantum phases labeled by the value of Planck constant coming as integer multiples of ordinary Planck constant - has allowed to find a more detailed formulation for

these intuitive ideas. The alert reader has perhaps noticed that the hierarchy of Planck constants and negentropic entanglement seem to provide two different ways to realize macroscopic quantum coherence. Are these two realizations independent of each other and if not, how do they relate to each other? This remains an open question to high extent.

1. High T_c super-conductivity was assumed to play a key role in living matter but the precise mechanism of super-conductivity was poorly understood. For the views at that time see the articles *Biosystems as macroscopic quantum systems* (see <http://tinyurl.com/y7m9g4n6>) [L1] and *Quantum model for sensory receptor* (see <http://tinyurl.com/y7opejka>) [L3].

A detailed model for high T_c bio-super-conductivity was however lacking. The hierarchy of Planck constants allows to construct this kind of model [K7, K8] applying also in the case of ordinary condensed matter systems. Rather remarkably, dark electrons at magnetic flux tubes play a key role in this model. Also negentropic entanglement could stabilize Cooper pairs.

Another new element not present at the time of writing of these articles is the new physics model of cell membrane (see <http://tinyurl.com/y7vahkzg>) as almost vacuum extremal of Kähler action [K15] motivated by quantum criticality and the expectation that large values of Planck constant correspond to almost vacuum extremals if one accepts the TGD based explanation for the hierarchy of Planck constants as a result of dynamics rather than something fundamental. It must be emphasized that the existing high precision determinations of Planck constant do not exclude the hierarchy since they do not detect dark matter. This leads to a picture about cell membrane as an analog of computer monitor with lipids representing pixels to which one can attach various qualia. These qualia need not however correspond ours which are assigned to sensory receptors.

2. In the article *Manysheeted DNA* (see <http://tinyurl.com/yczh88ss>) [L2] several ideas related to DNA were discussed.
 - (a) Homeostasis in many-sheeted space-time roughly states that supra currents at super-conducting space-time sheets determine the dynamical equilibria also at the space-time sheets containing ordinary matter. The strange findings about the behavior of cell membrane ionic currents support this hypothesis (they are quantal and flow even in absence of metabolic energy feed suggesting that Josephson currents are in question).
 - (b) Quantum spin glass degeneracy generalizing ordinary 3-D spin glass degeneracy to 4-D one meaning that strict determinism breaks down to piecewise one. Hence not only quantum states but also quantum jump sequences and therefore conscious experiences should have space-time correlates. These correlates would relate to conscious experience like written text to conscious thoughts and would provide a kind of feedback essential for symbolic memory. 4-D spin glass degeneracy provides also a justification for the hierarchy of Planck constants.
 - (c) A further key idea was healing by time reversal. The idea is that the reversal of the arrow of geometric time implies that second law holds in opposite direction of geometric time so that basically entropic process looks like negentropic one. Also the notion of magnetic mirror, topological self-referentiality, the identification of information molecules as quantum links in quantum web, the idea about molecular recognition mechanisms, the connection between metabolism and generation of quantum coherent states, scaling law of homeopathy were further ideas discussed in the article.

The developments since 2003 have enriched this picture with several new ideas.

- (a) ZEO and the notion of CD allow to assign the arrow of geometric time directly to the zero energy states rather than their dynamics. Dark matter as a hierarchy of phases with large value of Planck constant can be identified as controller of ordinary matter in living systems, and negentropic entanglement assumed to have ATP as a correlate allow to a more detailed articulation of these ideas.

- (b) The idea about DNA as topological quantum computer [K2] with braids realized as magnetic flux tubes connecting DNA nucleotides with lipids of cell membrane is another key idea and means that DNA becomes the hardware of quantum computations with software represented by the braidings of flux tubes.
3. The article *Macrotemporal quantum coherence, quantum spin glass degeneracy, and number theoretic information concept* (see <http://tinyurl.com/y7wlrzmo>) [L8] described the vision about living matter as a macroscopic quantum system. The notion of negentropic entanglement and the idea about life as islands of rationality in the oceans of real and p-adic continua was described already in this article.
 4. The article *Biosystems as conscious holograms* (see <http://tinyurl.com/yb79md6j>) [L7] develops the idea about living matter as conscious hologram. One of the key mechanisms was time mirror mechanism (see **Fig.** <http://tgdtheory.fi/appfigures/timemirror.jpg> or **Fig. ??** in the appendix of this book) finding a justification in ZEO. A model of remote mental interactions and an model inspired by the findings of William Tiller was proposed with key role played by the notion of magnetic body able to receive information from and control even in-animate matter. ZEO provides first principle justification for the time mirror mechanism.

The vision was applied to develop a model of bio-photons. The (see <http://tinyurl.com/y7vahkzg>) model of cell membrane (see <http://tinyurl.com/y7vahkzg>) as almost vacuum extremal, which emerged later, led to a radical proposal: bio-photons are nothing but large \hbar EEG photons which have suffered an energy conserving phase transition reducing the value of Planck constant to ordinary one.

5. The article *Quantum model for nerve pulse, EEG, and ZEG* (see <http://tinyurl.com/y842gm3w>) [L6] describes a TGD inspired view about nerve pulse and EEG. I would not speak about ZEG in the title now since the status of Z^0 radiation fields is still uncertain (classical Z^0 fields are however in an essential role in the model of cell membrane and sensory receptor).

Electronic super-conductivity and possibly super-conducting states assignable to biologically important ions are key elements of the model but the model of electronic super-conductivity was not convincing: it was assumed that super-conducting space-time sheets are at very low temperature. The model of electronic super-conductivity was not too convincing at that time and considerable progress has taken place with the advent of the hierarchy of Planck constants [K7, K8].

In case of biologically important ions it had already become clear that “TGD inspired nuclear physics” [K24] allows fermionic nuclei with given charge to have bosonic companions with the same charge and therefore same chemistry. This would make possible to assign Bose-Einstein condensates and super-conductivity even to atoms which are chemically equivalent with fermionic atoms.

EEG and its possible variants were identified as communications and control tools mediating sensory information to the magnetic body and allowing magnetic body to quantum control biological body. This means the presence of a completely new level in biological information processing. Again the hierarchy of Planck constants plays a key role in making possible for ELF photons with extremely small energy to have energies which are above thermal energy and thus have biological effects and carry information [K11, K36].

The aim of this chapter is to describe in some detail the recent view about remote mental interactions. Also connections with the work of other researchers are summarized.

3 Basic Questions And Basic Ideas

The basic ideas of TGD inspired model for remote mental interactions and related phenomena such as OBEs and near death experiences are summarized in the chapters *Quantum model for paranormal phenomena* (see <http://tinyurl.com/y8fc7zn4>) [K34] and *TGD based model for OBEs*

(see <http://tinyurl.com/y797h78x>) [K41] of the book “TGD Inspired Theory of Consciousness”. Also the chapter “Bio-systems as conscious holograms” [K6] (see <http://tinyurl.com/ydx4fuk5>) contains a summary of a model for how conscious hologram might allow to understand remote mental interactions, and TGD based view about the work of Willian Tiller related to intentional imprinting. The chapter contains also a section about bio-photons: there could be a connection with remote mental interactions since bio-photons could result from the transformation of large \hbar dark photons by a phase transition reducing the value of Planck constant, which in turn would be essential for communications between biological body and magnetic body.

I have not worked with this topic during last years, and I apologize for my very restricted views. The most important new ideas relate to the notion of magnetic body, ZEO, negentropic entanglement, and dark matter hierarchy. It would be interesting to deduce explicitly the implications of new ideas that have emerged since 2003 but the following discussion is just a commentary.

3.1 Basic Questions

The general idea is that remote mental interactions are by no means paranormal in the sense that they would be in conflict with well-established laws of physics, as skeptics want to see them. Our personal magnetic bodies apply remote mental interactions to receive communications from biological body and to control it routine. Remote mental interactions having living matter as a target would correspond to a situation in which the personal magnetic body of operator is able to receive information from the biological body of target or control it. Becoming possessed would be one manner to say this. Hypnosis would represent the basic example of this. The target could be also water perhaps containing some organic matter as in Tiller’s experiments. Also psychokinesis acting on inanimate targets such as computers can be considered but in this case the mechanisms of remote mental interaction cannot be quite same as in the case of biological targets.

The basic question is why the remote mental interactions having living target are so rare if they apply same mechanisms as living matter in general. A possible reason is that living matter has developed an immune system preventing the situation in which the organism becomes possessed. This would be very similar to what has taken place in the evolution of computers. The restriction of communication windows to narrow frequency ranges depending on species and even individual, and the counterparts of passwords realized as temporal field patterns could make this kind of immune system possible. Cyclotron frequencies would be central here and hierarchy of Planck constant would allow arbitrary low frequencies with energies below thermal energies at physiological temperature range. The first guess is that passwords using genetic code so that communications restricted to those occurring between the members of the same species become possible. The challenge is to invent plausible physical realizations for the passwords. One possible proposal inspired by the experiments of Gariaev and collaborators would realize the values of bit as two orthogonal photon polarization directions. Another realization would be in terms of a collection of frequencies interacting resonantly with the target DNA and inducing gene expression: no explicit knowledge of address of the target would be needed.

Second basis problem in many remote mental interactions such as the intentional effect on random number generator is “Who knows how?”. How the mere intent can be transformed to action without any knowledge about the details of the action? The attempt to understand how neuro-feedback affect the behavior of single neuron leads to the same question.

1. Magnetic mirrors make possible also feedback and this feedback could make possible learning. For instance, in psychokinesis (especially so in micro PK), this learning would be crucial and analogous to that what occurs when we learn to drive a car. In healing this kind of feedback might help to find the healing frequency by trial and error.
2. It is quite possible that also multi-brained and -bodied higher level collective selves actively participate in the process as a third party such that the remote mental interactions would act as a relay states. I have suggested similar explanation for Sheldrake’s findings about learning at the level of species and Tiller’s findings about the “transfer of intent”. This could make possible coherent amplification effects (TEM, prayer groups) and could make available information resources of all brains involved with the group. This could for instance explain the ability of a remote viewer to see an object on basis of data which need not have any meaning for her.

3. A fast amplitude modulation of alpha waves introducing higher harmonics to the carrier wave is a good candidate for mediating communication between brains and higher level multi-brained selves. Mesoscopic “features” in brain involve precisely this kind of amplitude modulation and might represent just this kind of messages. Interestingly, also speech is produced by a fast amplitude modulation of 10 Hz basic vibration frequency of speech organs (assignable to electron CD as a fundamental frequency) and kHz (quarks) frequency is a special frequency from the point of view of hearing.

Third key question relates to the metabolic aspects of remote mental interactions. One expects that negentropic entanglement between operator and target is involved. The hypothesis about the presence of ATP molecule at the magnetic flux tube connecting operator and target as a prerequisite for negentropic entanglement would reduce the energetics of remote mental interactions to basic metabolism. This allows to make quite strong conclusions about the character of these interactions. Here one must however remember that earlier model assumed much more general mechanism of metabolism involving transfer of particles to larger space-time sheets liberating or using zero point kinetic energy in this manner. It could be part of $ATP \leftrightarrow ADP$ mechanism or completely independent mechanism utilized by the prebiotic metabolism. It could be also involved with the remote mental interactions for which targets are in-animate.

Fourth question relates to mechanisms and here time mirror mechanism involving sending of negative energy photons to geometric past is the natural candidate for both intentional action, remote metabolism, and memory. Also its counterpart involving sending of positive energy signals to future can be considered. It must be emphasized that the reflection need not always occur. The negative energy photon could be just absorbed without any signal generated and this leads to ask what happens in the case of memory.

3.2 Key Ideas Of The TGD Inspired Model Of Remote Mental Interactions

During years a rather concrete TGD inspired model of remote mental interactions has developed.

1. The basic notions of the TGD inspired model are magnetic body as an intentional agent controlling biological body and receiving data from living body or even “dead” matter system with massless extremals (MEs) mediating these communications, zero energy ontology and the related notion of causal diamond (CD) serving as an embedding space correlate of self and assigning to elementary particles fundamental macroscopic time and length scales as those of CD, the hierarchy of Planck constants making possible macroscopic quantum phases and zoom-ups of quantum systems, and the vision about living matter as something residing in the intersection of real and p-adic worlds and the closely related notion of negentropic entanglement crucial for the functioning of living matter and conscious intelligence in TGD Universe. Note that this means that life corresponds to number theoretical quantum criticality in a well-defined sense.
2. Zero energy ontology means a radical departure from standard physics. The creation of zero energy states from vacuum is possible and means that in principle (just in principle!) the claims of parapsychologists about ectoplasm and of yogis about the possibility to create of matter from nothing are consistent with the basic conservation laws of physics. In TGD inspired biology this process could take place routinely. Causal diamond is the embedding space correlate for the zero energy state. Positive and negative energy parts of the state reside at its boundaries. p-Adic length scale hypothesis and number theoretical vision suggest that the proper time distance between the tips of CD comes as powers of two. For electron and quarks playing key role in the model of DNA as topological quantum computer this temporal distance would correspond 1 seconds and 1 millisecond respectively suggesting a direct connection between elementary particle physics and basic bio-rhythms.

The translates and Lorentz transforms of CDs are also CDs and one can assign to CDs a moduli space further expanded by the introduction of the hierarchy of Planck constants. One expects that this moduli space is crucial for understanding of the geometric qualia [K35]. The communications between sub-selves would be natural based on resonance. CDs are

characterized by resonance frequencies which in the rest system of CD come as harmonics of the fundamental frequency determined by the proper time distance. This would allow a universal coding of geometric data using frequencies. Both MEs and CDs could be regarded as being analogous to music instruments and this in fact explains basic facts about music experience. These resonance frequencies should play a key role in biology and also in remote mental interactions- even those in which target consists of “dead” matter since fundamental biorhythms characterize also elementary particles in TGD Universe.

3. p-Adic physics as physics of cognition is an essential element of approach. Intentions are represented as p-adic space-time sheets. In the intersection of real and p-adic worlds these space-time sheets have a mathematical representation making sense also in real context so that one can say that these surfaces are in the intersection of real and p-adic worlds and the phase transitions transforming surfaces belonging to different number fields are possible. This makes possible transformation of intentions to actions and their reversals possible in the intersection of real and p-adic worlds. U -matrix indeed makes indeed sense also for transformation representing the transformation of say p-adic space-time surface to a real one and is coded only by data assignable to the rational and common algebraic points of real and p-adic variants of partonic 2-surface [K22]. Note that zero energy ontology makes possible also the transformation of intentions to actions as p-adic-to-real phase transitions without breaking of the conservation laws.
4. Negentropic entanglement, which can be both space-like and time-like in zero energy ontology, makes possible quantum superposition of macroscopically different configurations of the target system correlated with the states of operator system. The operator should be able to achieve the negentropic entanglement and intentionally increase the amplitude of the desired outcome in this superposition. Negentropic entanglement need not involve binding energy and I have proposed this as a deeper level explanation for the nebulous notion of high energy phosphate bond crucial for metabolism in living matter. Quite generally, negentropic entanglement would make possible for the operator to transfer metabolic energy and momentum to the target. Remote healing involves often positive emotions like compassion and love suggesting that negentropic entanglement accompanies healing process. The hierarchy of values of Planck constant would make possible this process in long time and length scales.
5. Addressing of the target is key problem in remote mental interactions. Here password consisting of a collection of frequencies interacting resonantly with the DNA of living target and inducing remote gene expression dictated by the frequencies is one possibility. Gariaev’s findings that scattering of red laser beam from DNA generates broad band of frequencies, which are biologically active, could be interpreted in this model. The photons would correspond to the same energy but wide range of frequencies corresponding to different values of Planck constant. These frequencies would define the address of the target, eventually some part of DNA inducing gene expression. The interaction would be by the superposition of the electric field of incoming radiation with the electric field of flux tube inducing the analog of Becker’s healing current in turn loading metabolic resources and generating negentropic entanglement and also gene expression.
6. The notion of hologram is often used as a useful metaphor: Gariaev talks about DNA hologram and I have talked about conscious hologram. This notion obviously requires more detailed definition to be testable. What hologram does is that scattering of laser beam from it is effectively scattering from target. Magnetic flux tubes make TGD Universe an Indra’s net: could it be that the scattering from object behaving like bio-hologram could actually take place from the target which it represents! Photons would travel from object to the target along flux tubes, scatter, and arrive along flux tubes and leave the object. The object, which actually acts as a relay station, would define pseudo-hologram. Also frequency coding of the address could be combined with this picture if the lengths of flux tubes are multiples of wavelength (proportional for Planck constant).

3.3 Some Examples Of Remote Mental Interactions Interpreted In TGD Framework

Some examples about remote mental interactions with living target are in order.

1. In telepathy the communications from biological body of target would be based on EEG and its scaled analogs. Also ECG could be involved. In TGD Universe even electromagnetic field might be replaced with electroweak and color field below some scale in scale hierarchy defined by Planck constants.
2. In hypnosis magnetic body of operator would control the biological body of the target, which would be “possessed” and behave like a part of the biological body of operator.
3. It would be also possible to share sensory percepts and memories of the living target. The mechanism would be time mirror mechanism applying also to ordinary memory and sensory perception.

In the case of in-animate targets the modelling is not so straightforward. One could however assume that also now negentropic entanglement is involved and that the ATP of the operator is used. Note however the possibility of the more general mechanism at the end of the target.

1. In psychokinesis with inanimate target negentropic entanglement would be mediated by flux tubes containing ATP assignable to the operator. The metabolic energy of ATP of operator is transferred to the target. The increase in the rate of metabolism could therefore serve as a signature.
2. In the remote mental interaction with computer the intention is to affect the pattern of random numbers and the mere transfer of metabolic energy is not enough since the effect must also have a correct sign. The net effect is the change of the distribution of random numbers from expected and Tiller observes strange periodicities in the distribution. It seems that remote mental interaction must be able to affect the probabilities of the outcome so that they are not identical as randomness would require. What could be the mechanism? Direct entanglement with the representation of bits is not plausible. While writing this article it occurred to me that there might be a connection with the model for Shnoll effect [K4] which I developed for a couple of years ago and based on a deformation of probability distributions based on p-adic mathematics and quantum groups. What is remarkable is that the parameters characterizing statistical distributions vary slowly with periodicities assignable to the gravitational fields in solar system. Could it be that also the statistical effects of intentional action could be characterized by the same mathematics leading to purely number theoretical predictions? This will be discussed in more detail below.
3. In the intentional imprinting of Tiller creation of flux tubes connecting the magnetic body of operator and non-living target would take place. Intentional action induces changes such as change of pH and this could rely energetically on the use of ATP. Magnetic fields should be important and cyclotron frequencies might be important. When a sequence of random bits is used, periodicities with cyclotron frequencies are suggestive supporting the hypothesis involving magnetic flux tubes and Shnoll effect.
4. What could be the mechanism in the case of remote viewing? Magnetic body should receive from the target extrasensory input generating sensory percepts or more abstract cognitive mental images such abstract shape. Could the signal arrive from the target to the magnetic body of operator and therefrom to the biological body - maybe brain - of the operator to create genuine sensory percept? To have a genuine sensory percept back-projection to sensory organs is necessary and in TGD based model for sensory qualia the back projections to sensory organs are in a central role: the virtual world sensory input from brain and possibly from magnetic body to sensory organs used to build standardized mental images. Or is there any creation of sensory percept?
5. In the case of precognition the situation is not at all clear. In ZEO based vision the simplest view is that the “upper” light-like boundary of CD corresponds to the seat of sensory percepts

realized as mental images. Memories would correspond to information arriving from the geometric past inside CD. Precognition would mean receiving information from the geometric future of CD. Is this possible? How this would be realized. The vision about generalized Feynman diagrams suggests that given CD surrounds a vertex of generalized Feynman diagram in certain scale and that larger CDs are present and precognition would involve time reversed signals at the level of next CD. There presence of larger CD and longer time scale would mean that prophets are indeed “messengers of Gods”.

Why we do not remember the geometric future. Is the reason that the contents of conscious experience is about the boundary of CD which performs the state function reduction.

4 Parapsychological Phenomena

In this section various parapsychological phenomena are discussed in the general framework introduced in the previous section.

4.1 Extrasensory Perception, Precognition, And Other Parapsychic Effects

The general model for paranormal effects relies on same basic ideas as the model of quantum biology.

1. The transformation of p-adic [K25] space-time sheets makes possible the transformation of intentions to actions. Since p-adic space-time sheets have literally infinite size in real sense, distance does not matter. The set of points in the intersection of p-adic and corresponding real space-time sheet obeying same algebraic equations consists of rational and possibly also algebraic points common to real and p-adic variants of embedding space.

Parapsychological phenomena involve the transfer of information and negentropic entanglement makes possible genuine information at quantum level as also breaking of the second law of thermodynamics in the time scale of CD in question. Hence remote mental interactions should involve the generation of negentropic entanglement (see **Fig.** <http://tgdtheory.fi/appfigures/cat.jpg> or **Fig.** ?? in the appendix of this book) irrespective of whether the target is living system or consists of “dead” matter.

2. The idea about field body serving effectively as an intentional agent is second element of the model. The topological light rays representing negative energy signals propagating into geometric past created by a transformation of p-adic space-time sheet to a real one might be said to represent the “desire” inducing neural activities in the brain of geometric past. This mechanism provides not only a model for how magnetic body uses biological body as a motor instrument but also for PK.

MEs acting as bridges between different organisms would mediate em oscillations allow a directed transmission of smaller MEs behaving effectively as particles moving with light velocity. These MEs could be both real and p-adic and -using the terminology of Qigong practice- would represent qi (action) and yi (intention) respectively. An essential element would be resonance: sender and receiver in should be accompanied by MEs characterized by the same fundamental frequency: only these MEs could resonantly connect healer and healee. Healer must have ability to continuously vary the healing frequency.

MEs would naturally correspond to pairs of positive and negative energy space-time sheets. They would be attached to magnetic flux tubes and magnetic mirrors consisting of two flux sheets would make possible sensory-motor loop.

3. Zero energy ontology justifies the notion of negative energy signals and brings in also CDs as correlates of selves and natural fundamental targets of remote mental interactions. Zero energy ontology and the new view about time allows to assume that sensory qualia are at the level of sensory organ (objections such as phantom leg phenomenon can be circumvented) and that symbolic representations of objects of perceptive field and their attributes reside in brain.

