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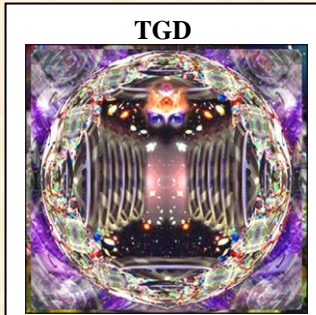
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UFOS, Aliens, and the New Physics

by Dr. Matti Pitkänen / February 1, 2006



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Contents

1. [Introduction](#)
2. [Basic vision](#)
 - 2.1 [Quantum-Classical correspondence](#)
 - 2.2 [Classical physics as exact part of Quantum theory](#)
 - 2.2.1 [Topological field quantization and the notion of many-sheeted space-time](#)
 - 2.2.2 [The possibility of **negative** energies](#)
 - 2.2.3 [TGD Universe is quantum spin glass](#)
 - 2.2.4 [Long-range classical weak and color fields](#)
 - 2.3 [p-Adic physics as physics of Cognition and Intentionality](#)
 - 2.3.1 [p-Adic numbers](#)
 - 2.3.2 [p-Adic length scales and p-adic cognitive codes](#)
 - 2.3.3 [Generalization of number concept](#)
 - 2.3.4 [p-Adically infinitesimal is infinite in real sense](#)
 - 2.3.5 [p-Adic fractal statistics as a signature of Intentionality](#)
 - 2.4 [The core ideas of the TGD-inspired theory of Consciousness and Quantum Biology](#)
 - 2.4.1 [Quantum jump as moment of consciousness and the notion of Self](#)
 - 2.4.2 [Macro-temporal quantum coherence](#)
 - 2.4.3 [Space-time as a 4-dimensional living organism](#)
 - 2.4.4 [Dark matter hierarchy, sensory representations, motor action, and metabolism](#)
3. [TGD-based view about Life](#)
 - 3.1 [The notion of magnetic body](#)
 - 3.1.1 [Magnetic body as an intentional agent](#)
 - 3.1.2 [Universal metabolic currencies](#)

- 3.1.3 [Dark matter hierarchy and motor control](#)
 - 3.1.4 [Emergence of symbols at molecular level and new view about hydrogen bond, water, and bio-catalysts](#)
 - 3.1.5 [Magnetic Mother Gaia as conscious entity](#)
 - 3.2 [Time mirror mechanism as a fundamental mechanism transforming intentions to actions](#)
 - 3.2.1 [Materialization of intentions](#)
 - 3.2.2 [Time mirror mechanism, scalar wave pulses, and wormhole magnetic fields](#)
 - 3.3 [Applications of time mirror mechanism](#)
 - 3.3.1 [Biological applications](#)
 - 3.3.2 [Instantaneous quantum remote-sensing?](#)
 - 3.3.3 [Remote utilization of energy](#)
 - 3.3.4 [Sharing of mental images and *telepathic* communications](#)
 - 3.3.5 [Plasma oscillation patterns as holograms](#)
 - 3.4 [Vision about the evolution of Life](#)
 - 3.4.1 [Cognitive evolution proceeding from long to short scales is also present](#)
 - 3.4.2 [Plasmoids as primitive lifeforms?](#)
 - 3.4.3 [Dark matter hierarchy and evolution](#)
 - 3.5 [Could simple lifeforms be induced by intentional action?](#)
 - 3.5.1 [Experimental arrangement](#)
 - 3.5.2 [Experimental findings](#)
 - 3.5.3 [Explanation of the pH oscillations in terms of the general model of intentional action](#)
 - 3.5.4 [The effects caused by the **quartz crystal**](#)
4. [How advanced civilizations could study the Cosmos](#)
 - 4.1 [Why space travel is not a good idea](#)
 - 4.2 [Time mirror mechanism as an ideal tool for the study of the Universe](#)
 - 4.3 [What are *aliens*?](#)
 - 4.3.1 [Do crop circles tell about solars or intra-planetaries?](#)
 - 4.3.2 [Do crop circles tell about futuro-terrestrials?](#)
 - 4.3.3 [How far in the Geometric-Future futuro-terrestrials might live](#)
 - 4.4 [Have more advanced civilizations performed genetic engineering at Earth?](#)
 - 4.5 [Fermi paradox](#)
 - 4.6 [Dark matter hierarchy as a solution of Fermi paradox?](#)
5. [What UFOs are](#)
 - 5.1 [UFOs as plasmoids?](#)
 - 5.2 [UFOs made of copper and steel?](#)
 - 5.3 [Are flying saucers necessarily living systems?](#)

Abstract

Time mirror mechanism is a basic mechanism in the TGD-inspired theory of consciousness. And it also has technological applications including instantaneous remote-sensing of Geometric-Past, communications with Geometric-Past, instantaneous remote utilization of energy, and perhaps even remote induction of simple lifeforms (about which simplest are perhaps "**plasmoids**"). The intelligent-looking lightballs reported repeatedly by UFO experiencers are indeed identifiable as plasmoids and quite recent experimental findings demonstrate that plasmoids satisfy the basic criteria justifying their identification as simple lifeforms.

The resulting vision about highly-developed lifeforms and about how they could study the Cosmos allows us to resolve Fermi paradox summarized by the simple question "Where are they all?" and reflecting in excellent manner our misguided view about Life, Consciousness, and Physics.

TGD also suggests a mechanism making possible to reduce gravitational and inertial masses of spaceships so that they would behave very much like a light system (as observations indeed suggest). Plasmoids could be living spaceships able to draw their energy from environment by the time mirror mechanism. It seems, however, that the highly-developed civilizations would probably not see the trouble to travel to distant galaxies since it is unnecessary. And in any case, the finiteness of light velocity would pose very strong limitations on what they could achieve in this manner.

Chilbolton and Crabwood crop circles can be interpreted as messages telling basic facts about the civilization responsible for their construction. The Chilbolton message is constructed using the same format as the Arecibo message and tells that both Earth, Mars, and Jupiter are colonized. These crop circles suggest strongly the existence of intra-terrestrial life and this inspired a model for pre-biotic evolution allowing also a model for the evolution of genetic code. The highly-advanced civilization could be identified as either intelligent intra-terrestrials or as ourselves in the Geometric-Future using a technology based on the time mirror mechanism to construct crop circles and using less intelligent intra-terrestrial plasmoids to construct the crop circles.

The Sun is depicted to have a smaller size as in Arecibo message. The Crabwood message came one year and one day after the Chilbolton message. These hints allow us to make estimate about the temporal distance of this civilization of the Geometric-Future from us.

The "sacred geometry" of crop circles involving ratios of simple rational numbers, simple algebraic numbers (in particular Golden Mean), and π could be an attempt to tell us about the crucial importance of rational numbers and finite-dimensional extensions of p-adic numbers for cognition. If entanglement probabilities belong to an extension of rationals defining a finite-dimensional extension of p-adic numbers, one can assign to entanglement a positive information measure as a number theoretic modification of Shannon's entropy. The interpretation as bound state entanglement crucial for Macro-temporal quantum coherence is possible.

1. Introduction

My personal interest in UFOs and extraterrestrials was stimulated by a TV documentary almost decade ago claiming that the locations of UFO observations seem to correlate with lines of tectonic activity.

Michael Persinger's work about UFO experiences was also very stimulating. The realization that crop circles are probably not hoax led to a development of rather unconventional ideas about lifeforms (possibly responsible for the generation of crop circles).

What are UFOs? What are *aliens*? The attempt to answer these basic questions requires an answer to a more general question: What is Life?

During the last decade, I have developed rather a elaborate theory of Consciousness and applied it to the modeling of living matter as a Macroscopic quantum system. The new view about space-time, Time, and Consciousness also allows us to develop ideas about UFOs and aliens -- in particular about possible manners by which highly developed civilizations could receive information about remote parts of the Universe and to get contact with other civilizations.

In this chapter (which is actually slightly modified popular article), I first try to summarize the TGD based view about consciousness and living systems. The basic notions are many-sheeted space-time, topological quantization and magnetic body, p-adic physics as physics of Intentionality and Cognition, and basic ideas of the TGD-inspired theory of Consciousness.

Time mirror mechanism is a basic mechanism in the TGD-inspired theory of Consciousness. And it also has technological applications including instantaneous remote-sensing of Geometric-Past, communications with Geometric-Past, and instantaneous remote utilization of energy, and perhaps even remote induction of simple lifeforms (about which simplest are perhaps "plasmoids"). The intelligent looking lightballs reported repeatedly by UFO experiencers are indeed identifiable as plasmoids. Quite recent experimental findings demonstrate that plasmoids satisfy the basic criteria justifying their identification as simple lifeforms.

TGD also suggests a mechanism making possible to reduce gravitational and inertial masses of space-ships so that they would behave very much like a light system (as observations indeed suggest). Plasmoids could be living spaceships able to draw their energy from environment by the time mirror mechanism.

It seems, however, that the highly-developed civilizations would probably not see the trouble to travel to distant galaxies since it is unnecessary. And in any case, the finiteness of light velocity would pose very strong limitations on what they could achieve in this manner.

Chilbolton and Crabwood crop circles can be interpreted as messages telling basic facts about the civilization responsible for their construction. The Chilbolton message is constructed using the same format as Arecibo message and tells that both Earth, Mars, and Jupiter are colonized.

These crop circles might be interpreted as hints about the existence of intra-terrestrial/planetary life. This inspired a model for pre-biotic evolution allowing also a model for evolution of the Genetic Code. The highly-advanced civilization could be identified as either intelligent intra-planetary or as ourselves in the Geometric-Future using a technology based on time mirror mechanism to construct crop circles and using less intelligent intra-terrestrial plasmoids to construct the crop circles. **[StealthSkater note: more on plasma lifeforms is on the "UFO#Plasmoids" page at => [doc](#) [pdf](#) [URL](#)]**

The Sun is depicted to have a smaller size as in Arecibo message. The Crabwood message came one year and one day after the Chibolton message. These hints allow to make estimate about the temporal distance of this civilization of the Geometric-Future from us.

The hypothesis about hierarchy of Macroscopic quantum phases characterized by arbitrarily large values of Planck constant [J6, F9, M3] resolved the long standing problem of properly interpreting the predicted long-ranged classical weak and color fields. And it induced a great leap forward in the evolution of the TGD-based view about Consciousness and Life [L4].

An especially fascinating possibility is the existence of lifeforms consisting of what I call dark N-atoms and N-molecules surviving at the hot temperatures of planetary interiors and Solar surface [N3, L4]. This progress has motivated the insertion of some comments relating to dark matter hierarchy (also in this chapter).

2. Basic vision

The 4 online books about TGD [1, 2, 4, 5, 3, 6, 7] and the TGD-inspired theory of Consciousness [10, 8, 9, 13, 11, 12, 14, 15] at my homepage provide comprehensive (and unavoidably a little bit out of date) summary of these topics. The online journal JNLRMI [30, 31] contains several articles about the TGD-inspired theory of Consciousness and Quantum-Biology and its applications to remote mental interactions [SS note: also archived on the "Science#Emergent" page at => [doc](#) [pdf](#) [URL](#)]. Here is given a brief summary of what might be called "basic principles" ...

2.1 Quantum-Classical correspondence

The fundamental meta-level guiding principle is quantum-classical correspondence (Classical physics is an exact part of Quantum-TGD). The principle states that all quantum aspects of the theory -- which means also various aspects of Consciousness such as volition, cognition, and intentionality -- should have space-time correlates.

Real space-time sheets provide a kind of symbolic representations whereas p-adic space-time sheets provide correlates for cognition and intentions. All that we can symbolically communicate about conscious experience relies on quantal space-time engineering to build these representations. What makes possible to have even space-time correlates of quantum jumps and quantum jump sequences classical non-determinism of the basic variational principle determining the dynamics of space-time sheets and inherent determinism of p-adic variants of field equations.

2.2 Classical physics as exact part of Quantum Theory

In the TGD Universe, space-times are 4-surfaces in the 8-dimensional space $H = M^4_+ \times CP_2$ obtained by replacing the points of Minkowski space Future light-cone with 4-dimensional compact space CP_2 having extremely small size of order 10^{-30} meters (see **Fig. 1**). Classical physics corresponds to the dynamics of space-time surfaces determined by the absolute minimization of the so-called Kahler action.