Sensory input generates sensory representations based on real space-time sheets possibly accompanied by p-adic cognitive space-time sheets. Field body can share these mental images by quantum entanglement and also receive sensory information as classical signals involving using frequency coding and coding by temporal patterns. These latter representations would correspond to cognitive and emotional aspects associated with the sensory input. One could even say that higher level sensory representations are somatosensory experiences of field body. The intersection points of real and p-adic space-time sheet would determine the physical cognitive representation and would be always discrete. The analogy with the discreteness of numerics should be noticed. Since this model would apply also to extrasensory perception, the attribute “extrasensory” becomes somewhat misleading attribute.

4. Extrasensory perception could also result from the direct electromagnetic perturbation of the sensory magnetic canvas outside the body and the sounds generated by auroras and meteors might be genuine “extrasensory” perceptions of this kind [K36]. The frequency spectrum for the sounds produced by meteors and detected both sensorily and electronically in in the range 37 – 44 Hz [F3], which is the range of thalamocortical resonance frequencies associated with sensory representations in magnetic sensory canvas model. The sounds are several orders of magnitude more intense than they should be unless em perturbations propagate to Earth in a channelled manner. Only few meteors generate these sounds. These observations suggest that a resonant amplification of the em perturbations by magnetic mirrors of the sensory canvas channelling the em field to the surface of Earth are in question.
5. One might argue that if memes are not universal, remote cognition is not very useful. If memetic and genetic codes are realized in terms of CDs of quarks and leptons, one would have universality. If DNA double strand provides the relay station through which sensory input and motor output of the magnetic body flows, one would achieve universality of communication and control mechanisms at the level of living matter. An interesting question is whether memes are really species-specific as the morphic fields are in Sheldrake’s theory. The ability of shamans to transform at the level of conscious experience to animals suggests that this might not be the case. There is also a famous real life story about a student who spend several days in the experiential world of dog. Various identification phenomena would very probably involve also magnetic mirrors acting as bridges between say shaman and animal (or possibly multibody collective self defining “species self”) and making possible to share the experience of animal. Same mechanism as in the case of long term memories would be in question but with personal memories being replaced with the experiences of another species.

The fact that p-adic space-time sheets have literally infinite size suggests that cognition and intentionality are cosmic phenomena and that there might be cosmic pool of shared cognitive mental images. Hence memes could be completely universal.

4.2 Psychokinesis

One can classify psychokinesis to various types depending on whether the target is living or “dead” and whether the effect on target is a mere transfer of energy and momentum or control action involving information transfer.

Below I briefly discuss an early TGD inspired model of PK, a general model of PK assuming time mirror mechanism (see **Fig.** <http://tgdtheory.fi/appfigures/timemirror.jpg> or **Fig. ??** in the appendix of this book) of ordinary intentional action but applied by the magnetic body of the operator to a system different from the biological body, and a more specific model for machine-human interactions. Also concrete examples of various kinds of PK effects are discussed.

4.2.1 A possible model for psychokinesis with non-machine targets

In [K45] a mechanism of psychokinesis based on the generation of wormhole magnetic field configurations making possible levitation was proposed. Although this mechanism was yet general it deserves a discussion and reader is recommended to see [K45] for details. Basic mechanism is the levitation of diamagnetic substances in an external magnetic field: the force results when the

diamagnetic substance repels external magnetic field from its interior. The force is essentially the gradient of the net magnetic energy inside the volume defined by the object.

The mechanism is purely TGD based and relies on the generation of a pair of space-time sheets having opposite time orientations, and carrying opposite magnetic fields and opposite energy densities, and the subsequent interaction of the second space-time sheet with the object moved in the psychokinesis. Exactly the same mechanism applies in case of MEs (massless extremals) and could be used to generate coherent locomotion of organism resulting as a recoil effect when the second ME is absorbed by the body part. MEs provide a candidate for the mechanism of psychokinesis.

4.2.2 TGD based general view about PK

A general TGD based explanation psychokinesis relies on the same fundamental mechanism as ordinary intentional action, long term memory, and remote metabolism. The model applies more or less as such also to telepathy and could also allow to understand the notion of water memory explaining homeopathic effects.

1. The basic mechanism of PK and retro PK relies on quantum jumps transforming the p-adic space-time sheets representing intentions to real space-time sheets representing desires represented as negative energy signals to the geometric past. These signals modify the output of say random number generator to a non-random one. Magnetic flux quanta would realize the bridges along with the negative energy signals would propagate. The mechanism would favor retro PK if the operator is in active role. Genuine PK is also possible but in this case target would be active sucking metabolic energy provided by the operator.
2. Negative energy signals could consists of dark phase conjugate photons or even massless W bosons since TGD allows scaled up variants of electro-weak gauge bosons with large Planck constant and arbitrarily small mass scales. Dark W bosons are especially interesting since they can induce charged entanglement and purely non-local charge transfer mechanism and have been proposed to play a key role in the generation of the nerve pulse.
3. Magnetic flux quanta are the bridges making possible (presumably) unconscious feedback so that the operator can unconsciously learn how to affect the machine. How intentions can have effect on system whose functioning is unknown to the operator is actually the basic mystery of, not only psychokinesis, but of remote healing and remote mental interaction in general, as also of the phenomena labelled as instrumental transcommunications (ITC). The learning by feedback, much analogous to that happens when we learn to drive bicycle, would solve this mystery. The effects of group activity could be understood if groups tend to form collective selves so that coherent amplification of the effect occurs.
4. The ability of the PK able person to imagine the desired effect is important and could correspond to the ability to generate p-adic space-time sheets representing the intention. The desire about the action represented by the corresponding real space-time sheet should induce the effect optimally. In personal discussions with a PK-able psychic I indeed learned that he always tried to imagine in every possible detail how he moved the physical object (say a box of matches). The role of imagination is important also in remote healing [J38]. Perhaps the p-adic pseudo constants made possible by the non-determinism of p-adic differential equations should be in a good approximation genuine constants.
5. The optimal targets are initial value sensitive- or more generally-critical.
 - (a) Quantum criticality is the basic characteristic of TGD Universe and the prediction is the existence of a hierarchy of criticalities. Number theoretical criticality would in turn characterize living matter and might be a characteristic of optimal targets.
 - (b) Also quantum criticality in the sense that several values of Planck constant are possible with large values of \hbar assignable to negative energy signals mediating the desire of the PK-able person. PK requires energy and this favors systems, which can utilize standardized metabolic energy quanta liberated in the dropping of particles to larger space-time sheets.

In many-sheeted space-time particles topologically condense at all space-time sheets having projection to given region of space-time so that this option makes sense only near the boundaries of space-time sheet of a given system. Also p-adic phase transition increasing the size of the space-time sheet could take place and the liberated energy would correspond to the reduction of zero point kinetic energy. Particles could be transferred from a portion of magnetic flux tube portion to another one with different value of magnetic field and possibly also of Planck constant h_{eff} so that cyclotron energy would be liberated. In the following only the “dropping” option is discussed.

- (c) Water would be an optimal system from the point of PK and retro PK. Homeopathy might indeed involve PK like aspects. Benveniste’s experiments [I1, I2] gave support for the notion of water memory but could not be replicated when the experimenters did not know in which bottles the treated water was. The preservation of water memories represented in terms of many-sheeted lasers for with $1/0$ corresponds to a population inverted state/ground state, requires metabolic energy feed and the system might suck this metabolic energy from the biological body of the experimenter [K17].
6. As noticed, the proposed model is extremely general and seems to apply to almost any paranormal phenomena. For instance, the claimed re-incarnation experiences could be understood in terms of the general mechanism for long term memory. The person who remembers having lived in past could share mental images of a person in the geometric past by time like entanglement (episodal memory), or could be able to communicate with negative energy signals to the brain of a person on geometric past memory recall and thus receive declarative memories. It is quite possible that survival of fittest in our culture has led to an evolution of an immune system preventing sharing of mental images and communications with other brains.

4.2.3 Machine-mind interactions

Machine-mind interactions represent a modern branch of parapsychological research and nowadays methodologically highly advanced. These interactions are studied several groups and individuals: mention only the Princeton Engineering Anomalies Research (PEAR), which is a group directed by Prof. Jahn, the Anomalous Cognition Project of Dick Bierman, and the retrospsychokinesis work of Helmut Schmidt. In the sequel some aspects of this work are discussed.

The generation of negentropic time like entanglement between operator and target leading to a superposition of pre-existing and desired zero energy states and a subsequent increase of the amplitude of the desired outcome could be the general mechanism of machine mind interactions. “Who known how?” is a highly relevant question in the case experiments involving the attempt of operator to affect the function of a machine like computer whose detailed functioning is not known for the operator. This question could have two answers. Either the operator learns to who to affect the outcome by the simple sensory-motor loop provided by MEs or there is third party who knows and corresponds to a higher collective level of consciousness.

1. *Retro psychokinesis with random number generators*

The analysis of experiments [J10, J11, J8] discussed in the [K44] suggests that the geometric past can change in the time scale of a fraction of second. Both the work done at PEAR [J18] and the work of Helmut Schmidt with retro psychokinesis [J30] provide support for the change of the geometric past in much longer time scales. PEAR experiments demonstrate the anomalous effect also in the direction of future. For instance, the experiments of Schmidt done 1992 discussed in New Scientist [J32] demonstrate that martial art students were able to affect the visual display determined by pre-recorded random numbers. The probability for this kind of deviations from non-randomness was about $1/1000$. Henry Stapp proposed an explanation for this in his paper published in Phys. Rev. A [J31] based on nonlinear quantum mechanics.

The change of also geometric past in the quantum jump between quantum histories implies the notion of a four-dimensional physical reality and forces to regard three-dimensionality of reality as illusion created by the 3-dimensionality of our sensory experience (recall the notion of the association sequence). This implies that our geometric past is changing all the subjective time and that communications to the geometric past and future are possible and are consistent with the weak causality violation hypothesis of Schmidt [J30]. What this hypothesis implies that in the

newest quantum history generated by RPK all separate records contain the pre-recorded random numbers are altered in the same manner in RPK. Schmidt has tested weak causality hypothesis by using two separate cassette tapes containing the pre-recorded random numbers, one used in the PK experiment and another one kept locked in a safe. The records were indeed found to be identical after the experiment.

The results of Schmidt suggest also classical signalling to the direction of the geometric past. Real space-time sheets with negative time orientation could serve as the geometric correlates for these signals.

2. *The work of Princeton Engineering Anomalies Research group*

The study of anomalies in human-machine anomalies provide a highly sophisticated and controlled manner to study psychokinesis in its various forms. For instance, in the experiments carried out in PEAR group (Princeton Engineering Anomalies Research) [J18] operators try to affect various kinds of electronic, mechanical, acoustical, optical and fluid devices. In unattended calibrations these devices yield random output whereas in the experimental situation operator tries intentionally to affect the output so that non-randomness results. Each input that operator tries to affect consists of 200 bits formed from a random physical signal and operator can have either the intention to increase the number of 1: s (high), the number of 0: s (low) or have no intention at all (baseline). Operators can exert their efforts from a distance of thousands of miles, before or after the the actual operation of the devices. Over the laboratory's 20-year history, thousands of such experiments, involving about 100 millions of trials, have been performed by several hundred operators.

The observed effects can be summarized as the average for the sum of bits which is 100.026 for high and 99.984 for low. The effect is by a factor 3.6 higher than the expected margin of error. Effects are thus quite small, of the order of a few parts in ten thousand on average, but they are statistically repeatable and compound to highly significant deviations from chance expectations. Effects are highly operator specific and there are significant disparities between male and female performances. The random devices respond also to the group activities of large numbers of people and are especially sensitive to the effect of small intimate groups, group rituals, sacred rites, musical and theatrical performances, and charismatic events.

Time mirror mechanism suggests the following model for the machine-human interactions encountered in say PEAR experiments.

1. The effect of intention could be on the generator of random noise, on bit sequence represented in the computer memory, or even on the recorded value of the sum of bits. A possible mechanism in the latter two cases is the reversal of electromagnetically represented bit.
2. The general mechanism of intentional action involves negative energy signals inducing a change in the charge distribution determining the value of bit. Negative energy photon could induce a dropping of ions to a larger space-time sheet. Also the emission of negative energy dark W bosons (appearing in TGD based model of nerve pulse) could induce a change in the net charge. In both cases the sign of charge would correlate with the character of intention and for the first mechanism there would be asymmetry between "high" and "low" (proton, electron).

3. *The work of William Tiller*

[J49] [J49, J46, J47, J48] has performed experiments involving intentional imprinting of targets such as water. The model for the findings of Tiller is discussed in [K6]. The imprinting manifested itself as temporal and spatial oscillations of pH and temperature. The surprising finding was conditioning: also the air around intentionally imprinted device exhibited these oscillations. Also computer could be conditioned. The Fourier transform of the correlation function for bit sequences of random number generator demonstrated peaks at harmonics of $f = 1/T$, $T = 113.778$ min. 2^n -multiple of.1 seconds for $n = 16$ would correspond to $k = 143$ and $T = 109.23$ minutes which is by about 4 per cent too small. The proposed assignment of cyclotron photons with motor action leads to ask whether large \hbar dark cyclotron photons with these frequencies could induce a periodic perturbation of the random bit sequence?

4.2.4 Could Shnoll effect and statistical effects of psychokinesis have common mathematical description?

In the remote mental interaction with computer the intention is to affect the pattern of random numbers and the mere transfer of metabolic energy is not enough since the effect must also have a correct sign. The net effect is the change of the distribution of random numbers from expected and Tiller observes strange periodicities in the distribution. It seems that remote mental interaction must be able to affect the probabilities of the outcome so that they are not identical as randomness would require. What could be the mechanism? Direct entanglement with the representation of bits is not plausible.

1. This brings in mind Shnoll effect [K4] in which probability distribution $p(n)$ for an integer valued observable transforms from expected smooth distribution - say Poisson distribution - to a many-peaked distribution. The distribution could relate to microscopic observable but the modification of distribution seems to depend on gravitational field created by solar system so that astrophysical and microscopic dynamics couple at the level of probability distributions. I have proposed a mathematical model involving p-adic numbers and their quantum counterparts as a model for the effect but have not been able to understand this astro-micro correlation. Could it be that Shnoll effect allows to describe also statistical psychokinesis. This would lead to precise number theoretic predictions and the model would be testable.

There is an interesting analogy with quantum computation in TGD framework. Individual bits or bit sequences correspond to outcomes of quantum computations inside CD and their distribution determines the outcome of the computation. Intentional variant Shnoll effect would mean that intentional action can affect this distribution. One could localize this intentional action to a CD containing the CDs defining bits.

It is however far from clear whether this model can be formulated as a modification for the probability for a given value of bit. It might well be that the effect is global rather than local and on the distribution of number of bits with a given value. Indeed, in TGD framework reality is 4-D and the sequence of bits produced by random number generator is what correspond to the event rather than single bit!

2. One can of course consider also a local model. A negentropic entanglement with the macroscopic quantum states of random number generator affecting the environment of system responsible for the random event could be in question and change the situation in such a way that second value of bit becomes more probable. Could the magnetic fields associated with the flux tubes mediating the negentropic entanglement with RNG and interacting with the target make second bit energetically slightly more favored? Could the negentropic entanglement prevent the normal state function reduction producing the random number and produce the random number as ATP is transformed to ADP so that operator would perform some fraction of state function reductions? How it is possible to have an effect with a correct sign without any precise knowledge about the functioning of RG?

4.2.5 Telekinesis and electrostatics

In the book “Mind at Large” edited by Tart, Puthoff, and Targ there is an article “An Investigation of Soviet Psychical Research” by Wortz *et al* reporting among other things the research related to the electrostatic aspects of telekinesis. The article mentions the work done by Vasiliev and associates with Nina Kulagina and the work of Adamenko with Alla Vinogradova, another highly gifted person in telekinesis. Kulagina and Vinogradova are said to have been able to move objects of .1 kg along table. Interestingly, according to the article PK able persons tend to be women. Adamenko has tried to understand the phenomenon theoretically and has proposed that the static charges of objects and electrostatic forces generated by the subject might explain the effects.

Adamenko’s work

The objects moved by subject persons were located at a table which was a di-electric cube with of side length of .5 meters in Adamenko’s experiments.

1. Vinogradova was able to induce an electric charge in cube and then move objects located at the cube. With biofeedback training also other subjects were able to replicate Vinogradova's feat.
2. To move the object the static friction (friction coefficient between.1 and.3) must be overcome. Adamenko theorizes that there is kind of buoyancy force caused by the flow of air molecules involved and that the electric field somehow induces this force.
3. The reported electric field was 10 kV/cm and corresponds to the voltage at which a dielectric breakdown occurs in a dry air. The reported movement of the air could correspond to a corona wind resulting at strong electric fields.
4. Adamenko assumes that the objects had either static charge or that they were polarizable and developed a dipole moment in the external electric field. The electrostatic interaction with the electric field induced by Vinogradova would have been the cause of the movement.

TGD based model

TGD based model for phenomena is based on the general mechanism of mind-matter interactions allowed by the many-sheeted space-time concept. There are three questions to be answered: How the table and possibly also object were charged?; How the motion of the object was caused?; How the object was lifted from table to circumvent friction force? *How the table and object were charged?* The charging of the table is certainly crucial for the PK effect. Vinogradova could have emitted "topological lightrays" (MEs), as a matter fact high frequency (microwave) MEs propagating like particles within low frequency (ELF) MEs. Negative energy ELF MEs could have served as correlates for entanglement. Entanglement is however not necessary in this case since conscious telepathy is not involved. Microwave MEs would have induced bridges between the atomic space-time sheets of the object and super-conducting magnetic flux tubes of Earth. The bridges would have made possible ionic and electronic currents between these space-time sheets and led to the charging of the table and possibly of also object. A suitable intentional targeting of MEs would allow to control the charge distributions of the table and object and therefore the pattern of the induced electrostatic fields.

What could have produced the motion of the object?

The interaction of the object with the electrostatic field of the table is a possible explanation for the PK effect. The distribution of the charges of the table and object would allow to control the field pattern and thus the direction of the electrostatic force. This is however not the only mechanism. Ionic currents from the magnetic flux tubes to the atomic space-time sheets of the object produce recoil effect (momentum is conserved only in many-sheeted space-time, not for single space-time sheet), and this could have been the fundamental mechanism of motion (essentially the mechanism of rocket motion). In both cases the subject would have produced only the ME bridges taking care of the control of motion but would not have provided the energy and momentum.

The experiments of Modanese and Podkletnov [H1] provide support for the mechanism. Modanese and Podkletnov studied capacitor at a rather low temperature and at a voltage near the dielectric breakdown voltage. The second electrode was a super-conducting disk. The resulting discharge was large and coherent and accompanied by radiation pulses of unknown type. The pulses induced the motion of the air and kicked test penduli. The force was proportional to the mass of the penduli. The effect caused by the pulses did not weaken with distance. This supports the view that the pulses were TGD counterparts of the Tesla's scalar waves realized as pairs of massless extremals with three momenta in different directions [K12] and induced temporary bridges between test penduli and magnetic flux tubes inducing the flow of ions and the recoil effect. The same mechanism should be at work as a microscopic and incoherent version in the case of lifters.

How to circumvent the friction?: a connection with the physics of lifters

Lifters exhibit the called Biefeld-Brown effect [K43]. Lifters are asymmetric capacitors consisting typically of a wire electrode and planar electrode, are in a voltage slightly above the voltage causing dielectric breakdown. Lifters move in the direction of the smaller electrode. Also the

flow of air from the small electrode to the large one is involved. On basis of the experimentation and guide the findings of Juha Hartikka, I ended up with a simple model of lifters. What would happen is that there is an electric discharge in the form of small plasmoids (discharge sparks would be analogous to ball lightnings), whose emission from the small electrode causes the recoil effect. The emission of the scalar wave pulses could induce the motion of the air by Modanese-Podletnov recoil mechanism. Since the table is charged, there should be a strong electric field also in the narrow space between the object and table. Therefore electronic discharges from the object could occur, and lead to a small scale lifter effect lifting the object slightly above the table. This does not require the object to carry a net charge.

Could the remote EEG sensor of Sergeyev be based on the same mechanism as PK?

In the same article also the remote EEG sensor invented by the mathematician Sergeyev claimed to remote sense EEG from a distance of 5 meters is described. Unfortunately, the information related to the invention of Sergeyev is classified. What is however known from the existing literature is that the sensor is surprisingly simple, consisting of a metal disk suspended into water and coated with a semiconductor. The immersion in water is reported to double the effectiveness of the sensor. According to the report, the ordinary EEG sensors can detect EEG only up to a distance of few centimeters since the noise of the environment masks the (Maxwellian) EEG at larger distances. Furthermore, the amplifying effect of water is not consistent with the high value of the di-electric constant of water if ordinary Maxwellian electrodynamics is behind the sensor.

Sergeyev's explanation for the functioning of the sensor utilizes bio-plasma hypothesis. The use of the term bio-plasma is remarkable since professional physicists know that plasma state at the temperatures and densities of living matter is not possible in standard physics universe. In TGD framework super-conducting ions leaking from the magnetic flux tubes of the Earth's magnetic field can give rise to what might be called bio-plasma, and Sergeyev's sensor is indeed said to produce bio-plasmagram. Also maser (microwave laser) effect in bio-matter producing ions and electrons flowing into air is mentioned.

All this suggests that EEG MEs containing microwave MEs inducing a leakage of the ions from magnetic flux tubes to the atomic space-time sheets of the metal disk and in this manner generate plasma. The strength of the resulting electric signal would be modulated by the intensity of the net flux of EEG MEs so that information about EEG would indeed result. EEG MEs would not topologically condense at atomic space-time sheets but propagate as bridges connecting the boundaries of the magnetic flux tubes and atomic $k = 151$ (cell membrane thickness) space-time sheets. This would explain the dissipation free propagation. For positive energy MEs the effective phase velocity would be of the same order as the alpha wave phase velocity since these MEs would tend to "stuck" (in quantum sense). The basic sensing mechanism would be very much the same as explaining the generation of nerve pulse. Also Z^0 MEs could be involved and would usually have a very weak interaction with the environment. The ability of water to act as a many-sheeted maser, presumably crucial for the functioning of living matter, could explain why the water amplifies the effectiveness of the sensor.

Also the remote sensing of the pulsating magnetic fields produced by Nina Kalugina and having strength nearly equal to that of the Earth's magnetic field are mentioned in the article. The possible significance of the pulsating magnetic fields for PK is still poorly understood in the TGD framework: the problem is that solutions of field equations representing this kind of field configurations are not known. One might however think that the pulsating magnetic fields carry also supra-currents, and that their presence intensifies the leakage of charged particles to the atomic space-time sheets of the remote sensor device.