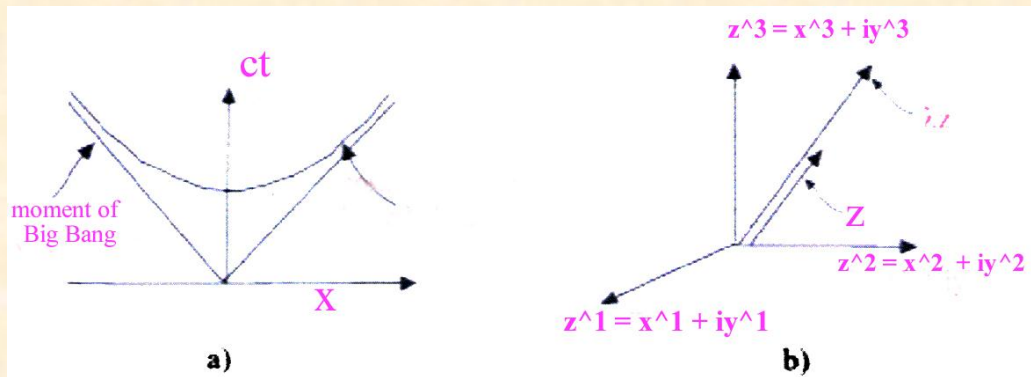


Figure 1: Space-times can be regarded as 4-dimensional surfaces in 8-dimensional space $H = M^4 \times CP^2$ obtained by replacing points of Future light-cone of Minkowski space with CP^2

This dynamics has several unconventional features basically due to the possibility to interpret the Kahler action as a Maxwell action expressible in terms of the induced metric defining classical gravitational field and induced Kahler form defining a non-linear Maxwell field (not as such identifiable as electromagnetic field, however).

2.2.1 Topological field quantization and the notion of many-sheeted space-time

Quantum classical correspondence is a very powerful principle. For instance, absolute minimization of Kahler action serving as the basic variational principle can be interpreted as a space-time representation for the Second Law of Thermodynamics. Hence the solutions of field equations correspond asymptotically to self-organization patterns for which dissipation represented by Lorentz 4-force vanishes.

This provides the physical intuition which has led to a discovery of extremely general solution families of field equations. It might even be that the classical field equations determining space-time surfaces are exactly solvable. The study of field equations leads to general classification of the phases of matter and simple topological criterion differentiates between living and "dead" matter [D1, I5].

1. Topological field quantization

The compactness of CP_2 implies the notions of many-sheeted space-time and field quantization. Topological field quantization means that various classical field configurations decompose into topological field quanta. Space-time becomes many-sheeted (see Fig. 2). One can see space-time as a gigantic Feynman diagram with lines thickened to 4-surfaces. Absolute minimization of Kahler action implies that only selected field configurations analogous to Bohr's orbits are realized physically so that quantum-classical correspondence becomes very predictive. An interpretation as a **4-D quantum hologram** is a further very useful picture [K2] but will not be discussed in this chapter in any detail. **[StealthSkater note: Tom Skegg's 'Star Chamber' would allow a remote-viewer to project a real-time hologram of himself. Don't know if this would apply to what Dr. Pitkanen is discussing or not. See the "PX#StarChamber" page at => [doc](#) [pdf](#) [URL](#)]**



Figure 2: Material objects correspond to the sheets of the many-sheeted space-time. Note that sheets are extremely near to each other.

One implication of many-sheetedness is the possibility of Macroscopic quantum coherence. Topological field quantization implies that the field patterns associated with material objects form extremely complex topological structures which can be said to belong to the material objects. The notion of field body -- in particular magnetic body, typically much larger than the material system -- differentiates between TGD and Maxwell's electrodynamics and has turned out to be of fundamental importance in the TGD-inspired theory of Consciousness. One can say that field body provides an abstract representation of the material body.

Space-time sheets topologically condense to larger space-time sheets by wormhole contacts which have Euclidian signature of metric. This implies causal horizon at which the signature of the induced metric changes from Minkowskian to Euclidian. This forces us to modify the notion of sub-system.

What is new is that two systems represented by space-time sheets can be unentangled although their subsystems bound state entangle with the mediation of the join along boundaries bonds connecting the boundaries of sub-system space-time sheets (see **Fig. 3**). This is not allowed by the notion of subsystem in ordinary Quantum Mechanics. This notion in turn implies the central concept of fusion and sharing of mental images by entanglement making possible **telepathic communications** of mental images over arbitrarily long distances.

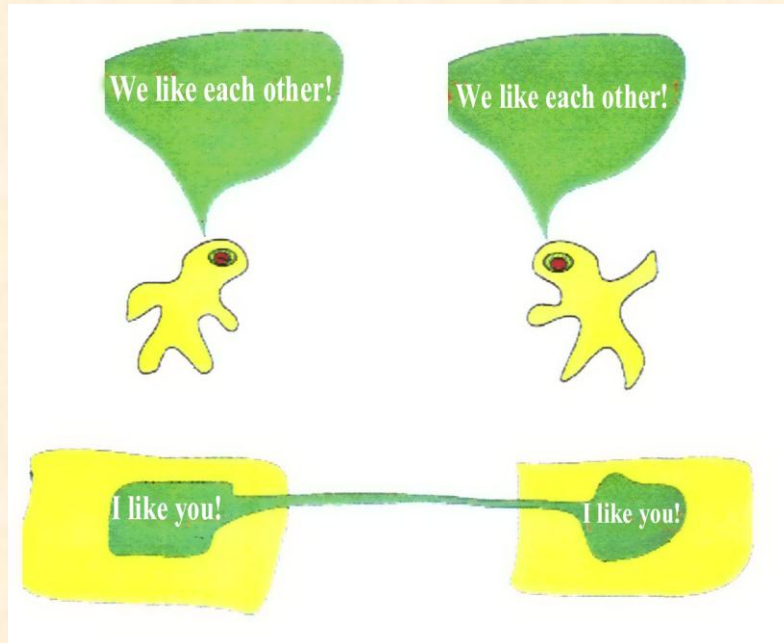


Figure 3: The space-time sheets condensed on larger space-time sheets having no join along boundaries bonds can be connected by join along boundaries bonds. This forces to generalize the notion of subsystem and makes possible sharing of mental images.

2.2.2 The possibility of negative energies

A further prediction derives from the fact that space-time is 4-surface rather than an abstract manifold.

The energy-momentum tensor of General Relativity is replaced by a collection of conserved energy and momentum currents which are 4-vector fields. This makes the notions of energy and momentum precisely defined but also implies that the sign of energy and momentum depend on the time-orientation of the space-time sheet.

Negative energies become, therefore, possible somewhat like in the lines of a Feynman diagram. Negative energy topological light rays have phase conjugate laser waves [16, 17] as the most plausible standard physics counterparts and play a fundamental role in quantum metabolism as a kind of "quantum credit card" [K6]. They generate also time like entanglement which corresponds to a formation of new kind of bound states.

Negative energies might even be possible for ordinary particles and could mean dramatic deviation from the standard Quantum Theory. The roles of annihilation and creation operators have changed for negative energy space-time sheets. This would mean that operator combinations involving both annihilation and creation operators would generate states involving positive and negative energy spacetime sheets. One can even imagine that an intentional action could create states with vanishing net quantum numbers and that positive and negative energy particles could be separated from each other.

Phase conjugate waves [16, 17] discovered by Zeldovich and his colleagues at seventies in Russia are counterparts of negative energy photons. They represent signals propagating to the geometric past and it is possible to understand their strange properties if one assumes that they have negative energies.

Kozyrev was probably the first one to observe phase conjugate waves from distance astrophysical and propagating towards the Geometric-Past [42]. Sadly, standard physicists are not yet mature enough to realize how far reaching this discovery is or to even take it seriously.

2.2.3 TGD Universe is quantum spin glass

Since Kahler action is Maxwell action with Maxwell field and induced metric expressed in terms of $M^4 \times CP_2$ coordinates, the gauge invariance of Maxwell action is as a symmetry of the vacuum extremals (this implies is a gigantic vacuum degeneracy) but not of non-vacuum extremals.

Gauge symmetry related space-time surfaces are not physically equivalent and gauge degeneracy transforms to a huge spin glass degeneracy. Spin glass degeneracy provides a universal mechanism of macro-temporal quantum coherence and predicts degrees of freedom called zero modes not possible in quantum field theories describing particles as point-like objects. Zero modes are identifiable as effectively classical variables characterizing the size and shape of the 3-surface as well as the induced Kahler field.

2.2.4 Long-range classical weak and color fields

Geometrization of classical fields means that various classical fields are expressible in terms of imbedding space-coordinates and are thus not primary dynamical variables. This predicts the presence of long-ranged weak and color (gluon) fields not possible in standard physics context.

The proper interpretation of these fields has been the most difficult challenge that I have encountered during the development of TGD. So difficult that it took not less than 24 years before I was mature enough to realize that these fields can be assigned to a fractal hierarchy of copies of Standard Model physics -- in particular the physics based on different value of Planck constant and having interpretation in terms of dark matter hierarchy.

A good metaphor for the **TGD universe is as an inverted Mandelbrot fractal** so that the increase (rather than decrease) of the resolution scale reveals endlessly new and larger structures due to the scaled-up variants of standard physics not possible to see in shorter length scales. **[SS note: articles on fractals are at the "Science#Fractals" page at => [doc](#) [pdf](#) [URL](#)]**

The exotic weak and color forces appear already in atomic length scales and force to modify the view about nuclear physics and condensed matter physics [F8, F9]. The charge entanglement induced by W MEs defines the most promising candidate for the general mechanism for how magnetic bodies perform quantum control of biological bodies. For instance, the model of nerve pulse generation represents an application of this mechanism [M2]. Chiral selection in living matter can be seen as a direct evidence for the exotic weak forces operating at the level of dark matter [L4]. The classical color force, in turn, is the backbone in the model of color vision [K3]. Colors correspond to increments of color quantum numbers in this model.

2.3 p-Adic physics as physics of Cognition and Intentionality

p-Adic number fields R_p , one for each prime p , and real numbers R are completions of rational numbers. p-Adic numbers differ from real numbers in that notions of distance, nearness, and continuity are completely different. p-Adic field equations are also inherently non-deterministic. For these reasons p-adic numbers are excellent candidates for modeling of space-time correlates of cognition and intention.

2.3.1 p-Adic numbers

Like real numbers, p-adic numbers can be regarded as completions of the rational numbers $q = r/s$ (r and s are integers) to a larger number field allowing the generalization of differential calculus. Each prime p defines a p-adic number field allowing the counterparts of the usual arithmetic operations. A basic difference between real and p-adic numbers is that the notions of distance are quite different.

Any rational can be written as $q = p^k r/s$ where r and s are not divisible by p . The p-adic norm in R_p (analogous to absolute value in real context) is $|q|_p = p^{-k}$. In particular for $q = p^k$, the norm is p^{-k} and approaches zero when k becomes infinite. Real norm would become infinite at this limit. Therefore p-adically infinitesimal corresponds to infinite in the real sense.

p-Adic numbers allow the generalization of the differential calculus. The basic rules of the p-adic differential calculus are the same as those of the ordinary differential calculus. There is, however, one important new element. The set of the functions having vanishing p-adic derivative consists of so-called pseudo constants which are piecewise constant function. In the real case only constant functions have vanishing derivative. This implies that p-adic differential equations are non-deterministic. This non-determinism is identified as a counterpart of the non-determinism of Cognition, Imagination, and Intentionality.

2.3.2 p-Adic length scales and p-adic cognitive codes

Parallel space-time sheets with distance about 10^4 Planck lengths form a hierarchy. Each material object (atom, molecule, cell,...) corresponds to this kind of space-time sheet. The p-adic primes $p \approx 2^k$ (k prime or power of prime) characterize the size scales of the space-time sheets in the hierarchy.

The p-adic length scale $L(k)$ can be expressed in terms of cell membrane thickness as

$$L(k) = 2^{(k-151)/2} \times L(151) \quad (2.1)$$

$L(151) \approx 10$ nm. These are so-called primary p-adic length scales. But there are also n-ary p-adic length scales related by a scaling of power of $\sqrt[p]{p}$ to the primary p-adic length scale.