4.3 Healing As Rejuvenation?

The article of Lian Sidorov [J38] and its references give a thorough view about remote healing and viewing. One particular healing method goes under name Qigong [J14]. Qigong is a general term for a large variety of traditional Chinese energy exercises and therapies. Qigong is generally considered as a self-training method or process through Qi (vital energy) and Yi (consciousness or intention) cultivation to achieve the optimal state of both body and mind. The traditional Chinese medicine postulates the existence of Qi, which could be regarded as a kind of subtle

energy circulating around the physical body.

The physiological, chemical and electromagnetic effects of both internal and external Qigong have been studied ([J38] contains large number of related references). Also the effects of Qigong healing on cancer has been studied [J14].

4.3.1 Negentropic entanglement as Qi?

In TGD framework the energy associated with MEs and supercurrents flowing along magnetic circuitry could be a natural counterpart of Qi. The positive metabolic energy assignable to negentropic entanglement or negentropic entanglement could be an alternative identification for Qi. If entanglement is entropic it corresponds to bound state entanglement and this entanglement of its negative metabolic energy could be seen as the counterpart of “sick Qi”.

Yi could in turn would translate to p-adic cognitive representations representing also intentions, perhaps p-adic variants of MEs or even magnetic mirrors. Internal Qigong refers to self healing whereas external Qigong means directing Qi energy or intention to help others by opening Qi blockages or inducing the sick Qi to get out of body, or helping to achieve Qi balance. The transfer of metabolic energy by ATP-ADP process [?] would be basically a transfer of negentropic entanglement in TGD framework and Qi blockage could be interpreted as a blockage preventing transfer of this entanglement (of metabolic energy in standard framework) would be basically a transfer of negentropic entanglement in TGD framework and Qi blockage could be interpreted as a blockage preventing transfer of this entanglement (of metabolic energy in standard framework).

Zero energy ontology in principle makes possible the creation of matter from vacuum as zero energy states. This process involves a generation of a new CD serving as a correlate for self carrying positive and negative energy parts of the zero energy state at its future and past boundaries. The standard physics interpretation would be as a quantum fluctuation in a space-time volume dictated by CD. At space-time level space-time sheets within CD would be the correlate. Also the transformation of p-adic space-time sheets to real ones and vice versa in the intersection of real and p-adic worlds becomes possible.

4.3.2 Healing as regeneration of negentropic resources?

De-differentiation of cells taking place in the healing of cancer cells resembles rejuvenation. But what does rejuvenation mean? The first guess is that it corresponds to time reversal and running of biological programs backwards so that the stage before the emergence of disorder is reached. This interpretation is attractive but during the preparation of this article I realized that it does not conform with the most recent view about what the arrow of geometric time is [K5].

To begin with, one must understand how the arrow of psychological time is induced from quantum arrow. This question is not completely understood in TGD framework. There are several arrows of time: quantum arrow of time, arrow of the geometric time of 8-D embedding space, and the arrow of the geometric time of 4-D space-time sheet of subsystem identifiable psychological time.

1. Quantum arrow of time has a nice explanation: for zero energy states either positive or negative energy states (but not both) can be chosen to have well defined single particle quantum numbers - they are prepared. The simplest manner to identify quantum jump and unitary process U would be as state function reduction taking place alternatively for positive or negative energy part of the state. One would have time-flip flop at embedding space level: the arrow of 8-D embedding space geometric time would alternate. This of course sounds weird unless one makes a sharp distinction between different times.
2. What about the arrow of the time at 4-D space-time level? What is clear that observer of space-time as Flatlander does not observe the change of the arrow of embedding space time but experiences constant arrow of time reflecting itself as second law. In fact, entropy defines natural time coordinate for Flatlander. This can be understood if quantum average 4-D space-time surfaces associated with subsequent zero energy states effectively combine to form a multiply folded towel like structure. In quantum jump 4-D space-time surface can be said to turn downwards at the upper end of CD, return back to turn upwards at the lower end of CD, and so on. Flatlander would experience the flow of 4-D time as a continual increase

of entropy manifesting itself as properties of the space-time sheet with which Flatlander identifies herself. The 4-D arrow of time would not change. Only by observing space-time sheets in different time scales would make possible for the Flatlander to discover that the 8-D embedding space arrow of time alternates. Phase conjugate laser beams and self assembly in biological systems would represent examples of processes allowing to overcome the restrictions of being Flatlander. During last decades we have been indeed able to overcome these restrictions as the discovery of phase conjugate laser beams demonstrates [D3]. In TGD framework massless extremals (MEs, topological light rays) provide a representation for the phase conjugate laser beams. Also the discovery of Italian physicist Fantappie that living systems are characterized by both entropic and syntropic processes demonstrates the presence of both directions for the arrow of time at embedding space level [J37, J5].

In this framework healing corresponds to rejuvenation if the age of cell is as entropy defining also a measure for the amount of differentiation that has occurred. By second law ageing would be reduction of negentropy resources and healing as rejuvenation would mean the increase of negentropy of the system. This is possible if the notion of negentropic entanglement is accepted. The healing as increase of the negentropy of the system implying rejuvenation should take place in state function reductions and NMP [K22] would make them possible if the notion of number theoretic entanglement entropy is accepted.

4.3.3 How topological light rays and magnetic flux tubes relate to healing?

Massless extremals are excellent candidates for the space-time correlates of communication and control signals and depending on the sign of the energy can propagate in both time directions. Real bosons correspond to wormhole contacts connecting positive (negative) energy MEs whereas virtual bosons are identified the wormhole contacts connecting positive and negative energy MEs. In zero energy ontology it makes sense to speak about quantum jumps transforming p-adic MEs to real ones and about reflection of MEs in time direction so that positive energy ME transforms to negative energy ME or vice versa. Also MEs analogous to virtual particles are possible. They correspond to pairs of MEs with opposite time orientations so that the wormhole throats carry opposite signs of energy. In this case the classical momentum is not anymore light-like and although wormhole throats are massless the boson itself can be interpreted as a virtual off-mass-shell particle.

In quantum optics time reversal is known as a phase conjugation [D3] and is one of the basic notions of holography. MEs act as both quantum holograms and receiving and sending quantum antennae of [K27]). MEs can generate reference waves of coherent photons interacting with other MEs and activating dynamical holograms of coherent light. If the reference wave is phase conjugated, the resulting hologram is time reversed.

What makes this so interesting is that MEs and magnetic flux tubes are the tools of of quantum control in the TGD based view about biosystem as a symbiosis in which MEs control superconducting magnetic flux tubes controlling ordinary matter at atomic space-time sheets via the many-sheeted ionic flow equilibrium. The coherent light pattern emitted by ME resulting from the interaction of ME with the reference wave (its phase conjugate) could act as a control command (time reversed control command) inducing process (time reversed process).

How topological light rays and magnetic flux tubes relate to healing?

1. In the original vision about healing as time reversal for biological programs phase conjugate reference waves would provide a simple and general mechanism of healing by time reversal allowing the living matter to fight against second law. This picture is however inconsistent with the recent view about the arrow of time.
2. In the recent view about the arrow of time topological light rays generate non-local single particle excitations at the flux tubes carrying cyclotron Bose-Einstein condensates and the resulting negentropic entanglement induces healing.

4.4 Near Death Experiences

Near death experiences are rather commonly experienced, say by the victims of various accidents. These experiences are known for centuries but it was the best-selling book “Life after Life” of Raymond Moody which brought these experiences known to the general public [J42].

1. *What NDEs are?*

NDEs seem to possess invariantly the same characteristic features. There are feelings of peace and joy, time speeded up, heightened sense, lost awareness of body, seeing bright light, entering another world, encountering a mystical being or deceased relatives and coming to a point of no return. The experiences seem to proceed in quite universal manner. First comes a loud buzzing or ringing noise and a long dark tunnel. Patient sees his own body from outside and does not feel any pain or agony anymore. Patient meets others and a being of light who shows his life in its entirety as a kind of playback to evaluate. Then comes the point of no return, and although patient feels peace, joy, and love, the patient has to return to continue his life. Often these experiences induce very profound changes in the subsequent life of the patient. The claims of Moody have been supported by subsequent research and hardly anyone, even the most foolhardy skeptic, denies the reality of these experiences.

The latest twist in the development emerged when University of Southampton research team announced the result of a one-year study of NDEs of victims of a heart attack supporting the view that consciousness and mind exist after the brain has ceased to function and the body is clinically dead. The resuscitated patients were various times clinically dead, with no pulse, no respiration and fixed dilated pupils. Independent EEG studies have confirmed that brain's electric activity, and hence brain function (according to standard dogmas of neuro science) ceases in this kind of situation. 11 per cent of patients who survived the heart arrest however recalled emotions and visions during this state. This announcement has created considerable excitement in various consciousness related discussion groups and the question whether some of the basic dogmas of neuroscience are badly wrong has been raised by the neuroscientists themselves.

2. *TGD based view about life after death very concisely*

It is good to summarize the latest TGD based view about consciousness after physical death before comparison with other theories and detailed analysis of NDEs. The view, which is certainly not the only possible one can imagine, is supported by the improved view about psychological time.

The basic notion is that of 4-D body involving both the physical body and the magnetic mirror structures associated with it. 4-D body is gradually carved like an artwork via state function reduction sequences which can correspond to both directions of geometric time in zero energy ontology. Self interprets these sequences for sub-selves as sensory perceptions and motor actions which would be thus time reversals of sensory percepts. This fractal trial-and-error construction of the 4-D body occurs in various time and length scales. Gradually increasingly stable 4-D body results.

Since magnetic mirror structures are fundamental for the field realization of the genetic code, one can quite well consider the possibility that this process induces also the self-organization of the ordinary living matter around the magnetic mirror structures. This would have interpretation as a reincarnation. Buddhas able to resist the temptation to reincarnate would continue their life at the field level. Interestingly, the development of physics from Newtonian physics of the material bodies to Maxwellian physics of fields would mirror the evolution of consciousness from concrete biological life to life at the field level.

3. *Astral plane theories for NDEs*

There are several theories of NDEs. A theory enjoying popularity in New Age circles is based on the notions of the astral projection and next world stating that we have another body that is vehicle of our consciousness which leaves the body at the moment of death. Although completely respectable as such, this kind of theory is not based on existing or even postulated physics, and is therefore hard to test. The notions of "higher vibrational level" and "astral plane" are simply devoid of a physical meaning.

In TGD framework the idea about "vibrational levels" generalizes in an astonishing concreteness to an entire hierarchy of electromagnetic life forms and electromagnetic bodies whose sizes vary to astronomical length scales [K15, K36]. In this framework the idea about brain as a seat of consciousness is an illusion resulting from the fact that sensory data is mostly about the immediate region around body. Of course, even the idea that consciousness (as opposed to its information contents) can be localized to some part of space-time, is basically wrong in TGD approach.

A possible test for the astral projection theories is a weighing of the body after death to deduce the weight of the astral body (assuming of course that astral planes obey ordinary physics!). If “astral planes” correspond to the p-adic space-time sheets, this test of course does not make sense. Magnetic mirror structures are obvious candidates for astral body and are real but their separation from body is impossible so that this kind of measurements do not make sense. The notion of 4-D body also suggests that the physical body remain in the geometric past in the physical death wherefrom it can communicate with the living ones via the magnetic mirrors of magnetic body.

Extrasensory perception via astral bodies is a second possible test. This test might make sense if extrasensory perception can be generated by patterns of ELF em fields as supposed in the TGD inspired model of qualia. Magnetic mirrors connecting organisms to each other and also to “nonliving” matter make possible ESPs. Also direct electromagnetic perturbations of the magnetic sensory canvas can give rise to ESPs: in [K20] the possibility that the strange sounds produced by meteors [F3] could correspond to ESPs is discussed.

4. *Tunnel experience*

The theory of Grof and Halifax [J27] is based on the observation that NDE involves elements which might be assigned to the moment of birth. Perhaps NDE is reliving the moment of birth. The counter argument is that the newly born baby does not see anything unless she is able to perceive extrasensorily. “Nothing but hallucinations” theories are of course no explanations at all and belong to the same category as “consciousness as mere illusion” theories. In neuroscience framework also the wake-up reality is seen basically as a hallucination produced by brain and coupled with sensory input to guarantee correspondence with what is out there.

The tunnel is experienced also during epilepsy and migraine, during meditation and relaxed state of mind, and with certain drugs like LSD, phencyclidine and mescaline. It has been suggested that the physiology of brain could explain the properties of near death experiences [J35]. The theory of Cowan [J35] states that the tunnel results from a failure of the inhibition leading to brain induced activity yielding visual experiences. What is however questionable is why person would feel falling into the tunnel, to say nothing about meeting deceased relatives. Blackmore and Troschlenko have proposed a theory in which also the motion along tunnel could be understood as a visual illusion [J12].

TGD based explanation for tunnel experience might be simply as a direct visual experience about magnetic flux tube structures resulting from the perturbation of the magnetic sensory canvas outside body. Thus a genuine ESP would be in question. Magnetic field obeys indeed same basic equation as incompressible liquid flow. Both retinas and pineal gland (“third eye” literally since it contains retinal pigments and serves as a genuine third eye in some species [K15] are magnetic structures. The practically always present vortex in center (“third eye” in my private terminology) could correspond to the magnetic flux tube structure emanating from the pineal gland whereas the very dynamical flow could correspond to the contribution of retinas. If the magnetic mirrors are universal electromagnetic bridges connecting us to other living beings, in particular to our friends and relatives, the meeting of the 4-D bodies of the deceased relatives would happen at the level of fields. The movement along the tunnel could correspond to the propagation along this kind of magnetic mirror.

I cannot resist the temptation of telling about a personal “tunnel experiences” taking place every-daily although this might be criticized as highly unscientific. For me science is attempt to identify the regularities of conscious experience and the only conscious experience I have is my own! As I close my eyes in a half-meditative state achieved by writing at computer terminal, I can see a dim flow consisting of points. Typically this flow enters to or emerges from a tunnel. It can be rotating spiral like flow or simple sink or source. Source or sink can be also linear structure. Earlier this experience was not stable and tends to fade away all the time, and after few minutes I was not anymore able to achieve it. Situation has changed quite recently: I can have the experience almost anytime in peaceful state of mind. During the “great experiences” this flow was much more complicated and completely visible and formed a stable background of the ordinary visual experience and of hallucinatory visual images.

There is however no experience of entering into the tunnel in this case so that the tunnel need not be the same as encountered in NDEs.

5. *OBE aspect*

Blackmore explains OBEs [J45] as resulting from the replacement of ordinary self-center experience of world with bird's eye of view model where brain sees own body from above. Bird's eye of view is only a memory model so that extrasensory perceptions are predicted to be impossible during OBEs. There is however some evidence that patients can report very precise visual perceptions during OBE. It has been indeed argued, that some other senses than vision, namely [K32] [J45], could create indirectly these perceptions. It is however difficult for even the most hardborn materialist to understand how a clinically dead person could be able to effectively see by hearing, since this feat is impossible for even completely healthy person.

The idea of Blackmore about bird's eye of view is very attractive as such and can be interpreted in TGD framework in quite different manner. Cognitive maps based on the canonical identification map [K14] typically exterior to inside and vice versa. Thus both a p-adic map of the external world realized inside brain and a p-adic map of body and its surrounding realized outside the body are possible and would give models of the external world and self. The inside-to-exterior map could provide a bird's eye of view about body and its immediate surroundings.

Both exterior→interior and interior→exterior maps could contribute to the conscious experience even under the normal wake-up consciousness and the exterior contribution would thus represent genuinely extrasensory contribution to the conscious experience. When the ordinary sensory input and volitional activity ceases as during NDE, the contribution of the model of external world to the conscious experience becomes negligible. The ability to experience tunnel unstably during relaxed wake-up consciousness with eyes closed is consistent with the interpretation that these two components are competing. It is quite possible that during sleep the bird's eye of view component also dominates but that no memories about this period are generated for the simple reason that the brain functions necessary for the generation of the memories are not active.

The notion of magnetic sensory canvas implies that we actually see at ELF frequencies. Same applies to other senses. This implies the possibility of experiences without any sensory input or even without any neuronal activity. The needed ELF MEs acting as sensory projectors would be generated in the dropping of ions from atomic space-time sheets to the magnetic flux tubes of magnetic body carrying field strength.2 Gauss (Earth's magnetic field has nominal value.5 Gauss). If the ion drops in high n cyclotron state the subsequent decay of the state by cyclotron transitions generates a bundle of parallel ELF MEs giving rise to the sensory projection. This representation can be generated by the entire body and would give rise to a three-dimensional vision about body as seen by the environment. There is some evidence for this kind of anomalous vision.

1. Yogis have reported altered states of consciousness in which they see their own body three-dimensionally, that is simultaneously from all directions.
2. Becker tells in his book "Cross currents" [J43] about a young cancer patient who told that he can see the interior of his own body. The patient could locate the calcium deposit left as tumor vanished. This supports the view that ELF MEs could project from the entire body to the sensory canvas.
3. Also the OBE experiences, for instance those associated with NDEs, could have a similar interpretation. The sensory input from eyes and even the input from neural activity could be absent during NDEs so that the visual experience should be determined by the background ELF component emanating from the brain and body. The third person perspective associated with OBEs might be always present but be masked by the strong sensory input.

What has been said applies also to other senses. Maybe a personal reminiscence is allowed. I As I was younger I often woke-up partially and realized that I hear my own snoring as an outsider: not a pleasant experience! Sometimes I had an experience which might be interpreted by saying that the hearing in the first perspective is superposed with the hearing in the third person perspective. The third person hearing has a time lag so that the outcome is a kind of double breathing with time lag.

Sensory canvas hypothesis provides a more concrete view about the situation. The magnetic mirrors connecting brain to sensory canvas should be there also in the absence of sensory input. Could it be that the out of body view is always involved but masked by the from the body view and after the physical death only out of body view remains?

The competition between bird's eye of view and sensory view has also EEG correlate. Delta waves in the EEG spectrum are natural EEG correlates for the external part of cognition. The reason is that this part of EEG frequency spectrum has a shape and intensity very similar to that for the so called sferics [F1], which correspond to meteorological electromagnetic perturbations typically associated with thunder storms. Could sferics be the electromagnetic correlates of disincarnates?! The degree of the sensory alertness correlates directly with the ratio of the EEG net intensities in the delta band and in higher EEG bands [F1]. This is consistent with the competition predicted by NMP. Certainly in the NDE experiences studied by the Southampton team only delta band is present in EEG. Note that delta waves dominate also during deep sleep.

Also alpha band is a good candidate for communicating sensory information to higher level selves having magnetic sensory canvas receiving sensory input from several brains simultaneously. It is indeed alpha band in which detectable changes occur in remote vision and remote healing [J38]. Could it be that higher than alpha consciousness somehow transforms to alpha consciousness in physical death and could it be that alpha consciousness relates with the fact the lowest Schumann frequency associated with the perturbations of Earth's magnetic field is in the alpha band? It might be that magnetic transition frequencies are involved with the "vertical" communications from brain to the sensory canvas whereas Schumann resonances would be involved with the lateral communications between different sensory canvases. The fact that hypnagogic experiences involving also identification with other persons (personal experience) appear in the borderline between wake and sleep when dominating EEG frequencies are around 7.8 Hz supports this view.

6. *Life review*

Blackmore explains the life review as an effect analogous to the lively episodal memories generated by stimulating temporal lobes. This explanation leaves open what exactly happens in the stimulation of the temporal lobes and what episodal memories are. To say nothing about the systematic review and evaluation.

In TGD framework brain and perceptive field are four-dimensional and it is quite possible that episodal memories are multitime experiences involving input which comes from the moment of the geometric time when the recalled experience happened and happens again at the level of sensory representation but not as real life event since this would involve macroscopic volition and induce miracle life events in the geometric future. The notion of 4-D body makes this idea concrete. In the physical death 4-D body becomes in some sense mature (about possible de-construction processes in shorter time scales). The volitional contribution essential for the illusion that world is 3-dimensional is not anymore present and entire 4-D body is experienced as a whole. Perhaps this is just what life review is.

Since geometric memories are in question, the review is only a narrative since our geometric past changes all the subjective time and the review is about geometric past subjectively now. Life review would be a temporal counterpart of the OBE experience in the sense that one sees one's geometric life history from outside in a 4-dimensional sense. This is possible since p-adic cognitive representations are four-dimensional and four-dimensional bird's eye of view could begin to dominate at the moment of death.

Also genuine subjective memories about time interval equal to the wake-up period of self and of order lifetime could be in question. This requires the occurrence of what might be called a p-adic phase transition to higher level self with much longer subjective memory: this view is in accordance with the vision about the physical death as a birth to a life in "other world". p-Adic phase transition could mean that the p-adic magnetic mirrors after the geometric time after physical death correspond to higher value of p and quite concretely, have lengths which are longer than during the physical life. This makes possible both geometric and subjective memories in much longer time scale.

7. *Positive emotions*

With the motivation coming from the OBEs associated with the temporal-lobe epilepsy, it has been suggested that brain-stress near NDE episode leads to the release of neuropeptides and neurotransmitters (in particular endogenous endorphins) which are responsible for positive emotional states like joy, peace, and love. Again the question concerns about the deeper mechanism. Presumably these neurochemicals are only correlates for the experiences in which extra-sensory component of the experience begins to dominate. It has been also suggested that the lack of oxy-

gen is what gives rise to the NDE experiences [J45]. The observations of the Southampton team seem to exclude these explanations. Of course, one could claim that some core parts of brain are working even when the patient is clinically dead (no respiration, no heart beat, dilated pupils) and that these functioning parts of brain are able to generate NDE. If so, spiritual experiences would represent the lowest possible levels of consciousness, and even reptiles would have them: perhaps a vulgar skeptic could applaud here but I do not find this idea very convincing.

In TGD framework clinical death naturally implies that extrasensory component of the conscious experience begins to dominate. This picture is consistent with the view about brain as p-adic-real transformer rather than the seat of the entire conscious experience. The dominance of the positive emotions would simply mean that the negative emotions coming from sensory input would be absent.

8. Other worlds

The experiencing of “other worlds” requires a considerable amount of hand weaving in the standard neuroscience framework. Blackmore claims that imagined worlds are experienced as real because these experiences are the most stable. I believe that Blackmore is right in the sense that mental images (sub-selves) correspond to self-organization patterns which are stable asymptotic states of self-organization. I do not however believe that this is an essential point, and certainly Blackmore’s explanation fails if the interpretation of the Southampton team about NDEs is correct.