A quite recent model for photosynthesis [K6] gives additional support for the importance of also n-ary p-adic length scales $L(n,k) = 2^{(n-1)k/2} L(k)$ so that the relevant p-adic length scales would come as half-octaves in a good approximation. But the prime and power of prime values of k would be especially important. p-Adic length scale hypothesis allows to quantify the notion of many-sheeted space-time and make rich spectrum of predictions such as p-adic frequencies $f(k) = c/L(k)$ and corresponding energies.

p-Adic cognitive are realized as bit sequences defined by field patterns such that duration of codeword is $T(n,k) = L(n,k)/c$ and the number k_1 of bits is a factor of k . For prime values of k , the number of bits is maximal which is one reason for why they are in a special position. The Genetic code corresponds to $k_1=6$ and memetic code to $k_1=126$ [L1]. These cognitive codes would be universal and especially interesting concerning communications with *extraterrestrial* civilizations since they correspond to precisely defined frequencies. [StealthSkater note: wonder if SETI listens in on these?]

2.3.3 Generalization of number concept

The basic ingredient is the new view about numbers. Real and p-adic number fields are glued together like pages of a book along common rationals representing the rim of the book (see **Fig. 4**). This generalizes to the extensions of p-adic number fields and the outcome is a complex fractal book like structure containing books within books.

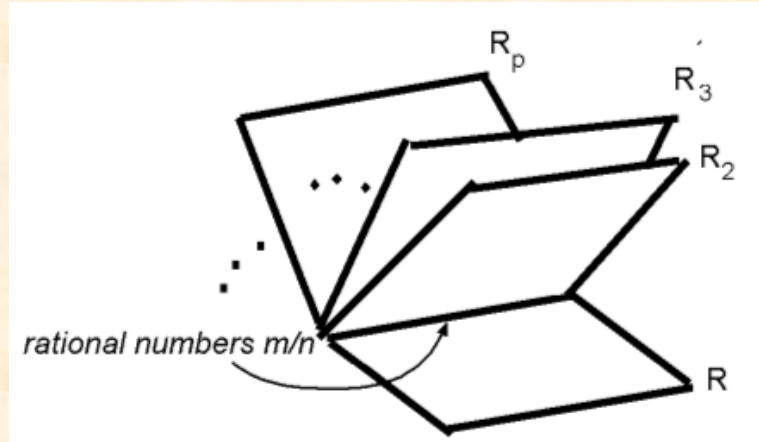


Figure 4: Generalization of the number concept: real and p-adic number fields correspond to the pages of book and the rim of book corresponds to rational numbers common to all of them.

This also holds true for manifolds and one ends up to the view about many-sheeted space-time realized as 4-surface in 8-D generalized imbedding space and containing both real and p-adic space-time sheets. The latter are interpreted as correlates for thoughts and intentions. The transformation of intention to action corresponds to a quantum jump in which p-adic space-time sheet is replaced with a real one (see **Fig. 5**).

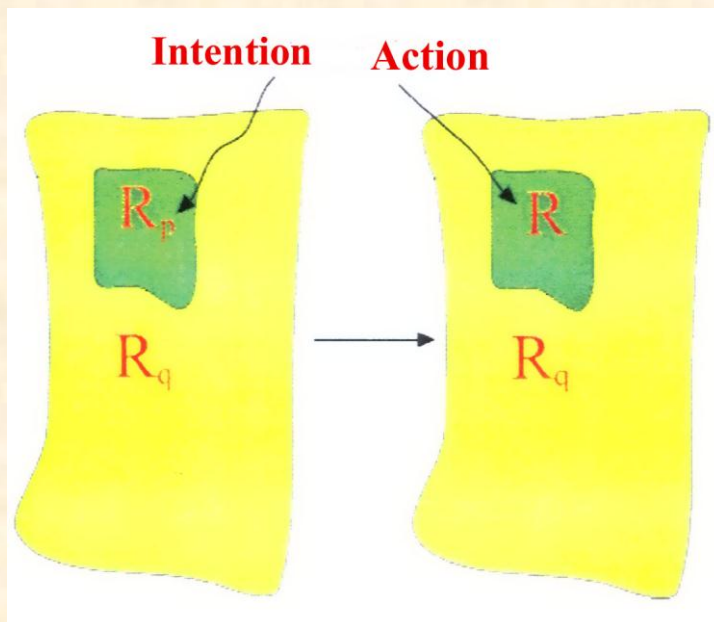


Figure 5: The transformation of p-adic space-time sheet to a real one in quantum jump correspond to the transformation of Intention to Action

2.3.4 p-Adically infinitesimal is infinite in real sense

One implication is that the rationals having short distance p-adically are very far away in real sense. This implies that p-adically short temporal and spatial distances correspond to long real distances and that the evolution of cognition proceeds from long-to-short temporal and spatial scales whereas material evolution proceeds from short to long scales.

First, a rough sketch is generated and then smaller and smaller details are added gradually. Together with the non-determinism of p-adic field equations, this explains the long-range temporal correlations (i.e., ability to realize rough plans) and apparent local randomness of intentional behavior.

The fact that p-adically infinitesimal distances correspond to infinite distances in real sense means that continuous p-adic space-time sheets have a literally infinite size. Thus cognitive body is of infinite size and our thoughts have infinite size in real sense. This turns upside down the usual view about brain as seat of thoughts and forces a new view about conscious existence.

Particular biological life cycle is like turning attention to a particular biological body serving as motor instrument and sensory receptor. After biological death, the attention turns to some other biological body (perhaps in some other galaxy). This allows also a fresh look to what one means by *extraterrestrial* and *aliens*.

2.3.5 p-Adic fractal statistics as a signature of Intentionality

The failure of the real statistics and its replacement by p-adic fractal statistics for time series defined by varying number N of measurements performed during a fixed time interval T allows very general tests for whether the system is intentional and what is the p-adic prime p characterizing the "intelligence quotient" of the system.

The replacement of $\log(p_n)$ in the formula $S = -\sum_n p_n \log(n)$ of Shannon entropy with the logarithm of the p-adic norm $|p_n|_p$ of the rational valued probability allows to define a hierarchy of number theoretic information measures which can have both negative and positive values and one can assign to rational valued probabilities a unique p-adic entropy S_p as maximally negative entropy and identify it as information associated with the entanglement. This kind of entanglement is naturally interpreted as bound state entanglement.

2.4 The core ideas of TGD-inspired theory of Consciousness and Quantum Biology

The following ideas of the TGD-inspired theory of Consciousness and of Quantum Biology are the most relevant ones for what will follow.

2.4.1 Quantum jump as moment of consciousness and the notion of Self

"Everything is conscious and consciousness can be only lost" is the briefest manner to summarize TGD inspired theory of consciousness. Quantum jump as a moment of consciousness and the notion of self are key concepts of the theory besides quantum mechanical concepts like entanglement (see **Fig. 6**) and bound state (electron and proton in hydrogen atom provide the basic example of bound state. Generation of bound state quantum entanglement with environment means that the system loses its consciousness.

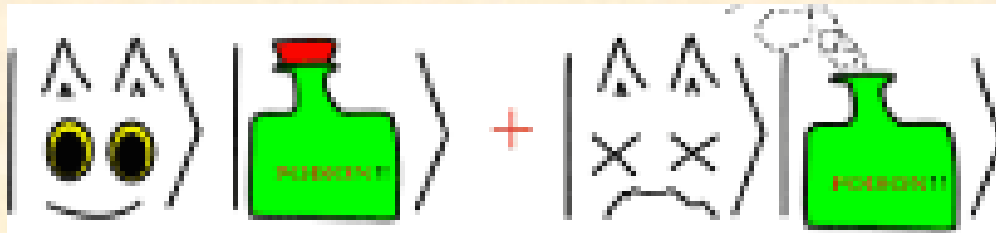


Figure 6: Quantum entangled systems lose their identify. Schrodinger cat entangled with the poison bottle is neither living nor dead or is both simultaneously

A moment of consciousness corresponds to single quantum jump which has a complex anatomy not discussed here. 'Self' is a system able to avoid bound state entanglement with environment and can be formally seen as an ensemble of quantum jumps. The contents of consciousness of self are defined by the averaged increments of quantum numbers and zero modes (sensory and geometric qualia). Moments of consciousness can be said to be the counterparts of elementary particles and selves the counterparts of many-particle states, both bound and free.

The selves formed by Macro-temporal quantum coherence are in turn the counterparts of atoms, molecules and larger structures. Macro-temporal quantum coherence effectively binds a sequence of quantum jumps to a single quantum jump as far as conscious experience is considered. The idea that conscious experience is about changes amplified to Macroscopic quantum phase transitions is the key philosophical guideline in the construction of various models such as the model of qualia, the capacitor model of sensory receptor, the model of cognitive representations, and declarative memories.

Selves can have sub-selves and self experiences them as mental images. The TGD-based notion of sub-system allows sub-selves to entangle and this corresponds to the fusion of mental images. This occurs for instance in stereovision. In the case that the systems in question represents a mental image, entanglement means fusion and sharing of mental images. The implication is that the contents of our consciousness is not so private than we have accustomed to think. For instance, shared mental images could be behind the development of moral rules and be crucial for the existence of society.

2.4.2 Macro-temporal quantum coherence

Macro-temporal quantum coherence is second consequence of the spin glass degeneracy [K2]. It is essentially due to the formation of bound states and has as a topological correlate the formation of join along boundaries bonds connecting the boundaries of the component systems.

During Macro-temporal coherence, quantum jumps integrate effectively to single long-lasting quantum jump and one can say that system is in a state of oneness -- Eternal now and outside time.

Macro-temporal quantum coherence makes possible stable non-entropic mental images. Negative energy topological light rays (MEs) are one particular mechanism making possible Macro-temporal quantum coherence via the formation of bound states. Remote metabolism and sharing of mental images are other facets of this mechanism.

2.4.3 Space-time as a 4-dimensional living organism

p-Adic physics as physics of intentionality and cognition is a further key idea of the TGD-inspired theory of Consciousness. p-Adic space-time sheets as correlates for intentions and p-adic-to-real transformations of them as correlates for the transformation of intentions to actions allow a deeper understanding of also Psychological-Time as a front of p-adic-to-real transition propagating to the

direction of the Geometric-Future. Negative energy MEs are absolutely essential for the understanding of how precisely targeted intentionality is realized.

Entire 4-dimensional space-time can be said to be living and self-organizing structure which changes in each quantum jump. This means that **our Geometric-Future and -Past contain civilizations and -- in principle -- we could communicate with ourselves of Geometric-Future.**

Even **our own biological bodies can be lived through many times.** Although one must assume that there is a kind of "dead time" during which large changes in the immediate Geometric-Past are not possible. For instance, a different decision in the geometric youth could suddenly and profoundly change our life in Geometric-Present.

2.4.4 Dark matter hierarchy, sensory representations, motor action, and metabolism

Dark matter hierarchy forces a profound reconsideration of brain metabolism and allows to develop a detailed model for how magnetic bodies use biological bodies as sensory receptors and motor instruments [M3] leading among other things to a generalization of the notion of genome.

For ordinary Quantum Mechanics, photons at EEG frequencies correspond to ridiculously small energies. Dark matter hierarchy is accompanied by a hierarchy of EEGs and its generalizations with the scalings of frequencies predicted to come in powers of $\lambda \approx 2^{11}$ [M3]. For $k_{em}=4$, the energies of EEG photons are above thermal threshold at room temperature for $f \geq 1$ Hz, and 5 Hz frequency corresponds to 86 meV energy.

The fact that arbitrarily small frequencies can correspond to energies above thermal threshold at higher levels of dark matter hierarchy implies that photons with arbitrarily low frequencies can have sizable physical effects on matter. This conforms with the findings about the effects of ELF EM fields on living matter [M3]. These effects allow to develop a rather detailed model for EEG and identify the parts of EEG correlating with communications of sensory data to the magnetic body and with quantum control performed by the magnetic body [M3].

The implication is that the transfer of energy between magnetic bodies and biological body could be major factor in metabolism. The question is whether the magnetic bodies provide metabolic energy for brain or utilize the metabolic energy provided by brain or both. Time mirror mechanism as a mechanism of intentional action would predict that magnetic body uses the metabolic resources of brain during intentional action.

Together with the strange findings about ionic currents through cell membrane suggesting that ionic channels and pumps are actually ionic receptors and the ionic currents through them are only small samples about the net currents, this vision leads to a profoundly new view about brain metabolism.