In TGD framework the other worlds might correspond to the emergence of magnetic mirror structures which correspond to higher value of p-adic prime than during the physical life. They would have much longer lengths and give rise to much longer subjective and geometric memories. Note that the MEs associated with magnetic mirrors are classical representation for light (which brings in mind Tibetan book of death!) so that one could say that the deceased becomes a light being in a well-defined sense. The meeting of the light being might mean an ability to communicate with and sensorily experience the presence of other light beings, natural if the deceased herself has transformed to a light being (but having still 4-D body in the geometric past, this is perhaps why angels have human body!).

Note also that the absence of sensory and corresponding cognitive mental images during NDE is analogous to the empty mind free of mental images which is the goal of the meditation practices. Perhaps soul could be identified as a self having no sub-selves, “irreducible self” as suggested in [K37].

9. After effects

The after effects induced by the spatio-temporally extended consciousness in which one sees one’s own life from outside are often dramatic. It is difficult to reduce these after effects to brain pharmacology.

My own “great experience” had many aspects common to NDEs and induced profound (not at all pleasant!) changes in my own life. In my case the direct experience of the higher levels of reality made possible the realization how magnificent the almost-boring everyday reality really is when seen through sharpened senses, how pathetically narrow the zone of wake-up consciousness is, and how ridiculously little the celebrated big science tells about reality. This realization resulted in a strong conviction that I am on a right track, and has given the courage to work these fifteen years as a ridiculed scientific dissident in a country in which vulgar skepticism is in the role of a scientific state religion and vulgar skeptics have taken the role of the mind police of science.

5 Conscious Hologram And Remote Mental Interactions

The notion of conscious hologram allows also a unified description of remote mental interactions.

5.1 Big Vision

The notion of conscious hologram, which is based on the generalization of the notion of Feynman diagram, provides a general view about remote mental interactions.

1. Brain can be seen as a part of a gigantic dynamical and fractal brain consisting actually of the entire universe. The same mechanisms that work at the brain level work also at larger

length and time scales. Brains/bodies serve as “neurons” for the magnetospheric selves receiving information from several brains/bodies. In particular the fusion of the mental images defined by similar structures can give rise to stereo-consciousness, and the notion of species consciousness and even multi-organ consciousness associated with various kinds of organs makes sense.

2. The notions of super-genome and hyper-genome provide a concrete view about how transpersonal levels of self-hierarchy are realized. Super genes are magnetic flux sheets containing sequences of genes like text lines at the page of book. Hyper genes are flux sheets containing sequences of super-genes belonging to different organisms as genetic text lines. This picture conforms nicely with and generalizes Shelldrake’s species memory and “alike likes alike” rule. It also suggest a concrete realization of remote biological mental interaction based on activation of gene expression and nerve pulse activity.

The flux sheets associated with super-genome and hyper-genome have fields strengths of magnetic field of Earth. The correlation of the quality of remote cognition performance with sidereal time [J34] leads to the hypothesis that also the flux quanta of galactic magnetic field couple somehow to living matter.

3. Besides time mirror mechanism charge entanglement realized in terms of W MEs is a basic mechanism of remote mental interaction. The simplest model for the generation of nerve pulse is based on quantum jump leading to a state in which Bose-Einstein condensate of Ca^{++} and/or Mg^{++} becomes exotically ionized and generates charge flow through cell membrane. Quite generally, charge entanglement would be part of the ordinary bio-control realized in terms of Ca^{++} waves. Charged entanglement provides also a mechanism for the sharing of mental images between magnetic body and biological body. There is no reason why this mechanism could not work also at the level of other remote mental interactions than those that we are too familiar with to realize that remote mental interactions are in question. The typical time 13-15 seconds associated with the remote realization of intentions by Qigong masters [J26] could correspond to a typical duration of W entanglement.

The models for bio-photons bio [I6] and Gariaev’s findings [I4] suggest a tentative model for how remote mental interactions proceed. Charged entanglement via W MEs makes possible sharing of mental images. After a reduction of entanglement the generation of positive and negative energy MEs occurs and involves time mirror mechanism making possible remote metabolism and communications of declarative memories. In the case of ordinary bio-control magnetic body utilizes the metabolic energy resources of biological body.

4. Association mechanism works also for remote mental interactions and is even in the case of brain based on MEs and magnetic flux tubes with neuronal firing and metabolic activities being side products of the this mechanism.
5. One of the strange findings about remote mental interactions is that remote viewer can receive information about an object for which she knows only coordinates, which as such are meaningless numbers to her. It is also commonly reported that erroneous readings or interpretations of the target tend to propagate to other viewers. These findings suggest that magnetospheric (earthly or galactic magnetosphere could be in question) dynamical multi-brained selves act as kind of relay stations mediating the remote contact between remote viewer and object. If some brain knows the meaning of the coordinates of the target, this is enough to connect remote viewer to the correct target.

Empirical support for the notion of multi-brained collective levels of consciousness comes from the experiments of Mark Germaine [J39]. An operator and a subject person were involved. The stimulation of the subject person consisted of a sequence of identical sounds containing now and then an odd-ball stimulus (now silence). The odd-ball stimulus generated an event related potential (ERP) visible in EEG and reflecting the conscious reaction. The operator was in a second room and by simple toss of coin decided whether to observe the stimuli in the computer monitor or not. The stimuli appeared in the computer monitor one second before they were heard by the subject person.

What was found that when the operator saw the odd ball stimulus from the computer monitor, the ERP was weaker on the average. An 11 Hz periodicity was the major component in the difference profiles.

The simplest explanation is that the brains of both the operator and of the subject person belong to a larger multi-brained self and that the evoked response represented partially the reaction of this self. When this multi-brained self had already seen the stimulus through the operator's eyes, it was not so surprised to hear this stimulus again through the ears of the subject person, and ERP was weaker.

The appearance of the 11 Hz periodicity suggests that this frequency is an important correlate for the entanglement of the subject person's mental images with those of some multi-brained magnetospheric self. The cyclotron frequencies of most bosonic ions in Earth's magnetic field are in alpha band so that the finding is consistent with the vision about a fractal hierarchy of generalized EEGs associated with the dark matter hierarchy [K11]. The notion of hyper-genome provides a detailed model for how transpersonal levels of self hierarchy control the behavior of groups of individuals. The hypothesis could be tested by looking whether the gene expressions of individuals having close personal relationship but not in a direct personal contact correlate.

5.2 Sketch For What Could Happen In A Typical Remote Viewing Experiment

Consider a situation in which a system consists of remote viewer A, person B knowing the position of target T and the coordinates XYZ for it. B gives the coordinates XYZ for person C in turn giving them to the remote viewer A. The following simplified sketch assumes that communication channels are permanent and that the intentions involved with the process are realized as p-adic space-time sheets in the brain of A, and very probably involve p-adic MEs as representations of the intentions.

1. Remote viewer A, person B knowing having target-XYZ association as two mental images in his brain, and target T have permanent bridges to a magnetospheric multi-brained self M. Therefore M knows the target-XYZ association via the brain of B.
2. Remote viewer A is a client of the multi-brained self M using the remote sensory services provided by M. A-M contact is more or less permanent: this is what it means to have the ability to remote view. Minimum requirement is the existence of magnetic flux quanta connecting A to M. The sharing of mental images requires generation of entanglement, say charge entanglement by W MEs. This would correspond the most primitive passive mode of remote viewing. W mode allows to share also mental images of primitive living systems like plants, and even those assignable to system regarded usually as in-animate. The reduction of charge entanglement makes possible remote mental interaction since resulting charge non-equilibrium generates currents: generation of nerve pulse and Ca^{++} waves would represent basic example of this kind.
3. One can imagine also active mode of remote viewing and this could be involved with telepathy: in this case M would not be involved. This mode involves intentional action (p-adic MEs are transformed to their real variants) and classical communications with the geometric past/future using neutral negative/positive energy MEs could realize declarative memories/"declarative" precognition as well as motor action based on classical communications using symbolic representations. The model for bio-photons suggests that Z^0 and em MEs are generated after the reduction of charge entanglement. The ability to predict reasonable well the personal future could rely on "declarative" pre-cognition. The evolution from bicameral mind to modern consciousness [K38] could have proceeded from a mere sharing of mental images by W MEs to complex classical symbolic communications involving also neutral MEs.
4. Since M cannot be assumed to have anything comparable to a nervous system, A-M communications should rely on sharing of mental images. That is, the intention of A (p-adic space-time sheet in brain of A perhaps) to remote view and the questions of A about the target would be shared by M. T-M communications could involve classical communication with light velocity generating magnetospheric sensory representation about the target by

self-organization. The 13-17 second delay of remote mental interactions [J26] could correspond to the typical duration of charge entanglement. Target could be also “non-living”: it is quite possible that magnetospheric selves form sensory representations also about “non-living” matter. The finding that meteor sounds have frequency spectrum in the 40 Hz band of thalamocortical resonance frequencies, rather than in the predicted 20-20.000 Hz band, supports the view that magnetospheric sensory representations at 40 Hz resonance band are associated also with the non-living matter [K19], [F3]. Also the vision about dark matter hierarchy conforms with the idea about Earth’s magnetosphere as a living organism.

5. Remote viewing by the sharing of mental images means that there are no sensory receptors associated with the passive mode of remote viewing: no such receptors have been identified [J40]. Various physiological correlates (say EEG patterns) of remote viewing should be reactions to the shared mental image rather than direct correlates of it. If primary sensory qualia are at the level of sensory organs, remote viewing differs from hallucinations in that there is no feedback to the retinas from cortex responsible for “qualiafication”: this could provide be a clear-cut test. At least in the case of living targets the laws that govern the ordinary sensory perception should hold true for the remote viewing. For instance, the known correlation of the AC performance with the spatial and temporal entropy gradients of the target should hold true for living targets. Even in the case of a non-living target similar correlation holds true if the sensory perception of magnetospheric selves obeys same laws as that of ours: there is some evidence for the correlation of the entropy of non-living target with the AC performance [J40].

5.3 About The Physiological Correlates Of Anomalous Cognition

In the article “Physiological correlates of Psi cognition” of Charles Tart [J15] some apparently contradictory findings about physiological correlates of anomalous cognition are described besides the experimental findings of Tart. Changes in EEG, galvanic skin response, finger pulse, and basal skin resistance are examples of possible candidates for the physiological correlates of remote mental interactions.

The findings are following.

1. The first class of experiments involves two persons: subject and agent. The agent is subjected to various kinds of stimuli inducing emotional response: sudden sounds, painful stimuli as in the experiments of Targ, etc.. Subject person is typically in a sound proof room and tries to remotely cognize when subject person experiences these stimuli. Various candidates for the physiological correlates are measured. The physiological correlates typically express a heightened arousal. For instance, in the experiments of Tart [J15] galvanic skin response occurred more frequently, and EEG became more complex with more beta waves and fewer alpha, theta, and delta waves.
2. In the second kind of experimental arrangement remote viewing or telepathy is involved but the second person, if present at all, is not subject to any stimuli inducing emotional reaction. Now the physiological correlates tend to be characteristic for a relaxed state of mind. The increase of the basal skin resistance is one such correlate.

At first these findings might seem to be contradictory. The paradox disappears if sharing of mental images is in question and if the mental images induce same emotional response in the subject person as in the agent.

The remotely perceived (possibly sub-conscious) stimulus or remote anticipation of the stimulus induces in the subject person an emotional reaction having as a correlate the reduction of skin resistance. In the experiments of Tart [J15] both the real electrical stimulus experienced by the agent and the electrical stimulus guide by the operator to an electrical resistance instead of the agent, generates the arousal in the subject. This requires that both the operator, agent, and subject belong to the same multi-brained self so that the reaction of the subject can be interpreted as a kind of conditioned reaction of the multi-brained self expressed via the body of the subject.

5.4 Local Sidereal Time, Geomagnetic Fluctuations, And Remote Mental Interactions

The article of J. Spottiswoode [J34] discusses two strange findings about remote mental interactions.

1. There is a statistical tendency of the anomalous cognition (AC) performance to concentrate in a 2 hour period around 13.30 of the local sidereal time (ST), which is the time measured using as a reference distant stars and thus running at a slightly different rate than the solar time: the lag is $\Delta T = 24/365$ hours ~ 3.7 minutes during 24 hours.
2. The anticorrelation between the level of geomagnetic fluctuations and AC performance has also a maximum during 2-hour period around ~ 13.30 ST.

The fact that AC performance is associated with the same sidereal hour suggests the identification of the galactic magnetosphere as a conscious involved with remote cognition. For interstellar and galactic magnetic fields cyclotron time scales correspond to the time scales of human consciousness so that also these magnetic flux quanta could receive sensory input from biosphere and control it.

5.4.1 Support for the role of magnetospheric consciousness

The so called ap index measures the intensity of the fluctuations of the Earth's magnetic field. If the magnetosphere is a conscious entity, ap index can be interpreted as a measure for the level of arousal of the magnetospheric mind. The negative correlation between ap and AC performance tells that AC is most probable, when the magnetosphere is in a "calm state of mind". This is natural since only in this kind of situation the noise masks minimally the signals from the galactic magnetosphere.

The local magnetic noise produced by the modern high tech environment is much stronger than the geomagnetic noise but this does not matter. If artificial magnetic fields correspond to $k_d = 0$ level of the dark matter hierarchy, they have no effect on higher levels of dark matter hierarchy. Note that the hypothesis is $h_{eff} = nh$, where n is product of distinct Fermat primes and power 2^{k_d} .

5.4.2 Is there an ELF signal from the special direction masked usually by the geomagnetic noise?

The obvious question is why the anticorrelation between anomalous cognition effect size and ap index is highest at 13.30 ST? What this finding means that a particular portion of the sky defined by a definite longitude is above the head of a successful anomalous cognizer independently of the time of year. Thus there should be something special in a direction at this longitude.

The simplest explanation for these findings goes as follows.

1. Suppose that there is a higher level conscious entity at the direction 13.30 ST at the galactic magnetic body such that various cyclotron frequencies involved with the communications with this entity correspond to a typical time scale of the anomalous cognition. This conscious entity could have size of galaxy or it could correspond to a flux tube of galactic magnetic body using the cognizer and target as sensory receptors and motor instruments just as our magnetic body might use neurons of our brain or our body parts.
2. Anomalous cognition could involve positive and negative energy signals to this magnetic body and back so that essentially instantaneous AC events would be possible.
3. The information transfer between two kinds of flux tubes is made possible by the topological condensation of the flux tubes of B_E or its dark variant at those of the galactic magnetic field or its dark variant and would be maximal when both are nearly vertical. Also geomagnetic noise would be transferred via wormhole contacts to the flux tubes of the galactic magnetic field and perturb these communications. Both AC and its anticorrelation with geomagnetic noise would be maximal when the flux tubes of of magnetic fields in question are approximately parallel. Since the flux tubes of B_E are approximately vertical, this the case when

the galactic center is directly above the head. This would explain the special value of sidereal time. One can say that the magnetic flux tubes of the interstellar magnetic field define kind of cosmic umbilic cord which might serve as a correlate for the tunnel experience associated with NDEs.

4. If signals to geometric past and back are involved the time and length scales would measured using 10^5 years as unit. The signals themselves would be coded using frequencies characterizing time scales of neural consciousness as kinds of ripples to the very slowly oscillating background signal just as perturbations due to nerve pulses interfere with EEG rhythms. Since remote psychokinesis and anomalous cognition should rely on the same mechanism, the first guess for the time scale involved with these signals is as the time lag of 13 to 17 seconds involved with the remote realization of intentions by Qigong masters [J26]: the interpretation as a typical duration of charge entanglement was already proposed. It would not be surprising if the time scale of entanglement would determine also the scale of cyclotron frequencies. This would mean the importance of the frequencies in the range .06 to .08 Hz for anomalous cognition.

The following scenario suggests a possible manner to understand the time scale of remote PK.

1. If protonic cyclotron transitions generate the low frequency MEs in the range $f_1 = .06$ Hz to $f_2 = .1$ Hz, the strength of magnetic field must be in the range 13 to 17 nT (nanotesla). The magnetic flux tubes of an interstellar magnetic field in a direction with a longitude defined by 13.30 ST should be in question.
2. The ends of the magnetic flux quanta attached to structures within the inner magnetosphere co-rotate with Earth. The resulting twisting presumably tends to induce additional noise to the interstellar magnetic field or Earth's magnetic field or both.
3. The strengths of the typical disturbances of Earth's magnetic field are in the range 50-200 nT [J34]. The average strength for a given frequency component for the fluctuating part of the Earth's magnetic field increases at low frequencies. At the alpha band the strength of the Fourier component of fluctuations is about $\sqrt{B^2(f)} \simeq 1 \text{ pT}/\sqrt{\text{Hz}}$ at alpha frequencies. Interestingly, the magnetic perturbation produced by brain at alpha band has a peak, which is slightly above the fluctuations of the Earth's magnetic field. This is perhaps not an accident in light of the expected role of the alpha band in remote mental interactions. The strength for the Fourier component $B^2(f)$ for the fluctuations of $B^2(t)$ [J6] is roughly $\sqrt{B^2(f)} \simeq .1 \text{ nT}/\sqrt{\text{Hz}}$ at $f_2 = .01$ Hz, and about $\sqrt{B^2(f)} \simeq 10 \text{ nT}/\sqrt{\text{Hz}}$ at frequency $f_1 = .06$ Hz.

What puts bells ringing is that the noise level 50-200 nT is by a factor 4 to 15 higher than the required interstellar static magnetic field at the lower limit corresponding to the 17 second period. These findings suggests that magnetic fluctuations tend to mask the positive effect of the interstellar magnetic field on AC. Only when the strength of the fluctuations of the Earth's magnetic field at the cyclotron frequency of the interstellar magnetic field reduces sufficiently below the strength of the interstellar magnetic field, the masking effect is small enough.

5.4.3 What is the origin of the interstellar magnetic field?

The idea about the magnetic umbilic cord connecting distant astrophysical objects to a single quantum coherent whole is sensible in the many-sheeted space-time. The TGD based model for the galaxy formation assumes that the ordinary matter results from the decay of cosmic strings, which are objects carrying extremely strong magnetic fields (magnetic flux tubes and these objects belong to the same solution family of field equations). These cosmic strings form a complex network. For instance, this model explains gamma ray bursters [K39].

The huge energy production of gamma ray bursters is consistent with their huge distance only if one assumes that the energy is liberated in jets. In TGD framework the gamma ray bursts can be identified as jets resulting in the decay of split cosmic strings giving rise to the ordinary matter. The bursts are indeed known to originate in the regions, where new stars are born. This picture supports the idea about the existence of a fractal magnetic flux tube network connecting different

astrophysical objects, and left as a remnant from cosmic strings, when their magnetic energy transformed to the ordinary matter and gave rise to the birth of stars. This network could give rise to galactic nervous systems in turn combining to the central nervous system of the Universe.

Surprisingly, this picture might be consistent with the constraints on the direction and magnitude of the interstellar magnetic field.

1. According to the online lecture of S. Oliver [E6], the measured values of the interstellar magnetic fields depend somewhat on the method with which they are measured (this might be a signal of the many-sheetedness). The interstellar magnetic fields vary in the range $B_u = 1$ mGauss– $B_l = .1$ μ Gauss [E8], which means that both electronic and protonic cyclotron time scales for all interstellar magnetic fields correspond to time scales relevant for human consciousness. The minimal values of k_d are $k_d = 53$ for B_u and $k_d = 66$ for B_l from thermal stability: .1 second time scale of alpha band is mapped to 50 s for B_u and to ~ 3 days for B_l .
2. The synchrotron radiation associated with the diffuse emission from the whole sky but concentrated towards galactic plane corresponds to a field strength $\sim .6$ nT. Zeeman splitting for hydrogen 21 cm line from condensing clouds gives fields in 1-2 nT range. In the plane of the galaxy the field is roughly parallel to spiral arms and its strength is 1-1 nT and too weak to correspond to the proposed magnetic umbilic cord. Also the direction of the spiral arm is different from the direction of the required magnetic umbilic cord.
3. The second guess is that the magnetic umbilic cord is orthogonal to the galactic plane. The direction of the galactic North Pole has the right ascension (identifiable as the sidereal time at the meridian of the rotating observer) RA=12.49 $\delta = 27.4$ degrees: RA is not too far from 13.30 so that this guess might make sense. Taking into account that the rotation axis of is tilted by 23.5 degrees towards Sun this would mean that the direction of the magnetic umbilic cord is with accuracy of 3 degrees in the plane defined by the orbit of Earth around Sun. Interestingly, the magnetic field associated with the solar wind varies in the range .2 – 80 nT and average value is 6 nT.

According to [E8], galactic center carries a dipole like field with a strength of order 100 nT, not too far from 10-30 nT. Also this field has filament like structures (flux tubes), which might extend to long distances [E8]. The flux tubes of this field should intersect the galactic plane orthogonally. If the strength of the magnetic field inside the flux tubes stays constant rather than varying like dipole field strength, these flux tubes could give rise to the magnetic umbilic cords connecting us directly to the center of the galaxy. Galactic center, perhaps the immense black-hole region there, could be an monstrous brain having galaxy sized central nervous system! That the model for magnetospheric consciousness would generalize to the scale of entire galaxy would conform with the fractality of consciousness.

4. According to [E8], supernova remnants are accompanied by radial filament like structures carrying magnetic field in 1-10 nT and it seems that supernova wind might carry this field around galaxy: very natural if flux tubes carry the field. According to [E6], for individual sources such as supernova remnants like Cas A Minor, the field strength is 10-30 nT. This corresponds to the interval 5.6 to 17 seconds. That the field strength is of the same order of magnitude as the dipole field at the galactic center conforms with the idea about magnetic nervous system of galaxy connecting the center of the galaxy to the stars. This magnetic field would be easy to observe in case of supernovae because super nova explosion has packed magnetic flux tubes to a very dense bundle.

5.4.4 Connections with other effects?

There might be fascinating connections with other strange findings.

1. In Comorosan effect [K45] , [I10] the irradiation of a bio-matter with a laser irradiation lasting for a multiple of 5 seconds has anomalous effect on a catalyst action. 5 seconds corresponds to to $n = 3$ cyclotron transition for proton in a magnetic field of 10 nT. Comorosan effect occurs also in a non-living matter and suggests that the magnetic umbilic cord serves as a kind of cosmic clock.