3 TGD-based view about Life

The notions of many-sheeted space-time, magnetic body, p-adic physics as physics of Intention and Cognition, time mirror mechanism as a tool to realized intentional Action, and classical Z^0 force are the basic elements of the TGD-inspired view about Life.

3.1 The notion of Magnetic Body

The magnetic field associated with any material system is topologically quantized. One can speak about magnetic body since one can assign a given magnetic flux tube to a definite material system.

3.1.1 Magnetic Body as an intentional agent

An attractive idea is that the relationship of the magnetic body to the material system is to some degree that of the manual to an electronic instrument. Magnetic body would thus allow to realize both sensory and abstract symbolic representations about the material body. Magnetic body would in this case serve as a kind of computer screen at which the data items processes in say brain are communicated either classically (positive energy MEs) or by sharing of mental images (negative energy MEs).

Magnetic body is also an active intentional agent. Motor actions are controlled from magnetic body and proceed as cascade- like processes from long to short length and time scales as quantum communications of desires at various levels of hierarchy of magnetic bodies. Communication occurs backwards in geometric time by negative energy MEs. Motor action as a response to these desires occurs by classical communications by positive energy MEs and as neural activities.

This explains the coherence and synchrony of motor actions difficult to understand in neuroscience framework. The sizes of flux tubes are Astrophysical. For instance, EEG frequency of 7.8 Hz corresponds to a wavelength defined by Earth's circumference. The non-locality in the length scale of Magnetosphere -- and even in length scales up to light life -- is forced by the Uncertainty Principle alone if taken seriously in Macroscopic length scales.

3.1.2 Universal metabolic currencies

The leakage of supra currents of ions and their Cooper pairs from magnetic flux tubes of the Earth's magnetic field to smaller space-time sheets and their dropping back involving liberation of the Zero-Point kinetic energy defines one particular metabolic "Karma's cycle".

The dropping of protons from $k=137$ atomic space-time sheet involved with the utilization of ATP molecules is only a special instance of the general mechanism involving an entire hierarchy of Zero-Point kinetic energies defining universal metabolic currencies. This leads to the idea that the topologically quantized magnetic field of Earth defines the analog of central nervous system and blood circulation present already during the pre-biotic evolution and making possible primitive metabolism. **This has far reaching implications for the understanding of how pre-biotic evolution led to living matter as we understand it [L4].**

3.1.3 Dark matter hierarchy and motor control

The following general overview about quantum communication and control emerges from the model for EEG hierarchy as correlate for dark matter hierarchy discussed in detail in [M3].

1. Cyclotron frequencies relate to the control of the biological body by the magnetic body and could be assigned with the magnetic flux sheets going through DNA since it is the genome where protein synthesis is initiated and is thus the optimal intermediate step in the cellular control.
2. One of the basic functions of cell membranes is to perceive the chemical environment using various kinds of receptors as sensors. Neurons have specialized to receive symbolic representations of the sensory data of primary sensory organs about the situation in the external world. A good guess is that in this case magnetic flux quanta are hollow cylindrical structures parallel to the cell membrane associated proteins serving as Josephson junctions.

Also, magnetic flux tubes parallel to axon serving as templates for axons could define communication lines connecting cell membranes to the cellular magnetic body ($k_{em}=2$ perhaps). Also synaptic contacts should involve similar magnetic flux quanta connecting them to neuronal magnetic body ($k_{em}=3$ perhaps).

3. This picture would explain why the temperature of brain must be in the narrow range 36-37°C to guarantee optimal functionality of the organism. If interior superconductivity is lost, magnetic body receives sensory data but is paralyzed since its desires cannot be realized. If boundary superconductivity is lost, magnetic body can move but is blind.
4. In the length scales below the weak length scale L_w , charged weak bosons also behave as massless particles and the exchange of virtual W bosons makes possible a nonlocal charge transfer. Dark quark-antiquark pairs associated with the color bonds of the atomic nuclei can become charged via the emission of dark W boson and thus produce an exotic ion. The same can happen at the higher levels of dark matter hierarchy.
5. Massless extremals (MEs, topological light rays) serve as correlates for coherent states and Bose-Einstein condensates of dark bosons. Besides neutral massless extremals (MEs), TGD predicts also charged massless extremals obtained from their neutral counterparts by a mere color rotation (i.e., color and weak quantum numbers are not totally independent in TGD framework).

The second nonlocal quantum control mechanism is based on EM charge entanglement involving a superposition of ordinary ions/atoms and exotic ions connected by a W massless extremal joining magnetic body and biological body. In quantum jump, this state would be reduced to exotic charge state with some probability increasing with the strength of the classical W field. Charged massless extremals could be seen as correlates for nonlocal quantum control by affecting charge equilibria whereas neutral MEs would serve as correlates for coordination and communication. Color charged MEs could also induce color charge polarization and flows of color charges and thus generate visual color qualia by the capacitor mechanism discussed in [\[K3\]](#).

6. These nonlocal quantal mechanisms can induce or change electromagnetic polarization in turn inducing ordinary charge flows and thus making possible quantum control of nervous system by magnetic body. The generation of nerve pulse could rely on the spontaneous state function reduction occurring for charge entangled state reducing the resting potential below the critical value by this kind of mechanism inducing charge transfer between cell interior and exterior.

Also remote mental interactions -- in particular *telekinesis* -- might rely on this mechanism.

3.1.4 Emergence of symbols at molecular level and new view about hydrogen bond, water, and bio-catalysts

The first questions one can ask about dark matter is "What dark atoms could be?" This question is discussed in [\[J6\]](#) and more thoroughly and relating it to the general model about living matter in [\[L2, N2, L4\]](#).

One can imagine 2 notions of dark atom. The first one is based on λ^{2k} -fold radial scaling of ordinary atom and predicts that energies are scaled down like $1/\lambda^{2k}$. The second is based on λ^k -fold radial folding of the ordinary atom without changing its size. Both of these notions seem to make sense.

The radially-folded atoms seems to be especially interesting biologically. The nucleus of this dark atom is ordinary whereas electrons are dark. The space-time sheet associated with a dark atom at k^{th} level of dark matter hierarchy is locally λ^k -fold covering of M^4 , $\lambda \approx 2^{11}$. The sheets however integrate to a single sheet globally.