2. The strength of the Earth's magnetic field in far-away in the plasma sheet is about 10 nT. Could this cosmic magnetic umbilic cord be connected with the plasma sheet and be in a synchrony with what happens there? Plasma sheet is known to be highly self-organizing structure containing in the velocity distributions of charged particles features like "wings" and "eyes" [F2]. In [K20] I have proposed that plasma sheet defines the "self model" of magnetospheric brain and is thus in a role analogous to the insula in the human brain. It would rather natural for the cosmic umbilic cord to couple with that part of the magnetospheric brain which corresponds to the highest level in the self hierarchy associated with the magnetic Mother Gaia.
3. Lungs contain magnetic particles giving rise to magnetic field of about 10 nT. The theory of magnetospheric sensory representations inspires the speculation that the moment of physical death is decided by magnetospheric self sending to lungs stopping signal at proton's cyclotron frequency associated with 10 nT magnetic field.

5.5 Could Magnetic Flux Tubes Make Possible Effective Holograms?

What conscious holograms really are? Are they genuine holograms or are they holograms only in the sense that the scattering of light beams from them is very much like scattering on ordinary holograms - that is like scattering from the original object. Could one imagine mechanism making possible scattering from the original object effectively represented by the hologram like structure?

To proceed notice that there is rather general belief that just some objects possessed by the patient is enough for healer- in some sense this object are holograms of the patient. Usually this belief is of course regarded as primitive pars pro toto magic. This belief might however have some justification in terms of negentropic entanglement expected to be fundamental aspect of remote mental interactions. In principle negentropic quantum entanglement can take place via arbitrary number of relay stations and magnetic flux tubes connecting the entangled objects would be the quantum correlate for it. Negentropic entanglement would serve as a correlate for attention, experience of understanding, etc., and it would correlate closely with metabolism: generation of ATP and associated high energy phosphate bond would generate negentropically entangled electron Cooper pair or add electron to negentropically entangled existing many-electron system and its decay to ADP would liberate metabolic energy quantum and destroy the negentropic entanglement.

Negentropic entanglement could actually mean that objects of the external world - say living beings - can act like parts of our biological body. There is a wide variety of psychological experiments which show how illusory is our view about what our body is. Quantum entanglement of object with its target having magnetic flux tubes as geometric correlates making object a relay station. The object - call it O - would only serve as a relay station connected to say person, call it P , possesses the object. The light scattering from the O could actually transform to dark photons and travel along flux tubes to P , where it is scattered back- say from DNA- and returns back along flux tubes and leaves O . Effectively this is like scattering from a hologram of P represented by object O . The flux tube connection would make various objects in our vicinity effective holograms. This is something that one actually expects since attention- both visual and auditory - has flux tubes connecting perceiver to the target of attention as correlates.

One can consider two options since the radiation to object could transform to positive or negative energy photons. In the first case scattering could be seen as ordinary scattering from P . Negative energy photons would however represent signals traveling to the geometric past (analogs of phase conjugate laser beams) and scatter back from P as positive energy photons traveling to O . TGD based models of memory as communications with the geometric past and intentional action as a process in which negative energy signal to geometric past initiates neural activities (Libet's findings about active aspects of consciousness) involve similar mechanism. Also the remote metabolism based on sending of negative energy signals to a energy storage (analogous to population inverted laser) relies on the same mechanism.

Peter Gariaev's experiments irradiating DNA with red laser beam generate broad of radio waves, which in TGD Universe could correspond to photons with same energy but with large Planck constant. These photons have biological effects on organisms of the same species and even on closely related species. TGD based proposal is that the scattered laser beam defines a collection of frequencies serving as addresses for parts of DNA activating gene expression.

If this represents a basic mechanism of genetic expression, one can quite well imagine that an organism - call it A - whose DNA is somehow damaged, could utilize the healthy DNA of another organism - call it B - by sending to it the counterpart of laser beam which scatters and generates the superposition of dark photon beams serving as an address activating the DNA of A. A would effectively use the DNA of B and B would effectively become part of A: s biological body. This mechanism could explain why the mere presence of healthy organisms of the species can induce the healing of organism which is not healthy. It could be the basic mechanism of healing: patient could remotely use the healthy DNA of the healer to generate signals activating her own genes.

Some further comments and questions are in order.

1. The relay station mechanism could universal in biology. The transformation of ordinary photons to dark photons at flux tubes defining the magnetic body of DNA is assumed in the model explaining the photos taken by Peter Gariaev and his group about DNA sample showing the presence of what looks like macroscopic flux tube structures [K1].
2. The mechanism could also explain phantom DNA as real DNA connected by flux tubes to the chamber that contained the original DNA. The laser beam arriving to the empty chamber would travel along flux tubes to the place, where the removed DNA is, scatter and return back. This would create the scattering pattern assigned with the phantom DNA.
3. One can even ask whether the basic mechanism of homeopathy relies on relay station mechanism. Homeopathically treated water would be a collection of flux tube connections to the molecules, which were present in the first stage of the preparation process of the homeopathic remedy. Since the dark photons travel with light velocity, the times for travel of photons would be so small that the scattering of incoming light via the relay station mechanism would almost instantaneous so that the original molecules would be effectively present.
4. For instance, the de-differentiation of cells which looks to my rather mysterious phenomenon, means rejuvenation. Could one imagine that the genetic programs are replaced with those in geometric past and similar mechanism is at work. Could the rejuvenation mechanism involve scattering of the counterpart of phase conjugate laser light from non-differentiated healthy cells of the geometric past? If so, one should try to achieve the same effect directly at the level of cells. One could try to induce de-differentiation of the cells of the owner of the object serving as a relay station in the same manner. Healing of say cancer cells by de-differentiating them to omnipotent state. In the experiments involving Becker's DC current just this happened. In this microscopic situation might be can demonstrate the effect really convincingly.

5.6 Two Attempts To Understand PK

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 [J20, J21] (for an earlier article discussing his vision see [J9]) - 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.

“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 Millar) 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 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-Styled Operator Intention: A Review of a 12-Year Program” (see <http://tinyurl.com/oyjvjbw>) [J23] 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” (see <http://tinyurl.com/ya92afub>) [J28] and “Addition effect for PK on pre-recorded targets” (see <http://tinyurl.com/yau3ruul>) [J29] of Schmidt. In these experiments the background philosophy seems to be conform with the first option.

There is also a report (see <http://tinyurl.com/owrfo1q>) [J19] 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 [J8] support 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.

5.6.1 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”.

5.6.2 “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.

5.6.3 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 sheets 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 Alfvén wave (see <http://tinyurl.com/nfqj2ng>) inducing geometrical oscillation of the flux tube and therefore the direction of the magnetic field. State function reduction after the perturbation has ceased 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.

- Classically the effect of the small perturbation of the external magnetic field on spin is Larmor precession (see <http://tinyurl.com/bvxnz8q>) [D1] 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 $dm\mu_e/dt = \mu_e \times B$, $m\mu_e = (ge/m)s$, 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 [K33] the effects of ELF em fields on vertebrate brain [J13] ($2/5$ 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.

- 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.
- 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 $\hbar_{eff} = n\hbar$ (see <http://tinyurl.com/y7c8e6x8>) suggested by the vacuum degeneracy of Kähler action [K13] [L10].

- 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 (see <http://tinyurl.com/yddtp6gh>) [D2] based on the expression of free energy as function of magnetization as $F = aM^2 + bM^4 - HM$ is minimized 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 simultaneously 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 $E_{tot} = N_e g e B / m$. 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 [K13] and [L10]), 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 embedding 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 multi-sheeted 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 multi-furcate and second sheet would carry external magnetic field, and perhaps also the TGD counterpart 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 multi-furcations of space-time sheets predicted by the vacuum degeneracy of Kähler action and predicting hierarchy 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 [K31]) 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 degrees of freedom. In ferromagnets this kind of sharp peak is indeed observed at Fermi energy (see <http://tinyurl.com/yddtp6gh>) [D2]. 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 anti-fermion. This raises the question about realizability of Bose-Einstein statistics in Bose-Einstein conden-

sation. 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.

5.6.4 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. Sceptic 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.

6 TGD Inspired Model For OBEs

It is good to develop the model for OBEs by first summarizing what OBEs are and then listing the basic TGD specific ingredients of the model and then proceed by making questions (I hope that reader does not feel them to be leading).

6.1 OBEs, Autoscopy, Heautoscopy, And Other Strange Experiences

6.1.1 Phenomenological characterization

The phenomenological characterization of OBEs [J3] has been discussed in [J50]. A precise definition of OBE is to have sensation of being outside the body. Autoscopy experience involves a also a sensation of seeing a mirror double of the body or part of it or at least experiencing its presence. There is a form of AS in which some internal organs are perceived. In one form of AS only the presence of double is experienced. AS experiences are often accompanied by physical difficulties such as migraine episodes and epilepsy.

Heautoscopy refers to an experience of meeting one’s alter ego, doppelganger. The main differences to AS is that in AS the double is mirror image and that alter ego is experienced to have also duplicated features of psychological self.

OBEs are classified to parasomatic and asomatic experiences according to whether the person experiences of having body or not. In aparasomatic experience a detachment from both the physical and parasomatic body is experienced. Blackmore suggest that OBE starts when sensory input from the body ceases while person remains conscious [J44]. This brings in mind the notion of subtle body of spiritual practices identified as the body experienced during lucid dreaming [J36]. The notions of guardian angle and ba-ka double of ancient Egypt, could relate to the double body too.

There is also a classification of OBEs to asensory, naturalistic and supernaturalistic ones. Asensory experience lacks sensory percepts about environment, naturalistic one involves perception of familiar surroundings, and supernaturalistic other-worldly realms like heaven or visits to other planets and contacts with aliens.

One can distinguish between natural and enforced OBEs. Natural OBEs are triggered by exhaustion, illness, traumatic events, NDEs, meditation, etc.. Enforced experiences can result from intoxication, anesthesia, hypnosis, etc..

6.1.2 OBEs induced by electric stimulation

Relatively recently OBEs and AS experiences have been produced by an electric stimulation of the angular gyrus [J22]. Angular gyrus is located in the parietal lobe, near the superior edge of the temporal lobe, and is involved in processes related to verbal communication and cognition and also

with the transformation of written language to internal monologue. The experience developed to a full fledged OBE as the intensity of electric stimulation was increased. The electric stimulation induced responses in vestibular and sensory-motor systems, two of three systems which govern body balance.

According to experimenters, OBE and AS frequently involves what they call pathological sensations of position, movement and perceived completeness of one's own body. These include vestibular sensations such as floating, flying, elevation and rotation, visual body-part illusions (illusory shortening, transformation or movement of an extremity) and the experiences of seeing one's body only partially during OBE or AS. Authors believe that these experiments yield neurological evidence about the common neurological mechanism behind OBEs and AS experiences.

[J50] [J4] has criticized the interpretation of experiments.

1. Only single subject person was studied. She suffered from temporal lobe epilepsy and the epileptic region was at distance of about 2 cm from angular gyrus. Hence one can ask whether genuine OBEs were in question and whether the results generalize to healthy persons.
2. The OBE was not typical. For instance, body was seen only partially and the conscious attempt of the subject person to examine it more closely led to its disappearance. The environment was not perceived.
3. The claimed localization of the spot inducing OBEs to angular gyrus might be an illusion. Same researchers have represented results in which the OBE is induced in a different manner. Interestingly, the experience is associated with the generation of 4 Hz theta wave, which corresponds to the dominating EEG band during sleep.
4. The reductionistic conclusion that OBEs can be reduced to neuropathology and are thus "only" hallucinations is not justified. What has been shown is that electric stimulation of angular gyrus helps to induce the OBE and this leaves a lot of room for theorizing.

6.1.3 Explanations of OBEs and related experiences

The explanations for OBEs can be divided to two classes.

1. Something is assumed to leave the body.
This something could be something physical or non-physical ("astral"). In some cases people who have had OBE share reported of having perceived objects that were actually there and having experienced events and dialogue that truly happened. Charles Tart has documented the case of Miss Z [J16] who in controlled experiments was able to deliver the randomly selected five digit number which was in a position which could be seen only from the position out of her body. Telepathy would be an alternative explanation for this.
2. Nothing leaves the body.
Parapsychological explanations involve remote sensing and hallucinations. Psychological explanations regard OBEs as basically hallucinations. The observation that electrical stimulation generates both AS and OBE could be seen as a support for this interpretation. Of course, one can ask what hallucinations really are. Furthermore, the reports about seeing internal organs during AS experience [J43] are not easily explainable as hallucinations.

TGD based model does not fit into either category. The model involves the notion of magnetic body serving as the third person receiving visual stimulus from the body and reflecting it back to the brain where it is processed. In this model the conflict between hallucinatory character of AS and OBEs and a real perception of body from outside is only apparent. The basic mechanism allows to develop also a more detailed model for dreams, hallucinations, third person aspect of wake-up consciousness, and directed attention.

6.2 Questions

In the following the model is developed by posing questions about OBEs.

6.2.1 Where the information processing giving meaning to what is seen is carried out?

Seeing is much more than just receiving the photons on retina, since a lot of information processing is needed to give meaning to what is seen. This essentially involves a decomposition of visual input to recognized objects having relations to each other and to the past of perceiver. This applies also to the visual percepts during OBEs. The most natural candidate for the system processing the visual stimulus and giving it meaning is the brain of the subject person.

Sharing of mental images allows to consider an alternative interpretation based on telepathy. The sensory organs in other bodies receive the visual stimulus and other brains do the information processing. For instance, “unconscious” victim of accident could share the fused mental images of people around the place of accident. This would explain the case of Miss Z studied by Tart [J16] as telepathy.

6.2.2 Are OBEs “only” hallucinations?

In TGD framework the first possibility is that the sensory stimulus is always artificial and comes from brain to eyes and other sensory organs by back projection. OBE would be a dream like cognitive representation, simulation rather than a real percept. REM is expected to always accompany OBEs in this case.

There is an objection against this idea. If person is unconscious or has NDE, it is questionable whether she is able to construct such high level cognitive representation as the representation of the state of her own body as seen by outsider is, and even transform it to a sensory representation. One can also ask what hallucinations really are. In TGD framework hallucinations must be generated by an artificial sensory stimulus so that hallucinations and genuine OBEs might involve the same basic mechanism.

6.2.3 Does OBE originate from an actual sensory stimulus?

The well-known fact that body parts indeed contain holograms about other body parts [I11] (see the discussion in [K17]) and the TGD view about the relationship between dark and living matter [K10] allows to consider seriously the possibility that OBE originates from an actual sensory stimulus.

The dark photon laser beams emanating from the body would be received by a magnetic body containing dark matter at some level in the hierarchy of magnetic bodies and would be reflected back to the receiving sensory organs along MEs possibly parallel to magnetic flux tubes rather than space-time sheets along which ordinary visual input arrives.

It is quite possible that several magnetic bodies in the hierarchy are involved. The magnetic bodies involved need not always correspond to a personal magnetic body and could receive input from several biological bodies and remote vision and telepathy might involve signals from brain reflected to a second brain via multi-brainy magnetic body. Magnetic bodies could be associated also with “dead” matter.

In this picture the case of Miss Z could be understood in two alternative ways. A dark photon beam possibly created by the visual representation of the random number (does “dead” matter generate sufficiently intense beams of this kind?) and reflected by personal magnetic body could be in question. Alternatively, the magnetic body involved could receive the information about random number from the brain of the experimenter and reflect it to the brain of the subject person.

6.2.4 Why does electrical stimulation induce OBEs?

Electrical stimulation of angular gyrus induces OBEs just as the stimulation of neurons of temporal lobe induces long term sensory memories. In neurological “brain only” approach the interpretation would be that the responses in the vestibular and somatosensory system induce the AS and OBE as hallucinations. In TGD framework the response in vestibular and somatosensory system would be interpreted as a response to an actual experience of being in a detached position and orientation, and brain would process genuine sensory data about being in detached position.

One might think that the temporal ordering between the experiences and these responses would allow to decide which causes what. In TGD framework negative energy signals propagating

backwards in the geometric time are however a basic element of brain functioning and this criterion need not be apply.

One imagine two mechanism generating OBEs.

1. The mechanism inducing visual OBE and related experiences could simply turn off the ordinary sensory input so that only the dark photon beams from the magnetic body and reflected back from biological body would contribute to the visual stimulus. This would occur automatically during dreams and NDE experiences.
2. The sensory input from the magnetic body could be amplified. Time mirror mechanism (see **Fig.** <http://tgdtheory.fi/appfigures/timemirror.jpg> or **Fig.** ?? in the appendix of this book) could be responsible for this amplification [?]. During epilepsy strong electric fields generated by brain during epilepsy induce starvation of neurons and the electrical stimulation of angular gyrus could have the same effect. Starving neurons would generate a beam of phase conjugate (negative energy) dark photons received by magnetic body in order to get metabolic energy. The magnetic body would be in a state analogous to a population inverted (possibly many-sheeted) laser defining a hologram like representation of the body. The receival of negative energy photons would induce a cascade like induced return to the ground state and amplify the dark photon beam arriving from magnetic body so that it would not be masked by the ordinary visual input anymore and would give rise to a percept.

6.3 Dark Matter Hierarchy, Zero Energy Ontology, Negentropic Entanglement, OBEs

Dark matter hierarchy, zero energy ontology, and the notion of negentropic entanglement lead to new insights also about OBEs.

6.3.1 Basic ingredients of the TGD inspired model

The model of OBEs involves several ingredients that are specific to TGD.

1. Magnetic bodies and field bodies are excellent candidates for the “third person” seeing the ordinary body. Magnetic body could receive a visual stimulus from ordinary body and reflect it back as a visual stimulus during OBE processed by the brain of the subject person. Thus body would see itself from the perspective of the magnetic body. Also dreams and hallucinations might involve the same mechanism. In the case of hearing sounds created by subject person could be reflected back to her ears or more plausibly, microwave hearing [I5] could be involved.
2. Topological light rays (“massless extremals”, MEs) are an element of TGD having no counterpart in Maxwell’s ED and play a key role in TGD inspired theory of consciousness. The interpretation of MEs has remained somewhat obscure. The development of TGD based model for dark matter residing at magnetic flux tubes and characterized by large value of Planck constant implying quantum coherence in even macroscopic length and time scales changed the situation in this respect. The model for dark matter as macroscopically quantum coherent phase is discussed briefly in this book in chapter [K29] and more extensively in the book “Genes, Memes, Qualia, and Semitrance” [K10]. MEs can be identified as space-time correlates of Bose-Einstein condensates (“laser beams”) of dark photons. It is however still unclear whether ordinary laser beams actually correspond to dark photon Bose-Einstein condensates and become visible only in de-coherence to ordinary photons. Negative energy MEs can be identified as correlates for phase conjugate laser beams of dark photons. The so called time mirror mechanism is universal building block of basic biological and brain functions [?].
3. Bio-systems as conscious holograms is one of the key ideas of TGD approach [K6]. Bio-holograms [I11] suggest themselves as primary sensory stimuli quite generally. Biological body could generate dark photon “laser beams” received by magnetic bodies and reflected back to retina or perhaps to pineal gland [J17], the “third eye”. This would explain AS as well as the images of internal organs [J43]. Also other systems, at least living systems, could

be seen from the perspective of the magnetic body. Remote vision hypothesis testable by using living targets not visible in ordinary sense. This would give also rise to telepathy if reflection occurs from magnetic bodies of another person.

4. In TGD framework sensory organs are identified as seats of primary sensory experience and brain only constructs symbolic representations about percept, in particular identifies objects of perceptive field. This does not exclude a considerable back projection to sensory organs modifying the sensory input. Dreaming involves back projection to sensory organs inducing artificial sensory experiences as simulation. One possibility is that dreams and hallucinations represent direct back projection to sensory organs along neural pathways. An alternative view is that the projection involves dark photon beams generated by brain and reflected back from the magnetic body. If OBEs are hallucinations, the visual sensory memories of the subject person about herself could serve as building blocks to generate simulation about what person looks like when seen from outside.
5. Sharing and fusion of mental images is one of the basic notions of TGD inspired theory of consciousness [?, K6]. One can ask whether OBE involves sharing of the visual experience of other persons involved about subject person. If this were the case, the presence of other persons would be necessary to have OBE. Sharing of mental images would explain the case of Miss Z as telepathy.

6.3.2 Dark matter hierarchy

The identification of dark matter as a hierarchy of quantum phases labeled by the values of Planck constant [K13] provides additional insights about OBE experiences. Planck constant is quantized and can have arbitrarily large values and since Compton length and other analogous quantum lengths and times scale as Planck constant, this means macroscopic and macro-temporal quantum coherence and a reduced rate of dissipation.

Also the magnetic body controlling biological body (actually onion-like hierarchy of them) is assumed to carry dark matter and (forgetting ontological delicacies) dark matter could be seen as the agent responsible for the quantum control of ordinary matter in living systems. The value of Planck constant becomes also a measure for the evolutionary level of the living system and great leaps in evolution can be identified as transitions increasing the maximum value of \hbar in “personal” hierarchy of magnetic bodies [K11].

6.3.3 Zero energy ontology and causal diamonds

Zero energy ontology is second new element of quantum TGD and states that all physical states have vanishing net values of conserved quantum numbers. Zero energy ontology provides a firm justification for the notion of negative energy signals consisting of (say) phase conjugate photons propagating to the geometric past. These negative energy signals are crucial element of the time mirror mechanism playing a central role in the general mechanism for intentional action, remote metabolism, and long term memory.

Causal diamond (CD) defined roughly as the intersection of future and past directed light-cones serves as an embedding space correlate for zero energy state. Space-time sheets representing zero energy states are inside CD and the future *resp.* past boundaries of CD carry positive *resp.* negative energy parts of zero energy states.

What is important from the point of view of consciousness theory is that CDs serve as embedding space correlates of selves and sub-CDs as those for sub-selves (mental images). Sub-CDs are very much analogous to music instruments in the sense that the frequencies which come as harmonics of the fundamental frequency defined by the proper time distance between tips of CD (coming as powers of two) resonate with the geometry of CD and put it to “ring”. Sub-CDs could be seen as an analog of radio receiver as far as sensory representations are considered and sending antenna as far as the motor control of biological body is involved. This allows to communicate sensory data from brain to sub-CDs at magnetic body CD in a highly selective manner. MEs (massless extremals) mediating the communications between magnetic body and biological body are also very much like strings of a music instrument. This picture generalizes the earlier music metaphor applied to axonal pathways.

A more precise definition of CD is as the Cartesian product of the intersection of future and past directed light-cone with CP_2 . The hierarchy of Planck constants brings in additional structure. There is identification of preferred $M^2 \subset M^4$ defining a preferred time direction (rest system/quantization axis for energy) and spin quantization axis. The preferred geodesically trivial sphere $S^2 \subset CP_2$ and the selection of point assigned with CP_2 at the future and past boundaries of CD gives rise to a selection of quantization axes of color isospin and hyper charge.

Sensory representations are a key element of the consciousness theory and the moduli space of CDs characterizing what kind of CDs are possible brings in new representational resources.

1. The moduli space of sub-CDs involves the position for the either tip of the sub-CD and the naïve expectation is that this position could code for the position of the perceptive field. If so the representation would be very concrete and since the size of CD is already for electron with .1 lightseconds the representations is realized automatically in astrophysical scale.
2. The moduli space of sub-CDs assignable to the mental images with another tip fixed could represent geometric qualia. Without any further restrictions this space corresponds to proper time constant hyperboloid of future light cone. The values of time parameter come in powers of two. One can however quite well consider the possibility that only a discrete lattice of the hyperboloid is realized- at least in the intersection of real and p-adic worlds.
3. A Lorentz boost for sub-CD induces scaling of frequency and scaling of the object in the direction of the boost. Therefore boost coded to the fundamental frequency of CD could code for various shapes of a figure obtained by scaling. Boost of sub- CD leaving the other tip of sub- CD invariant could also code for the velocity of object. Also the velocity of the object of the perceptive field could be coded to the shape of sub-CD by performing corresponding Lorentz boosts to it [K35].
4. The moduli space of CDs contains also the choice of quantization axes of energy (preferred rest system) and spin as well as the choice of quantization axes of color isospin and hypercharge identifiable as flag manifold $SU(3)/U(1) \times U(1)$. Mathematician Barbara Shipman has proposed that this flag manifold is involved with the representation of geometric data in honeybee dance [A1] and I have proposed a model for what might be involved [K15].

The moduli space of CDs is thus highly relevant for the representation of the geometric data associated with the objects of the perceptive field and the this data would be communicated using MEs with harmonics of the fundamental frequency of sub-CD so that sub-CD would act like radio receiver. This includes the position of the real object codable to the position of sub-CDs at magnetic body, the velocity of the object of the perceptive field codeable to the Lorentz boost changing the shape of sub-CD and represented as scaling of the frequency assigned with the stationary object. Also the shape of perceptive field would represent this kind of geometric data. This picture supports the interpretation of sub-CDs as spotlights of attention giving information about many-sheeted space-time inside the regions defined by the sub-CDs. It would seem that sub-CDs are dynamical objects created, destroyed, and shifted in quantum jumps. This picture is also consistent with the explanation for the arrow of psychological time based on zero energy ontology [K44].

6.3.4 Negentropic entanglement

The third new element is the notion of negentropic entanglement (see **Fig.** <http://tgdtheory.fi/appfigures/cat.jpg> or **Fig. ??** in the appendix of this book) making sense when entanglement probabilities are rational or even algebraic numbers. Negentropic entanglement makes sense in the “intersection of real and p-adic worlds” consisting of partonic surfaces whose mathematical representations make sense both in real sense and p-adically. Negentropic entanglement is possible also between different number fields in accordance with the idea that cognition corresponds to p-adic number fields and cognitive representations are realized in the interactions of realities and p-adicities. Living matter is identified as matter in the intersection between real and p-adic worlds. This view together with zero energy ontology allows precise definition for the idea that intentional acts transform p-adic space-time sheets to real ones and for the reversal of this transformation [K22].

It is natural to assume that negentropic entanglement is what makes living matter living and is involved with the sharing of mental images and with the formation of sensory representations by entanglement. Negentropic entanglement can be also time-like. MEs are excellent candidates for mediating this kind of entanglement whereas magnetic flux tubes would naturally mediate space-like negentropic entanglement. The sequence of negentropic entanglements would have as its upper ends sub-CDs at highest layer of the magnetic body and sensory organs as its lower ends. Even sensory organ could have negentropic entanglement with the real object of the perceptive field and this might be crucial element in the construction of the sensory representations. For instance, the deduction of distance of the object of perceptive field might rely on interferometry using the dark variants of visible photons with wave length which is of the order of the distance to the object.

6.3.5 OBEs in more general framework

A general model for the remote mental interactions follows from a model for the living matter by assuming that also other biological bodies can serve as targets for the control action of the magnetic body or communicate sensory information to the magnetic body. The notion of negentropic entanglement favors biological systems as targets but it is of course an open question whether also “dead” matter could have negentropic entanglement with its magnetic body. Ordinary intentional action would represent a particular case of remote mental interaction in this framework.

Consider now OBEs in this general framework.

1. During OBE experiences the mental images constructed by brain about biological body could be absent due to the absence of the metabolic energy feed to the appropriate parts of brain taking care of the construction of cognitive mental images about biological body and communications of them to the magnetic body. The simplest representation would be in terms of bit sequences with bit 1/0 represented in terms of population inverted state/ground state of many-sheeted laser. Negative energy signals to the geometric past would be used to read these signals by inducing partial reduction of the population in inverted states. In absence of metabolic energy feed 1: s would gradually transform to 0: s. It is however essential that time-like negentropic entanglement is involved besides classical communications. This would make it possible to share the mental images.
2. In absence of these cognitive mental images to the magnetic body, magnetic body would not anymore provide strict cognitive representations of biological body and virtual world experiences would result. Since only magnetic body would contribute to the bodily experience, the low rate of dissipation due to large value of \hbar would explain the pleasant experience about the absence of the sensory noise.
3. This general picture could also explain why OBEs seem to correlate with neural disorders such as epilepsy and disorders relating to perturbed body image. During this kind of disorders the feedback provided by the sensory and cognitive input would be lacking from the brain regions suffering the neural disorder and magnetic body would be solely responsible for the body image. The lacking strict correspondence between the conformations of magnetic body and biological body would mean that the experience is hallucination from the point of view of biological body. At the embedding space level the “conformations” of the magnetic body could be rather abstract and represented in terms of positions and other moduli of sub-CDs.

6.4 A More Detailed Model For OBEs

In the following a more detailed model for various aspects of OBEs is developed.

6.4.1 Do bio-photons result from the de-coherence of dark photon beams?

Bio-holography provides support for the body as a hologram (more precisely, dark photon hologram). For instance, an electric stimulation of ear during Kirlian imaging of a finger tip creates a Kirlian photo from which it is possible to abstract a hologram of ear [I11] (for a TGD based model see [K6, K17]). This suggests that body parts can in some sense “see” each other. In particular, brain can “see” body parts (note that bacteria possess a primitive IR vision based

on micro-tubules): this of course need not correspond to a conscious vision at our level of self hierarchy.

The biological function of bio-photons [I6] is poorly understood, and they are an excellent candidate for ordinary photons resulting when dark photon beam de-coheres. TGD based model of bio-photons can be found in [K18] and the identification as dark photons is discussed in [K10]. The findings of Peter Gariaev about the effects of visible laser light on DNA [I4] and so called phantom DNA effect [I3] provide a further support for the biological importance of bio-photons (see the discussions in [K10, K18]).

6.4.2 What is the mechanism of out-of-body hearing?

Mechanism could be even more general and work also in the case of other qualia. In particular, hearing might involve similar reflection of sound waves at larger space-time sheets from the magnetic body and heard as “other-worldly” sounds.

A more plausible option is that the auditory sensation is generated by dark microwave photons reflected back from magnetic body. Microwave [K32] [I5] is indeed a well-known but poorly understood phenomenon and the generation of microwaves by plants after sunset correlates also with taos hum [I7] (see the discussion in [K19]) which does not generate any response in microphones but reflects the features of the acoustic environment.

The auditory and visual hallucinations of schizophrenic persons would represent in this framework a genuine sensory input. The notion of bicameral mind introduced by Jaynes [J33] discussed in TGD framework in [K38] would fit also nicely with this picture. The “god” controlling the behavior of bicameral by giving explicit commands would correspond to some magnetic body, not necessarily that of the subject person, but a magnetic body receiving input from several brains in the social group and representing collective consciousness.

6.4.3 Where are the sensory receptors giving rise to the primary sensory experience?

The simplest guess is that the visual stimulus from the magnetic body is received by eyes. The fact that REM accompanies visual dreaming supports this view in the case of dreams. The receiving sensory organ could be also pineal gland [K9, K36], “third eye”, the seat of the soul according to Descartes [J17]. Pineal gland is known to contain retinal pigments and its counterpart in more primitive animals is known to function as a genuine eye. A simple test in the case of artificial OBEs is to look whether the electric stimulation of OBEs generates also REM.

If OBE hearing is indeed microwave hearing, the identification of the primary sensory receptors is not obvious, although their existence cannot be denied.

The insect olfaction relies on infrared light as discovered by Callahan [I9] (see the discussion in [K15]). One might therefore wonder whether also humans possess olfactory receptors sensitive to IR light, and whether the emission of dark IR photons reflected from magnetic body could play some role in olfaction and in the generation of olfactory hallucinations. One can even ask, whether the molecular recognition mechanism underlying chemical senses relies on IR light. It is known that human nose contains so called vomeronasal organ [J1] sensitive to odors having sexual or social meaning but that these odors do not give rise to a conscious experience.

It is known that blind persons can learn to “see” when their skin is stimulated by electromagnetic fields representing the environment. Perhaps dark photon beams could induce also tactile sensations. Quite generally, the earlier proposal that information in all sensory modalities can be transformed to field patterns represented by MEs could sharpen to the hypothesis that the information in various sensory modalities allows a representation as dark photon beams inducing corresponding sensory qualia in the interaction with appropriate sensory receptors.

6.4.4 What is the mechanism causing the kinesthetic sensations during OBEs?

The model should also explain sensations of lifting, flying experiences, and the experiences of being in translational or rotational motion. The motion of the magnetic body with respect to the physical body should induce this kind of sensations. The basic idea is simple: generalize the mechanism allowing to hear the motion of a sound source. Generalizing from sound waves to dark photon beams, the sensation in question would be basically due to the Doppler shift of the dark photon beams travelling between biological body and the moving magnetic body. The change

of the dynamical hologram resulting in the interference of a bodily reference beam and Doppler shifted reflected beam in quantum jumps could be responsible for the sensation.

This model could also resolve an objection against the hypothesis that sensory receptors experience the primary qualia. The objection is based on train illusion. When you sit on a train and look at second train which starts to move, you can have an illusion that it is your train that moves. The illusion is not a mere belief but involves a sensation of acceleration in the entire body. There are two options.

1. The sensation is a response to various bodily activities induced by the belief of being in an accelerated motion.
2. The sensation is caused by a primary sensory input induced by the acceleration. This sensory input must be produced artificially in the case of train illusion.

Consider first a genuine accelerated motion of the biological body. One could argue that in absence of visual, auditory or other sensory information about being in accelerated motion, there is no belief about being in accelerated motion so that acceleration is not perceived at all for option a). This makes option a) implausible. For option b) the acceleration of the biological body with respect to the object defining the rest system is directly perceived. The Doppler shift of the dark photon beams radiated from biological body and reflected back from the rest system would induce the sensation. Reflection could occur either from the rest system or a magnetic body associated with it.

One can imagine two mechanisms creating an illusory acceleration for option b).

1. If the fixation of the attention to the moving train means the presence of dark photon laser beams connecting biological body and train or a magnetic body associated with it, the Doppler shift of dark photon beams could induce the sensation of acceleration.
2. Directed attention could cause a personal magnetic body to mimic the motion of train so that the relevant part of it deforms in the direction of moving train to keep the distance to the moving train fixed. This would induce train illusion by the same mechanism as in case 1).

For both mechanisms the reflection of dark photon beams becomes the fundamental mechanism of directed attention. Attention would mean a formation very concrete bonds between subject and object or a representation of object at the personal magnetic body: the rays connecting the eyes of cartoon characters would represent a very profound idea about consciousness. Both views about attention mean a clear-cut deviation from the prevailing neuro-scientific thinking according to which the experienced world is virtual and completely detached from the real world.

Cliff illusion might be an appropriate name for the disgusting feeling in stomach which one feels on the brink of a precipice. Sensory imagination about falling down is in question and could be induced by the deformation of the personal magnetic body such that it mimics free fall.

The floating sensations and strange deformations of personal body during OBEs could also correspond to the deformation dynamics of the magnetic body which could be also caused by external influences. If the size of the magnetic body is measured using Earth radius as a natural unit and if the personal magnetic body co-rotates with Earth, the variation of the effect of the solar wind could induce periodic deformations of the magnetic body as in the case of Earth's magnetic field. This could reflect itself as diurnal alterations in the shape of the body experienced during OBEs: a contraction during day time and an elongation during night time. Sunspot maxima induce magnetic storms and these could have strong effects on the shape of the body perceived during OBEs.

6.4.5 What is the mechanism making possible to see internal organs?

Becker tells in his book "Cross currents" [J43] about a young cancer patient who told that he can see the interior of his own body. The patient could also locate the remnant of the tumor correctly. The simplest explanation is that magnetic body at some level of hierarchy reflects the dark photons emitted by the internal organs.

Usually this does not occur and one should understand why the emission occurred in the case of the cancer patient. There is evidence that bio-photons leak out from non-healthy organs [I6]: this might mean that organs send more intense dark photon beams reflected at the magnetic body.

Time mirror mechanism involving time reflection instead of ordinary reflection suggests itself as an alternative explanation. The cells suffering starvation generated phase conjugate dark photon beams in order to get metabolic energy. This in turn induced a cascade like emission of positive energy dark photon beams from the magnetic body instead of mere time reflection.

6.5 The Role Of The Magnetic Body In The Case Of Other Brain Functions

During the construction of the model of OBEs it became clear that the reflection of dark photon beams from the magnetic body could serve as a building block of several ordinary brain functions. If has been already found that dark photon beams could define a fundamental mechanism of directed attention.

6.5.1 Dreams and hallucinations and magnetic body

The reflection of dark photon beams from the magnetic body could be involved also with dreams and hallucinations so that the neurological similarity of AS experiences and OBEs does not mean that both are hallucinatory. The “subtle body” assigned by many spiritual traditions with the dreaming state (for a nice summary see [J36]) would correspond to the magnetic body. In this case mental images constructed in brain would induce dark photon beams sent to magnetic body and reflected back. The mechanism would also naturally explain autoscopic and heautosopic experiences, in particular the ability to see internal organs.

6.5.2 The relationship of EMDR experiences to OBEs

Near-death experiences are not the only manner to get convinced about life after death. So called eye-movement de-sensitization and reprocessing (EMDR) discovered by Francine Shapiro [J7] induces what could be interpreted as after-death communications (see the discussion in [K34]). The experiences of subject persons are claimed to be induced by this therapy in a highly reliable manner: according to [J7] 98 per cent of patients willing to participate the therapy had after death communication experience. It does not matter what the religious convictions of the subject person are and the experiences are actually rather easy to induce. It does not matter if the loss is traumatic or not or whether it is recent or occurred for decades in past.

The experiences resemble near death experiences (light tunnels, beautiful landscapes) and involve spiritual contact with the deceased. The EMDR technique involves getting the patient to move his or her eyes in a particular rhythmic fashion while at the same time attending to a particular aspect of the traumatic memory. How EMRD works is poorly understood as yet: possibly the fact that the shifting of eyes leads to increased brain processing is of importance. Notice that rapid eye movements REM are also involved with dreams.

A possible explanation is that EMDR experiences involves visual communication using dark photon beams and/or their phase conjugates with the 4-D magnetic bodies of the deceased ones located possibly in the geometric recent or past via the magnetic mirrors associated with them. Essentially the same mechanism as involved with long term episodal memories could be in question: the only difference would be that the magnetic mirrors now mediate information not from own 4-D body from the 4-D body of the deceased.

6.5.3 Third person aspect of conscious experience

Our conscious experience involves so called third person aspect giving a symbolic bird’s eye of view about ourselves. Magnetic body could take the role of the third person. At the fundamental level this representation could be based on sensory stimuli originating from body and reflected back to sensory organs. It would be completely masked by the ordinary sensory input in wake-up state but distilled by brain from the dominating sensory input and coded to a cognitive representation to minimize the amount of irrelevant information. A strong interference of this kind of sensory representation with ordinary sensory input would be obviously highly undesirable. The third

person aspect could be present always and be based on the reflection of dark photons along MEs parallel to magnetic flux tubes.

6.5.4 Feedback to primary sensory organs via reflection from magnetic body

One objection against the hypothesis that primary sensory organs are seats of sensory qualia is that sensory stimuli are only the raw material sculptured into actual sensory perceptions and that directed attention chooses what aspects of sensory stimulus are amplified and which neglected. I have proposed that there is a feedback by projections to the primary sensory organs from brain generating artificial sensory stimuli modifying the primary sensory input. This feedback could be realized also as a reflection of artificial dark photon beams generated by brain from the magnetic body and received as such by eyes or received by brain and channelled to eyes via MEs parallel to visual pathways.

6.5.5 Does imagination involve feedback via magnetic body?

One can wonder, whether also imagination could involve reflection of dark photon beams from the magnetic body. In TGD framework the hypothesis that sensory qualia are generated at primary sensory organs and brain constructs only symbolic representations about experiences circumvents the basic objections such as the experience of phantom leg. In this framework imagination and cognition can be identified as symbol generating activities which are not initiated at sensory organs but at some higher level of the hierarchy starting from sensory organs and ending at the associative areas of cortex.

Imagination could however involve also transformation of symbolic representations to dark photon beams reflected back from the magnetic body. This input would not contribute to sensory input but might be abstracted from the sensory input and might serve as a kind of feedback. In absence of ordinary sensory stimuli the input from the magnetic body would dominate and imagined mental images would transform to dreams or hallucinations.

6.5.6 Sensory memories and magnetic body

In some exceptional cases often associated with a serious damage in cognitive areas of brain the feedback from the magnetic body could give rise to a genuine sensory representation making possible direct sensory memories. Examples are autistic persons with ability to remember visual scenes music pieces in every detail and also reproduce them.

One explanation is sharing of sensory mental images of geometric past. An alternative explanation is that the information about sensory memory is communicated from the geometric past in symbolic form and transformed to a dark photon beam reflected back from the magnetic body. The fact that angular gyrus is involved with the translation of written language to internal speech and the abstraction of meaning of visual metaphors supports the view that a transformation of linguistic statements to concrete images projected to the magnetic body occurs in this process.

I have proposed a mechanism [K35] explaining synesthesia. The association of different sensory modalities could also occur via a transformation of sensory input in given modality to dark photon beam reflected from magnetic body and generating a sensation in another modality. Synesthetes are also known to be capable of amazing sensory memory feats [J41] and I have proposed an explanation based on time mirror mechanism [K35]. Also in this case neurons in certain region of left brain hemisphere suffer starvation which should be lethal by standard wisdom.

As a matter fact, the starvation mechanism seems to be a very general mechanism: Callahan has found evidence that insects find more easily the plants suffering from under nutrition [I8] (see the discussion in [K16]). Even the fasting common in spiritual practices could be seen as a method to get body entangled with magnetic bodies by using time mirror mechanism.

6.6 Psychedelics Induced Experiences And Magnetic Body

There is a book about psychedelic induced experiences titled as “Inner paths to outer space” (<http://tinyurl.com/gnb4bp9>) written by Rick Strassman, Slawek Wojtowicz, Luis Eduardo Luna and Ede Frecska [J25]. It took some time to realize that I have actually have met the Luna and Frecska.

The natural TGD inspired hypothesis to be discussed in sequel in detail goes as follows.

1. Psychedelics bind to the same receptors as the neurotransmitters with similar aromatic rings (weaker assumption is that neurotransmitters in question possess aromatic rings). This is presumably consistent with the standard explanation of the effect of classical psychedelics as a modification of serotonin uptake. This binding replaces the flux tube connection via neurotransmitter to some part of the personal magnetic body with a connection via psychedelic to some other system, which might be even in outer space. A communication line is created making among other things possible remote sensory experiences.

Magnetic fields extending to arbitrary large distances in Maxwell's theory are replaced with flux tubes in TGD framework. The magnetic bodies of psychedelics would carry very weak magnetic fields and would have very large h_{eff} - maybe serving as a kind of intelligence quotient.

2. This would be like replacing the connection to the nearby computer server with a connection to a server at the other side of the globe. This would affect the usual function of transmitter and possibly induce negative side effects. Clearly, TGD inspired hypothesis gives for the psychedelics much more active role than standard hypothesis.
3. Psychedelics can be classified into two groups depending on whether they contain derivative of amino-acid trp with two aromatic rings or phe with one aromatic ring. Also DNA nucleotide resp. its conjugate have 2 resp. 1 similar aromatic rings. This suggests that the coupling between information molecule and receptor is universal and same as the coupling between the two bases in DNA double strand and consists of hydrogen bonds. This hypothesis is testable since it requires that the trp:s/phe:s of the information molecule can be brought to same positions as phe:s/trp:s in the receptor. If also protein folding relies on this coupling, one might be able to predict the folding to a high degree.
4. A highly suggestive idea is that molecules with aromatic rings are fundamental conscious entities at the level of molecular biology, and that more complex conscious entities are created from them by reconnection of flux tubes. DNA/RNA sequences and microtubules would be basic examples about this architecture of consciousness. If so, protein folding would be dictated by the formation trp-phe contacts giving rise to larger conscious entities.

This model meets of course strong objection: finite light velocity does not allow communications with outer space in standard physics framework. In TGD framework Zero Energy Ontology changes the situation. Second objection is that the communications require huge amount of energy unless they are precisely targeted. The third objection is that quantum coherence in very long, even astrophysical scales is required. In TGD framework these objections do not apply.

6.6.1 Some background about psychedelics

Psychoactive drugs can be classified into three basic types. Some raise the activity level (excitation), some calm down (inhibition), and some change the character of consciousness profoundly. Psychedelics/hallucinogens [J25] belong to the third group. Psychedelics (such as psilocin, psilocybin, DMT, LSD) containing aromatic rings and many of them (such as psilocin, psilocybin, DMT) attach to serotonin receptors.

As the official term "hallucinogens" implies, psychedelic induced experiences are regarded as hallucinations in the materialistic world view although the denial of the reality of subjective experiences themselves requires a really hard-nosed skeptic. The title of the book reveals that the question posed in the book is whether these experiences could be about real world, kind of sensory input from distant parts of the Universe. The indigenous people using ayahuasca and similar psychedelics have regarded these experiences involving meeting of representatives of other civilizations as perceptions about real worlds. Also Terence and Dennis McKenna, who are pioneers of systematic study of the effects of various psychedelics, shared this view. In the materialistic ontology of standard physics this kind of interpretation is of course excluded. That hallucinations are in question is "obvious", too obvious actually!

The classical psychedelics are psilocin and psilocybin contained by mushrooms, DMT found in ayahuasca, and mescaline found in peyote cactus. DMT is an endogenous psychedelic and there is pumping of DMT through blood-brain barrier so that DMT could have important brain function.

The aromatic ring structures of psychedelics and neurotransmitters (<http://tinyurl.com/d8636or>) involved provide a more concrete view about the situation.

1. Classical psychedelics are derivatives of two basic chemical groups: tryptamine and phenethylamine which in turn derive from the amino-acids trypandphe.
2. Trp (<http://tinyurl.com/y967c489>) is characterized by pair of aromatic rings (6-cycle and 5-cycle). Psychedelic psilocin (<http://tinyurl.com/yanyvhg1>), <http://tinyurl.com/blkp76t>, DMT (<http://tinyurl.com/osfg9r3>) have 2 aromatic rings. Neurotransmitter serotonin (<http://tinyurl.com/14h2g2y>) has also two aromatic rings.
3. Phe (<http://tinyurl.com/kr5cvud>) has single aromatic ring (6-cycle). Psychedelic mescaline (<http://tinyurl.com/cgw7nuv>) has single aromatic ring. Neurotransmitters dopamine (<http://tinyurl.com/bvxmwch>) and norepinephrine have one aromatic ring. Note that both serotonin, dopamine, and norepinephrine (<http://tinyurl.com/yaxyj9q6>) are associated with mood disorders: clearly control in long time scales is in question, which in TGD framework suggests very large size scales for the parts of magnetic body involved.
4. Remarkably, DNA and RNA nucleotides can be classified to those with two aromatic rings (pyrimidines A and G) and there conjugates with one aromatic ring (purines C, T and U). Note that also his and tyr are amino-acids (<http://tinyurl.com/jsphvgt>) with single aromatic ring (<http://tinyurl.com/yb492da6>). Information molecules involve often aromatic rings. For instance, hormones involve often complex rings structures. Also hydrophobic second messengers (such as cAMP) (<http://tinyurl.com/yajhj9zb>) involve aromatic rings.
5. LSD (<http://tinyurl.com/c112ox7>), which is synthetic psychedelic, has 3 6-rings and one 5-ring.
6. The classification of the neurotransmitter receptors (<http://tinyurl.com/cqyoref>) provides further insights. They are classified into two groups. Ligand gated receptors can be excited and inhibited by certain neural transmitters. G-protein coupled receptors (<http://tinyurl.com/y9qesr87>) modulate the actions of excitatory (glutamate, aspartate) and inhibitory neural transmitters (GABA, glycine). Most neural transmitters bind to G-protein coupled receptors and this is true for classical psychedelics and for serotonin, dopamine, and norepinephrine.

The first guess is that the presence of aromatic rings determines the character of the transmitter receptor pair and that G-protein coupled receptors having aromatic rings are above ligand gated receptors in the hierarchy and control them. They would correspond to two different levels in the hierarchy of magnetic bodies. Note that also LSD binds to G-protein receptors.

According to the book [J25], pineal gland might be in a special role concerning psychedelics.

1. Pineal gland is the only nucleus of brain, which does not appear as left-right pair: this suggests that its functions relate to a control of the entire brain in long time scales. Descartes regarded pineal gland as the seat of soul. Pineal gland is also known as “third eye” and in lower species it indeed serves the function of eye.
2. Pineal gland is responsible for the production of melatonin: the production rate varies with a circadian rhythm. Melatonin is a serotonin derived hormone and therefore has 2 aromatic rings: this suggests that the amount of serotonin is higher in pineal gland than elsewhere in brain. Melatonin helps in sleep disorders and affects also other parts of brain. One can ask whether melatonin is involved with establishing of distant flux tube connections during sleep - not only in pineal gland but also in other parts of brain - and whether these connections are built up during sleep.

3. There is some evidence that pineal gland can produce DMT from tryptamine (<http://tinyurl.com/osfg9r3>) *believed* to be released during dreaming, during spiritual and mystical experiences, and during the time of death. Taking the title of the book seriously, one can ask whether this eye is able to see also to cosmic distances possibly using large h_{eff} photons and whether DMT is involved.

6.6.2 Could instantaneous communications in cosmic scales be possible in TGD Universe?

In TGD inspired ontology the notion of magnetic body with astrophysical, galactic or even supergalactic size changes the situation completely. The basic communication tool would be touch of magnetic bodies generating reconnections and making possible signalling from the biological body to the member of distant civilization. The perception of the biological body of alien would differ in no manner from that of my neighbor since the mechanisms would be the same as involved with the transfer of sensory data to my personal magnetic body and control commands from there to biological body (at least through genome).

The basic objection against the possibility suggested by the title of the book is that finite light velocity poses absolute upper bound for the distance of objects with it is possible to be in contact during “trip”. One must be however very cautious here: the assumption that signals propagate only to singlet direction of time is essential also and derives from classical thermodynamics. In TGD framework second law continues to hold true but the arrow of geometric time for zero energy states changes in each state function reduction occurring to the either boundary of CD. Hence instantaneous communications (“remote seeing” !) using reflection in time direction become possible even over cosmological distances and define among other things the mechanism of memory in TGD Universe.

Time consuming and expensive space travel would become un-necessary: our magnetic body giving us cosmic size together with zero energy ontology making possible instantaneous “seeing” of both future and past by reflection of photons in time direction would be enough. Memory and anticipation would be basic examples about seeing in time direction. This view would also resolve Fermi paradox. We could be actually in a continual contact with the distant civilizations but without realizing it. One can ask whether similar contacts could take place in psychedelic induced experiences. Memories and future plans would be examples of “seeing” in time direction. The continual re-creation of the Universe by quantum jumps would of course mean that the actual future/past need not be same as those which are “seen”. Shamans identify various plants as conscious entities teaching them - in TGD framework this would translate to magnetic bodies of representatives of distant civilizations remotely teaching the representatives of more primitive civilizations.

What is the precise meaning of the catchy phrases “communications with geometric past/future”, “time reflection”, and “seeing in time direction”.

1. The recent view about state function reduction in Zero Energy Ontology leads to a precise identification of self as conscious entity. Self corresponds to a sequence of state function reductions leaving the passive boundary of causal diamond (CD) invariant and also Zero energy states correspond to superpositions of state pairs at opposite boundaries of CD. State function reduction leaves the member of the state pair at either boundary of CD (call it passive boundary) invariant - this is the counterpart of Zeno effect.

In the analog of unitary evolution following each reduction the position of active boundary is shifted to geometric future and the state at it is changed. This is the counterpart of unitary time evolution at active boundary. The increase of the temporal distance between the tips of CD gives rise to the experienced flow of time. Negentropy Maximization Principle (NMP) eventually forces the first reduction to the opposite boundary of CD: self dies and reincarnates at the opposite boundary and growth of the CD continues at opposite direction. The new self has arrow of time opposite that for the old one. The first state function reduction generates negentropic entanglement and can increase the value of h_{eff} so that evolution becomes possible.

2. In this framework geometric memories correspond naturally to time reversed sub-selves defining mental images. The space-time region (active boundary of CD) wherefrom they receive

sensory information is indeed in geometric past of the self so that the interpretation as episodal memory makes sense. Also classical communications are naturally associated with sub-self and its time reversal. Note that precognition is memory from the point of time-reversed self. During sleep we precognize our geometric future.

Consider now communications with distant objects in this framework.

1. Negative energy signal would mean death of sub-self representing mental images and its re-incarnation in the geometric past accompanied by negative energy signa received by the new sub-self. The death of the time-reversed sub-self generates a sub-self with original arrow of time receiving the accompanying positive energy signal. The dying sub-self sends a signal received by its re-incarnation!
2. Communications with distant parts of the cosmos would be experiencing the time reversals of one's own mental images! We would be quite literally cosmic entities. Study of cosmos would be study of our own minds. In this situation mind is only conscious about itself. If Mind is conscious about other Mind it must fuse with it to single Mind by generating negentropic entanglement, otherwise it has no experience about other Mind. As far conscious experience is involved, there is only one Mind. This is the TGD analog for One Mind theory and is able to avoid the paradox.

If the sub-self representing self model dies as one falls in sleep and re-incarnates as its own time reversal at the opposite boundary of CD, sleep could involve communications with distant parts of the Universe. Pineal gland generating DMT could play a key role in this process.

6.6.3 Why information molecules containing aromatic rings should be so important?

I have considered the question of the title in [L13] [K33] (<http://tinyurl.com/yatfreqe>). The basis idea is that aromatic ring can carry the analog of supra-current as electron pair and this current generates a dipole magnetic field represented as flux tubes around the ring. This makes molecules with aromatic rings basic conscious entities in living matter. The flux tubes can carry dark matter and if there are several molecules with aromatic rings near each other, reconnections can take place and give rise to larger structures with building bricks connected by pairs of flux tubes carrying supra currents and dark cyclotron photon signals.

DNA would be the fundamental structure of this kind. Each base-pair would contain $1+2+1+1=5$ (two rings from sugars) aromatic rings and longer DNA sequences would define larger conscious entities. Microtubules contain also aromatic rings assignable to 2 amino-acids phe and trp appearing in the tubulin molecules. Of course, all proteins contain these aromatic rings possibly integrating by flux tube connections to larger conscious entities. In this picture it would not be surprising of the basic information molecules would also involve aromatic rings.

DNA letters A,G and their conjugates T,C have the ring structures of trp and phe respectively and base pairs in the double DNA strand correspond to trp and phe ring structures connected by hydrogen bonds. Could the information molecule-receptor protein coupling rely on similar couplings with trp and phe playing the role of fundamental plugs. This hypothesis predicts that more complex information molecule-receptor pairs should have geometries in which trp:s and phe:s can meet each other naturally. Also protein folding could involve similar trp-phe self-couplings by hydrogen bonds determining the folding to a considerable degree. Protein folding would be determined basically by the generation of negentropic entanglement dictated by NMP and its understanding would require quantum theory of consciousness.

6.6.4 Psychedelic-receptor complex as plug-in to cosmic internet and a new perspective on remote seeing?

If one - just for fun - takes seriously the claims of shamans, one must ask whether our brain has well developed tools available for building contacts with distant civilizations and what these tools might be. The receptors of neural transmitters are obviously the natural candidates for the pathways to cosmos. In the case of neural transmitters these would serve as pathways to the personal magnetic body (with onion-like structure). Neural transmitters could be however replaced with psychedelics

if they have a geometric structure allowing a binding to the corresponding receptors. If psychedelics have flux tube connections to very distant parts of the Universe, a connection is generated.

1. One can argue that evolutionary pressures have forced living matter to develop highly standardized connections to various parts of the personal magnetic body and possibly also other magnetic bodies. Personal magnetic body has astrophysical size and EEG frequencies would correspond to communications in Earth size scale. Receptors serving as Josephson junctions emitting Josephson radiation with frequency characterised by h_{eff} are natural candidates for plug-ins.
2. The model for cell membrane as Josephson junction leads at the microscopic level to the view that the proteins associated with various ion pumps, channels, and receptors (of also neurotransmitters in postsynaptic junction) define Josephson junctions to which magnetic flux tubes are associated and characterized by local value of Josephson frequency, that is membrane potential and Planck constant h_{eff} . As the information molecule is attached to a receptor, a connection to some part of the some magnetic body would be generated and split as the molecule is not present. These connections are possible in the scale cell, organelle, organ, organism, population and maybe even in the scale of cosmos. Psychedelics affect serotonin receptors so that serotonin spends longer time in receptor.
3. The simplest picture is that the connection corresponds to a pair of flux tubes. As the connection is broken, the pair has suffered reconnection cutting it to two U-shaped closed flux tubes. When molecule is attached to the receptor, these U-shape closed flux tubes reconnect. The actual situation is of course expected to be more complex but the basic principle would be this.
4. Neurotransmitters and also other information molecules can be seen as molecules at the ends of flux tubes having ends in some fixed subsystem X. The attachment of neurotransmitter to the receptor would build a flux tube connection between postsynaptic neuron and X. The magnetic bodies in question characterised by passwords defined by collections of cyclotron frequencies corresponding to a hierarchy of space-time sheets. The Josephson frequency associated with the receptor is inversely proportional to h_{eff} . The natural guess is that it corresponds to the cyclotron frequency of the magnetic body part for electron, proton, or some ion associated with it. Josephson frequencies should serve as kind of passwords and receptors would be in one-one correspondence with these passwords defining gateways even to the outer space if the value of Planck constant is large enough.
The basic difference to ordinary view is that information molecules build only connections: after the establishment of a connection dark supracurrents and dark photons take care of the communication. Attaching the information molecule to receptor is like clicking a link in web.
5. Psychedelics would replace the ordinary neural transmitters building up this kind of flux tube connections in the normal situation so that the connections could be to quite different places.

One might be able to test this crazy hypothesis.

1. Pineal gland could still serve as the “third eye” but utilizing large h_{eff} photons. Fishes and birds are able to navigate to their birth places. The strongest assumption is that the flux tubes connect birth place and place of migration.

This mechanism could involve dark electron Cooper pairs at the magnetic flux tubes of Earth’s magnetic field generated by visible photons with energies above energy of red light making possible to move along magnetic flux tube. As the direction of flight ceases to be along it and spin direction of cyclotron Bose-Einstein condensate changes, cyclotron transitions would induce dark photon emission at energy of visible photons in turn generating visual sensation serving as a signal allowing to correct the direction of flight. This would explain why radiation at MHz frequency leads to disorientation (cyclotron transitions are induced resonantly).

This need not be enough. Could also “remote seeing” by pineal gland using the dark light coming along flux tubes (or maybe even active variant of this process by sending light which is reflected back in time direction). What about remote seeing in the “usual” sense of the word: could psychedelics help also in this process?

2. The role of DMT is especially interesting. Body synthesizes it and pumps it through blood-brain barrier. I learned in private discussion that the experiences induced by DMT are relatively predictable (Terence Mac Kenna has described it as a sudden “dropping” to another world somewhere “below” through some kind of wall) whereas other psychedelic substances induce rather unpredictable experiences.

Could it be that DMT corresponds to a permanent connection to some fixed external magnetic body or to a higher layer of level of personal magnetic body with permanent reconnection to some part other magnetic body? DMT as also other psychedelic substances would only help to induce the signal as Josephson radiation. This would be analog to the higher probability of remote mental interaction due to pre-bonding. What happens during sleep: is this connection generated during sleep: what about concentration of DMT during sleep in various brain regions.

3. The information molecule-receptor complex would be associated with the communications to a part of magnetic body determined by the flux tube assignable to the information molecule and possible communications from magnetic body as sensory experiences such as psychedelic experiences and mediated by radiation in opposite time direction. Also control commands from magnetic body - assumed to be realized as signals in opposite time direction as compared to sensory signals - are important and a natural assumption is that the commands initiating gene expression enter through genome via flux sheets traversing through DNA: the time scale for gene expression is slow and also other mechanisms are very probably involved. If both genome and cell membrane can (on general grounds it seems that they must do so) send signals in both time directions, the general vision about motor action as time reversal of sensory perception implies that cell membrane receives also control commands.

More generally, the complex formed by reacting biomolecules and catalyst could form a complex receiving control commands from the magnetic body. A temporary fusion of a catalyst molecule and of reacting molecules could serve as the analog of the information molecule-receptor complex. The protein Josephson junction associated with this complex would receive in a resonant manner cyclotron radiation from the magnetic body inducing a transition to a state in which the potential barrier preventing the reaction would be lower.

4. An interesting but ethically questionable test for the hypothesis would be following. Transfer neurotransmitters associated with the of subject B to the brain of person A, and see what effect they have on conscious experience of A. If the proposal is correct, person A would have flux tube connection to the magnetic body of B, and might receive some memories of B for instance. Could transplants induce similar effects? Heart transplants are reported to have strange effects suggesting that heart (having a lot of neurons) has emotional memories.

Irrespective of whether one takes seriously the thought game leading to this proposal, one must admit that it would provide deep for the notion of “information molecule”.

6.6.5 Still about the mystery of DMT

In FB I got a link to a very interesting article about DMT (N,N-Dimethyltryptamine, see <http://tinyurl.com/y8qrp8tc>). DMT (see <http://tinyurl.com/osfg9r3>) is psychedelic or hallucinogen - depending on one's attitudes. DMT is used for spiritual and healing purposes in many cultures. The effect is short-lasting: from 5 to 15 minutes. DMT induces mystical experiences, euphoria, dynamical geometric hallucinations of geometric forms, experiences about meeting of higher intelligences, extraterrestrials, elves, and even God.

First some facts about DMT.

1. DMT is found in both plants and animals and is the only naturally occurring psychedelic. Its occurrence in the pineal gland of rodents and therefore also of mammals has been reported.

2. Chemically DMT is a structural analog of serotonin and melatonin and involves aromatic 6-cycle and 5-cycle with common edge appearing in amino-acid tryptophan (see <http://tinyurl.com/przan6k>). Also DNA nucleotides A and G have this double cycle structure but have however more than one nitrogen atom.
3. The biosynthesis of DMT from amino-acid L-tryptophan (occurring endogenously in plants but not in animals) has been detected in rabbit's lungs. Whether DMT is produced by brain is still an unsettled question. It has been even argued that DMT is mere waste.

In TGD framework aromatic cycles serve as indication that molecule contains paired valence electrons with the value of $h_{eff}/h = n$ higher than its standard value: this explains the delocalization of electrons to longer than atomic length scale. n would serve as a kind of intelligence quotient: the larger the value of n is, the larger the maximal value of entanglement negentropy of the system is (understanding of this statement requires going outside the framework of the mathematical framework of standard physics: I call this framework adelic physics [L15] [K3] (see <http://tinyurl.com/ybp74yf8>).

In this picture the interpretation as a waste does not look sensible and the proposal that DMT is produced by brain or some other parts of body looks more reasonable. Biology does not usually manufacture anything without purpose. Especially so, if the manufacturing process requires metabolic energy. The biosynthesis of DMT from tryptophan does not occur spontaneously and requires N-methyltransferase enzyme as a catalyst. Also the highly non-trivial positive effects of DMT on consciousness suggests that it cannot be waste.

To understand what the purpose of DMT could be, one must have some idea about sensory perception in TGD Universe (I have already earlier written about DMT and psychedelics [L12] (see <http://tinyurl.com/ycualn43>).

1. TGD view about sensory perception relies on the idea that sensory qualia are at the level of sensory organs: this view makes sense if one accepts macroscopic quantum coherence [L14] (see <http://tinyurl.com/yb99u6u8>). TGD based view about time (zero energy ontology (ZEO)) allow to circumvent basic objections such as phantom leg: pain in phantom leg would be sensory memory of pain and in geometric past when the leg still existed. These sensory memories can be produced by stimulating temporal lobes in any subject person. One also avoids the challenge of explaining why structures consisting of essentially identical neutrons can produce so different sensory qualia.
2. This model however requires virtual visual feedback from brain realized as dark photons, which leak to ordinary photons identifiable as biophotons with energied in visible and UV range. The presence of virtual visual input could explain why the retina has inverted structure not expected in engineerish thinking.

Sensory percept would be an artwork created by the perceiver. This conforms with the fact that when congenitally blind people receive their vision, they report only seeing of diffuse light. The percept would be a standardized sensory mental images emerging as an outcome of iteration in which dark photons signals travel forth and back and give rise to a pattern recognition by transforming sensory input to standardized input nearest to it.

3. Dark photon signals would travel along magnetic flux tubes between brain to sensory organs and even between brain and magnetic body (MB) in much longer scales. Flux tubes would give rise to a connection network analogous to a telephone network. This network would have permanent part and dynamical part consisting of switches allowing to connect two flux tubes to single flux tube by a short bridge. Information molecules such as neurotransmitters, hormones, and messengers could act as switches/bridges: when the information molecule attaches to a receptor, the bridge is formed and signals can propagate.

Also nerve pulses could induce flux tube bridges between neurons of the neuronal pathway by using neurotransmitters and learning as amplification of synaptic connections would be essentially the gradual stabilization of these flux tube bridges. Nerve pulse patterns need not serve as communications inside brain but could only make possible communications in much

shorter time scales using dark photons. For 1 meter long axons about million forth and back signals are possible during millisecond.

Nerve pulses would however frequency modulate Josephson radiation from the generalized Josephson junctions defined by membrane proteins serving as ion channels. This modulation would code nerve pulse patterns to signals to MB mediated by EEG: EEG could also have fractally scaled variants corresponding to various layers of MB. This would explain the function of EEG.

4. Virtual sensory input need not always end up down to the sensory organs: there would be some kind of blocking stopping the virtual sensory input to higher level so that one would have only almost sensory percept: an imagined sensory experience. The virtual sensory input associated with imagination could proceed along different route than that associated with the buildup of percept. Also imagined motor actions would be halted motor actions. During REM sleep the blocking would not be present and the virtual sensory input would enter to sensory organs, in particular retina.
5. Pineal gland represents a kind of photoreceptor, “third eye”, which still serves as eye in some animals. Could the dark photons involved with imagination be received in pineal gland. Could they continue to travel to sensory organs during dreams and hallucinations? Pineal gland would be an organ of imagination besides serving as seat of soul! What is nice from the point of view of biological economy is that pineal gland would not be useless evolutionary remnant but would have found a new function.

Accepting this schematic view one can ask about the possible function of DMT.

1. DMT molecules could make possible REM dreams by providing the bridges making possible the propagation of dark photons to the retina. Pineal gland would be the natural relay station. Same mechanism could work for other sensory modalities if dark photons mediate the virtual sensory input transformed to ordinary percept at sensory organs. Also hallucinations would rely on this mechanism.
2. MB has very large layers, there is even evidence that galactic magnetic field is in contact with personal MB (personal MB could have flux tubes inside flux tubes of galactic magnetic field). Since magnetic field in Maxwellian world extends to infinity and since in TGD systems have field identity (field body/MB), one can even image that there are connections to distant civilizations with very weak magnetic field strengths at corresponding flux tubes carrying dark matter.

These connections could make possible a genuine sharing of sensory experiences and the encounters with ETs and alike could be genuine remote meetings! We might have these encounters during sleep quite routinely but would not remember anything since the sensory information would stop at the third eye! Only during dreams situation might change but also now sensory input would be virtual and represent imaginations.

Remark: I have told many times that I am working intensely and close my eyes lightly, I see a dim flow consisting of points and resembling an incompressible hydrodynamic flow. There are vortices and the flow goes back and forth. The flow lines are mathematically equivalent with field lines of a magnetic field in Maxwell’s theory and in TGD with flux tubes of MB in 1-1 correspondence with the points of the flow. Could this be seeing MB with the “third eye”?

7 Connection To The Work Of Researchers In Forefront

Here some examples about the work of other researchers possibly relevant for understanding remote mental interactions in TGD framework is discussed briefly.

7.1 Simon Shnoll

Shnoll and collaborators [E1, E4, E5, E2, E7, E3] have discovered strange repeating patterns of random fluctuations of physical observables such as the number n of nuclear decays in a given time

interval. Periodically occurring peaks for the distribution of the number $N(n)$ of measurements producing n events in a series of measurements as a function of n is observed instead of a single peak. The positions of the peaks are not random and the patterns depend on position and time varying periodically in time scales possibly assignable to Earth-Sun and Earth-Moon gravitational interaction.

These observations suggest a modification of the expected probability distributions but it is very difficult to imagine any physical mechanism in the standard physics framework. Rather, a universal deformation of predicted probability distributions would be in question requiring something analogous to the transition from classical physics to quantum physics [K4].

The hint about the nature of the modification comes from the TGD inspired quantum measurement theory proposing a description of the notion of finite measurement resolution in terms of inclusions of so called hyper-finite factors of type II₁ (HFFs) and closely related quantum groups. Also p-adic physics -another key element of TGD- is expected to be involved. A modification of a given probability distribution $P(n|\lambda_i)$ for a positive integer valued variable n characterized by rational-valued parameters λ_i is obtained by replacing n and the integers characterizing λ_i with so called quantum integers depending on the quantum phase $q_m = \exp(i2\pi/m)$. Quantum integer n_q must be defined as the product of quantum counterparts p_q of the primes p appearing in the prime decomposition of n . One has $p_q = \sin(2\pi p/m)/\sin(2\pi/m)$ for $p \neq P$ and $p_q = P$ for $p = P$. m must satisfy $m \geq 3$, $m \neq p$, and $m \neq 2p$.

The quantum counterparts of positive integers can be negative. Therefore quantum distribution is defined first as p-adic valued distribution and then mapped by so called canonical identification I to a real distribution by the map taking p-adic -1 to P and powers P^n to P^{-n} and other quantum primes to themselves and requiring that the mean value of n is for distribution and its quantum variant. The map I satisfies $I(\sum P_n) = \sum I(P_n)$. The resulting distribution has peaks located periodically with periods coming as powers of P . Also periodicities with peaks corresponding to $n = n^+n^-$, $n_q^+ > 0$ with fixed $n_q^- < 0$, are predicted. These predictions are universal and easily testable. The prime P and integer m characterizing the quantum variant of distribution can be identified from data. The shapes of the distributions obtained are qualitatively consistent with the findings of Shnoll but detailed tests are required to see whether the number theoretic predictions are correct.

The periodic dependence of the distributions would be most naturally assignable to the gravitational interaction of Earth with Sun and Moon and therefore to the periodic variation of Earth-Sun and Earth-Moon distances. The TGD inspired proposal is that the p-adic prime P and integer m characterizing the quantum distribution are determined by a process analogous to a state function reduction and their most probably values depend on the deviation of the distance R through the formulas $\Delta p/p \simeq k_p \Delta R/R$ and $\Delta m/m \simeq k_m \Delta R/R$. The p-adic primes assignable to elementary particles are very large unlike the primes which could characterize the empirical distributions. The hierarchy of Planck constants allows the gravitational Planck constant assignable to the space-time sheets mediating gravitational interactions to have gigantic values and this allows p-adicity with small values of the p-adic prime P . "A Possible Explanation for Shnoll Effect" (see <http://tinyurl.com/ya9y6tx>) [K4].

What makes Shnoll effect so interesting is that it involves interaction of very long length scales with microscopic scales - even nuclear physics length scale as in the experiments of Shnoll. Similar situation prevails machine-mind interaction involving intention to affect sequences of random numbers generated by microscopic systems via quantum transitions. The proposed model suggests a mathematical description of the statistical distributions modified by the intentional action but leaves the interaction mechanism open. A possible mechanism could be a realization intentions as actions via a mapping taking p-adic space-time sheets representing them in long length scales to real space-time sheets in short length scales. In the recent case the field patterns would represent space-time sheets carrying classical fields inducing the desired effect at microscopic level on particles that have topological sum contacts to these sheets. Classically gauge forces would be in question and at quantum level modifications of various reactions rates caused by these fields.

This map would be carried out by the quantum counterpart of canonical identification or its variant [K40]. The map would be characterized by resolution defined by power p^N of prime p . For powers of p^n , $n > N$. the map would be continuous from p-adics to reals and for $n < N$ it would be discontinuous and would correspond to the identification of reals and p-adic numbers via common rationals. I have discussed this kind of option based on ordinary canonical identification

- actually one of the first ideas related to p-adic physics - in [K28, K26]. The main objection was that this map is not general coordinate invariant. This could however make sense since cognition breaks General Coordinate Invariance via a selection of a preferred coordinate system and bringing in the number theoretic anatomy of coordinate variables. I have also proposed (see <http://tinyurl.com/yc3jenxg>) that the generation of cognitive representations and realization of intentional actions using canonical identification and its inverse could define the analog of T-duality of string theories, which also maps long and short scales to each other.

A more concrete model for the intentional action is obtained if one requires consistency with the model based on time mirror mechanism (see **Fig.** <http://tgdtheory.fi/appfigures/timemirror.jpg> or **Fig. ??** in the appendix of this book) as a key element of intentional action. Canonical identification maps p-adic space-time sheet representing the intention and having the size of CD assignable to intentional agent and characterized by a typical macroscopic time scale (actually astrophysical since already electron corresponds to Earth sized CD with time scale of .1 seconds) to a much smaller space-time sheet representing a flux tube connection and possible accompanying massless extremal connecting the biological body of the operator and target. The classical fields carried by these space-time sheets would induce the microscopic effect realizing the intention.

7.2 Michael Persinger

Anyone - atheist or believer - wanting to learn about Persinger's work and the basic insights of neuro-theology should listen the extremely inspiring talk *God and the Brain - The Persinger "God Helmet", The Brain, and visions of God* (see <http://tinyurl.com/y83pq5v1>) by Todd Murphy [J2]. Persinger's work (for references to the articles by Persinger and collaborators see the Wikipedia article about God helmet at <http://tinyurl.com/3cpoyq>) suggests that the temporal pattern of the modulation of magnetic field strength (FM would be in question for slow variations) is important. We do not however know the "code". Also the strength of the magnetic field can be important. Note that the effects of very weak ELF em fields on vertebrate brain take place in amplitude windows [K11].

The modulation of magnetic field would probably induce FM of cyclotron frequencies. The TGD inspired model for hearing [K32] suggests this kind of modulation as a way to represent the frequencies of the sound wave. Also phase information is very important: time reversed speech sounds very different as normal speech but has the same power spectrum. Modulations would be slow in the time scales defined by the audible frequency range. .1 seconds would represent lower limit for the variation rate of modulation. Audible frequencies above 20 Hz.

The article "TGD Based View about Classical Fields in Relation to Consciousness Theory and Quantum Biology" (see <http://tinyurl.com/ycoczvmx>) contains a section considering a model for the findings of Persinger and collaborators using "God helmet". The spiritual experiences induced by "God helmet" could be interpreted as subjective experiences generated when the personal magnetic body receives an additional layer. For instance, manic-depressive bipolar cycle might be understood as a cycle in which euphoric period means the emergence of a new layer appears to the magnetic body and depressive period means its disappearance. I have also commented other findings of Persinger. God helmet might provide a technical tool to test the notion of magnetic body.

7.3 William Tiller

William Tiller in Stanford University has carried out impressive experimental work with what he calls intention imprinted electronic devices (IIED), and his results challenge that standard assumption that the intentions of experimenter do not affect the experimental apparatus [J49, J46, J47].

7.3.1 Experimental arrangement

The goal was to try to imprint a specific intention into a simple, low tech electronic device so as to influence the companion, specific, well-designed, target experiment. The intentional imprinting was attempted in a meditative state. The intentionally imprinted device, IIED, was sent to a laboratory located at distance of about 1500 miles where colleagues had set up the experiment. The device was

placed about 6 inches from a continuously running and computer-monitored target experiment and switched on (total electrical power rate was less than 1 microwatt). Over a time period of about 1-4 months the recorded results from the target experiment changed in the directions of the specific intention and the change eventually reached the selected magnitude of the specific intention. Also an identical, but not intention imprinted device was used and the results were compared in order to achieve more objective measurements about the effects of human consciousness on electric devices.

The targets used were purified water, some bio-molecules, and larvae of flies. These targets were either unshielded or shielded from radiation. For the latter purpose they were closed inside a grounded Faraday cage (FC), which screened rather effectively the radiation coming at microwave frequencies whereas for ultra low frequency (ULF) fields the screening is virtually absent (skin depth behaves as $1/\sqrt{\pi\sigma f}$ at low frequencies and $f = 2\pi\sigma$ (in units $\hbar = c = 1$) defines kind of critical frequency above which screening occurs effectively). The targets could be affected by control device (CD) or by identical IIED generating microwave radiation. Radiation was generated either at single frequency (7.3 MHz) or at three frequencies (5.0, 8.0 and 9.3 MHz) [J48].

In the case of purified water the spatial distributions of physical parameters like pH, temperature, and conductivity were measured as a function time. In the case of bio-molecules the possible effect on thermodynamical activity, which measures the thermodynamical energy of single molecule, was measured. In the case of fly larvae the effect on the larval development time was studied. The results from various arrangements were compared with control targets (no FC, no CD, no IIED).

I have discussed a TGD based model for Tiller's findings the chapter

"Biosystems as conscious holograms" [K6] (see <http://tinyurl.com/ydx4fuk5>). The basis idea is that a connection between the magnetic body of operator and target is formed and the intentional imprinting involves magnetic fields and possibly also corresponding cyclotron frequencies. If one accepts the canonical identification as a map taking intention represented by p-adic space-time sheet to action represented by real space-time sheet in much shorter scale then the space-time sheets create would be microscopic space-time sheets carrying magnetic fields giving rise to the cyclotron frequencies.

The basic experimental results were two-fold. First of all intended effects were achieved. Secondly, the "conditioning" of the laboratory resulted as an unexpected effect and continued even after the removal of the target and IIED.

7.3.2 Direct effects of the intentional action

1. IIED imprinted by intention to increase/decrease the pH of water gradually induced a shift in the pH of purified water to the intended value, increased the in vitro thermodynamic activity of bio-molecules, and a reduction of larval development time.
2. For bio-molecules and larvae four simultaneous side-by-side treatments were tested: i) an unshielded sample, ii) a shielded sample, iii) a shielded sample with an "on" control device, iv) a shielded sample with an "on" IIED. Just the shielding of em radiation affected the thermodynamic activity of the bio-molecules, and just adding less than about 1 microwatt of microwave radiation via control device reduced the thermodynamical activity and lengthened the developmental time. Thus the microwave radiation acted as a stressor having entropic effect. When the control device was replaced with IIED, the degradation caused by microwave radiation was overcome.

7.3.3 "Conditioning" of the laboratory

Quite unexpected phenomena arose from a repeated conduct of IIED in a given laboratory space. By simply continuing to use IIED in the laboratory space, it became "conditioned in some very fundamental way". Three signatures heralded the onset of the "conditioning" process.

1. Oscillations of air and water temperature, and of pH and electrical conductivity of water with large amplitudes with the periods of oscillations in 10-100 minute range developed. The amplitudes of pH- and temperature oscillations was $\sim \Delta pH = .1$ pH-unit and $\Delta T \sim 1 - 3$ K units respectively. Even more remarkably, the oscillations were sustained in the locale even after the removal of the IIED suggesting kind of phantom effect analogous to phantom

DNA effect. Oscillation amplitude had peaks at the harmonics of fundamental frequency $f_l = 1/T_l$, $T_l = 36.6$ minutes with three lowest harmonics being very clearly visible [J47]. Also $T_l = 51.2$ minutes appears as fundamental period in some experiments. The ratio of these periods is 1.4 and rather near to $\sqrt{2} = 1.41$, which might relate to p-adic length scale hypothesis.

2. When an pH-increasing IIED with intention to increase pH by one unit was turned on in an almost unconditioned space located several hundred feet away from a strongly conditioned space, a well-defined pattern of pH-oscillations in an unconditioned space emerged. This pattern was accompanied by a highly correlated pattern of oscillations in strongly conditioned space. This kind of highly correlated oscillations were not observed in several unconditioned spaces - also located several hundred feet away.
3. The targets were subject to the action of a vertically aligned magnetic field in the range of $10^{-2} - 5 \times 10^{-2}$ Tesla, such that the direction of the field could be reversed. In an unconditioned space the change of the direction of the magnetic field did not affect the pH. In the strongly conditioned space the effect on pH was different for the opposite directions of the applied field and the difference in pH values was about .6 units. One can say, that the target had become sensitive to the effects of external magnetic fields.

7.3.4 TGD based model for intentional imprinting

The model obtained by combining the model for Shnoll effect based on the canonical identification as a map taking intentions to actions with time mirror mechanism would suggest that intentional imprinting generates flux tubes between the target and magnetic body (MB) of operator and also those between target and biological body (BB) of the operator. These flux tubes would correspond to the images of p-adic space-time sheets representing the intention and having astrophysical size scale (or the order of the size of CD associated with operator). These flux tubes would connect BB and MB also to the nearby environment of IIED. The fact that nearby environment remains intentionally imprinted when target and IIED are moved away could explain why the effect remains as oscillations even when IIED is removed and why synchronous oscillations take place.

Negative energy signals would tend to generate negentropic effects eliminating the entropic effects if microwave radiation. This could explain why IIED reduces the entropic effects caused by microwave radiation. Cyclotron frequencies define natural candidates for the time scales involved. The magnetic fields in question would be of order 10-100 pT. The mechanism of compensation of the effects of cyclotron photons remains open. The simplest possibility is that microwave photons generated by IIED correspond to large \hbar phase conjugate photons with energies in the range of energies of microwave photons. The effects of negative energy large \hbar photons, which have suffered phase transition to ordinary positive energy microwave photons could induce the negentropic effects.

7.4 About the double-slit experiment of Dean Radin

Dean Radin and his team have done a very interesting experiment [J24] (see <http://tinyurl.com/h44rns8> and <http://tinyurl.com/q7nbxnk>) testing the idea that observer induces state function reduction.

7.4.1 Experiment

The experiment is a modified double slit experiment. In double slit experiment a laser beam arrives to the screen via two slits and interference pattern is generated as if photons would behave like waves localized at screen. If one adds detectors at the slits, either detector fires and detects the passing-by photon, and interference pattern disappears with optimal detection efficiency.

The idea is to add a subject person (S) at distance of two meters. S imagines of measuring that electron passes through either slit. One can say that S intends to add a “detector” to either slit or both of them so that a state function reduction selecting either slit occurs. This experiment differs from experiments in which S tries to affect the ratio of frequencies of 0:s and 1:s in random series of bits: S does not try to force the electrons to pass by either slit. There is a feedback represented

as sound/yellow light whose height/intensity coded for the amount of the reduction of the height of the peak. There are two kinds of participants: meditators and those who have no experience in meditation.

The results of the experiment are thoroughly discussed in the Youtube lecture of Radin (see <http://tinyurl.com/h44rns8>). To my opinion the results are amazing. In one experiment it was found that the height of the peak of the Fourier transform of the intensity distribution of the diffraction pattern is reduced. In second experiment the depth of bottom of the trough of distribution was reduced. As if the intention would induce with some probability to perform the measurement selecting the photon path. The effect was small but appeared systematically for a group consisting of meditators. For persons without experience in meditation the effect averaged out also in this case it was present in the beginning of the experiment when subject person were not bored by the repetitive character of the experiment. The longer attention span of meditators could partially explain this.

Even more amazing finding was that in a variant of the experiment realized in internet the results were also positive although the persons intending to induce the experiment.

7.4.2 Arguments of skeptic

The standard argument of skeptic is that statistics is poor, that the experiment is even fraud, etc... One can however consider more refined and more imaginative objections. Let us make a digress from the usual behavior of skeptic and assume that the effect was real.

If the meditators could induce the measurement by intention, one expects that also the experimenter could have done it. To how high degree the outcome was due to the experimenters and how much due to the meditators? Experimenter also had the theoretical expectation that meditators are better in inducing the slit detection. Could the wish that the theory is correct have caused subconscious intention about performing the detection in the case of meditators or not doing it in the case of non-meditating subject persons?

In the case of net experiment situation becomes even more problematic. One can imagine that also in this case the intention of experimenter could induce the detection - at least if experimenter is near to the system. Should experimenters have spent the period of experiments in Mars or at least in a distant holiday resort! Experimenters studying remote mental interactions are usually not rich people and presumably they did not do this.

The experimenter effect is well-known in parapsychology. Some experimenters are extremely successful. Could one think that they have strong intentional powers? Ironically, this would demonstrate the reality of paranormal effects of this kind but in a way that can never convince the skeptics. There is evidence for this kind of effect in the testing of new medicines. Good results are obtained when the testers are enthusiastic and dream of a positive result. When they do same tests after some years, the results are worse.

7.4.3 TGD based model

The challenge is to understand how the S imagining a measurement telling that photon went through either slit could realize this intention. What does the detection mean and what it demands?

1. The measurement should involve a state function reduction selecting between the slits entangled with observer. In principle it is enough to have an interaction of photon in either slit localizing the path of the photon to that slit. It is enough that photon interacts with charged particles in either slit with some probability. This measurement is of course not optimal since the interference diagram is only partially changed. Only some fraction of these measurements take place and produce single slit pattern so that the observed pattern is a weighted average of double slit and single slit patterns. In principle one can estimate the probability for single slit pattern from the data.
2. Quantum classical correspondence requires that in order that the intention to detect could be realized, one must have a physical connection from the S to both slits or at least either of them. Also charged particles assignable to the connection should be involved to make scattering of photon possible. Also entanglement entangling detector fires/does not fire with corresponding states of some other system, say the S would be needed.

How could one realize these connections in TGD?

1. In TGD framework the magnetic flux tubes serve as correlates of entanglement and directed attention [K23]. To direct attention to a system means to connect with it by flux tubes. Flux tubes carry dark charged particles essential for TGD view about quantum biology.
2. Every system has U-shaped flux tubes emanating from it and acting as kind of tentacles scanning the environment. As a U-shaped flux tube from system A encounters another similar flux tube from system B, a reconnection takes place if the quantized fluxes are same. The outcome is a pair of flux tubes connecting A and B. The flux tube pair can carry Cooper pairs with members of the pair at the flux tubes. The photons from laser could scatter from the charged particles.
3. The dark particles the flux tube are dark with $h_{eff}/h = n$ [?, K30] satisfying an additional condition implying that n is proportional to the mass of the charged particle in turn implying that cyclotron energies $E_c = \hbar_{eff} e B / m$ are universal and assumed to correspond to biophoton energies in the range of visible and UV: bio-photons would result in the phase transition transforming dark photons to ordinary photons.

In order that photon scatters from the charged particles it must have the same value of h_{eff} as the particles at magnetic flux tubes emanating from the S . Some fraction of laser photons could satisfy this condition. Note that if perturbative quantum theory applies, the classical predictions are same as lowest order quantum predictions so that h_{eff} makes it visible only in higher orders assuming that perturbation theory works when $h_{eff}/h = n$ holds true. Unfortunately, it is not possible to estimate the probability that photon enters to the flux tube. Note that the probability depends also on the density of the flux tubes.

The effect is reported in net experiments for which distances can be long and there is no visual contact. Can one understand this?

1. If there quantum entanglement between A and B already exists one can increase the distance without spoiling the entanglement. But how to achieve the entanglement if the systems are at large distance from beginning?
2. The length of the magnetic flux tubes is not a problem. The size scale for the layers of magnetic flux tube corresponding to EEG frequency 7.8 Hz is circumference of Earth. The condition that the size of the flux tube is at least of the order of the cyclotron wavelength λ for cyclotron photons at the flux tube implies that length of the flux tube is of the order of the size scale of Earth for EEG frequencies.

In fact, our MBs could have much larger layers if biological rhythms have cyclotron frequencies as counterparts. The size scales could be of order light-life-time or even longer. This changes totally the view about the role of length scales in biology and consciousness. There is some evidence that galactic day defines the natural rhythm for precognitive phenomena: precognitive phenomena tend to occur at galactic midday. Galactic cyclotron frequencies (the galactic magnetic field is of order nT) could correspond to bio-rhythms up to 12 hours.

In net experiment the problem is how to generate the connection to a correct target. The same problem is encountered in the attempts to explain the claimed results of remote viewing experiments. Could the density of flux tubes of personal magnetic body (MB) be so high that the connection is generated with high enough probability. S receives data through the web. Could this help to build the desired connection.

1. Skeptic would explain the reported positive result in web experiments by saying that the results were actually induced by the intention of the experimenter who was near to the system. This might of course be the case.
2. The first possibility is that an entanglement is generated between the camera monitoring the system and slits involving flux tubes. The communication of the image from the camera to computer builds another flux tube bridge. The radiation reflected in satellite to the computer at Earth involves propagation along flux tubes. At the receiver ends similar bridges are build.

There is therefore a flux tube connection with the computer of used by S , who generates the last piece of the connection. This kind of flux tube connection would be between all communicating systems. Also the experiments would belong to this entanglement network.

3. MB has layers with size scale of order Earth size. Could it be able to meet the challenge by using the information coming from web. Could the U-shaped flux tubes be so dense as to be able to build a contact with the experimental arrangement with high enough probability? If they are to represent Maxwellian magnetic field in good approximation, they should be dense. What is important that these flux tubes correspond do different space-time sheets for distinct observers: this is actually the basic distinction between the field concepts of Maxwell and TGD.

Could it be that the feedback from S at her computer via the net to the computer at the other end generates quantum correlated events and this correlation has as correlates magnetic flux tubes connecting the distant systems.

4. The hyper-imaginative option is that S can delegate the problem with collective consciousness assignable to the magnetosphere of Earth and having all the engineering knowledge that Earth has! Could we be neurons of a gigantic brain of Mother Gaia, which would help S to realize their intention. Can single neuron realize its intention on a distant neuron in brain in the similar manner? Could some kind of resonance mechanism be involved?

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