Single electron states have very nearly the same energy as in the case of ordinary atoms since principal quantum number n is fractionized to $n = \lambda^k$. Fermi statistics allows also $N \leq \lambda^k$ -electron states. This is essentially due to the degeneracy caused by the λ^k -fold local stack structure of space-time sheets.

From the point of the exterior world, these atoms have an effective fractional charge $1 - N/\lambda^k$ since the fine structure constant associated with the interaction of dark electron with external world is scaled down by a factor $1/\lambda^k$. $N = \lambda^k$ corresponds to full electron shell and represents especially stable state analogous to noble gas atom or magic nucleus.

Dark N-hydrogen atoms (briefly, H_N -atoms for $k=1$ and $\lambda \approx 2^{11}$) are of especial interest from the point-of-view of Biology. One ends up with the hypothesis that H_λ -atom corresponds to hydrogen atom appearing in hydrogen bond. Furthermore, H_N -atoms could define λ -fold alphabet and their attachment to various bio-molecules could define letters for the names of bio-molecules.

The molecules labeled by name and conjugate name would have enhanced probability to fuse along the letters and conjugate letters ($N_c = \lambda - N$). In this process, one proton would be liberated and could drop to a larger space-time sheet liberating metabolic energy quantum. This process would define simultaneously the basic mechanisms of catalytic action and generation of metabolic energy quantum. H_N atoms would bring in symbolic representations and what might be called "molecular sex".

The assumption that that at least part of water molecules of water in living systems could be of form $H_N\text{-O-H}$ and $H_{N1}\text{-O-H}_{N2}$ leads to a model for ordered water as water in which only H_λ -atoms are bound to oxygen and to answer basic questions concerning the role of water in biochemistry.

For instance, the question why hydration induces depolymerization unless the water is in ordered phase can be answered. The prediction is that $H_N\text{-O-H}$ water acts as a catalytic poison by attaching to the letters of the names of molecules and thus spoiling catalytic specificity. The identification of ordered water as the predecessor of gel-phase emerges naturally.

In this framework, it is even possible to say something non-trivial about how first replicators have emerged. The **new view about the hydrogen bond** poses very strong constraints on allowed bio-monomers. Monomers forming negatively charged polymers at the verge of stability are ideal since they define optimal targets for catalytic action.

3.1.5 Magnetic Mother Gaia as conscious entity

Magnetic Mother Gaia could also form sensory and other representations receiving input from several brains via negative energy EEG MEs entangling magnetosphere with brains. The multi-brained magnetospheric selves could be responsible for the third person aspect of Consciousness and for the evolution of social structures.

Some aspects of **remote-viewing** very difficult to understand if remote-viewing involves only the target and viewer [32]. The successful healing by prayer and meditation groups [33] and the experiments of Mark Germaine [34] support the view that multi-brained possibly magnetospheric selves are involved. Magnetic flux tubes could function as waveguides for MEs and this aspect is crucial in the model of long-term memory.

3.2 Time mirror mechanism as a fundamental mechanism transforming Intentions to Actions

Time mirror mechanism is based on the generalization of what happens in the reflection of light. Instead of reflecting in spatial direction, light propagating in the direction of past is reflected in time direction (see Fig. 9). Phase conjugate light waves can be identified as light propagating in the direction of geometric past and with its photons having negative energies. Reflected light consists in turn of ordinary positive energy photons.

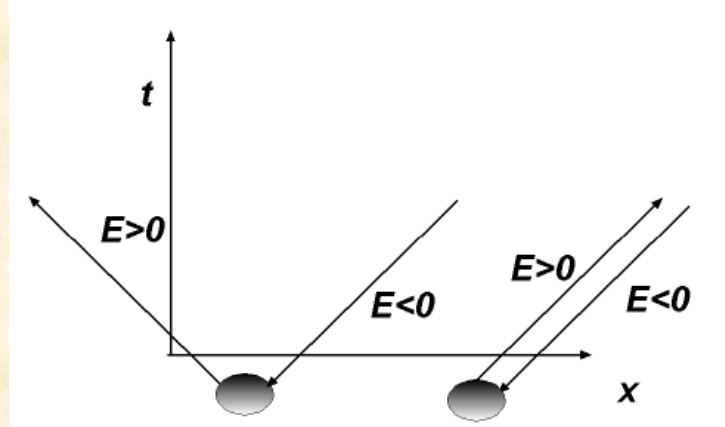


Figure 9: Time mirror mechanism

3.2.1 Materialization of Intentions

Long-ranged electro-weak fields -- in particular ELF EM fields -- are crucial for the TGD-inspired model of the brain and a natural assumption is that p-adic real phase transitions occur also for "topological light rays" (massless extremals (MEs)).

A concrete picture about the materialization of intentions emerges, when one asks how a precisely targeted intention could be realized at the atomic or molecular level. The basic point is that molecules can only intend to make simple quantum transitions.

1. If the transition occurs to a lower energy state, it can occur spontaneously whereas the transitions to a higher energy states cannot. Spontaneous transitions mask the possibly occurring intended transitions so that only the transitions which cannot occur spontaneously allow precisely targeted intention.
2. What would happen is that first a p-adic ME representing the intention to perform the transition is generated. Then p-adic ME is transformed to a real ME in quantum jump. Quite generally, it seems that intention can be realized in a precisely targeted manner only for the transitions (which cannot occur spontaneously) and thus involve the emission of negative energy MEs.
3. The generation of negative energy MEs utilizes the "buy now/let others pay" mechanism of metabolism which implies extreme flexibility since system gets energy instantaneously. Of course, there must exist an unselfish self which is able to pay. This puts severe constraints on the mechanism.
4. W MEs inducing charge entanglement involving exotic nuclear ionizations of opposite sign in entangled systems is especially attractive candidate for inducing generalized motor actions. The mechanism relies on the generation of classical electric fields at dark space-time sheets in turn inducing via Faraday law electric fields at space-time sheets containing the ordinary

matter: this leads to generation of ordinary ohmic currents. The generation of nerve pulse could represent one example of a generalized motor action realized in this manner by magnetic body [M2].

3.2.2 Time mirror mechanism, scalar wave pulses, and wormhole magnetic fields

Many-sheeted space-time makes possible many-sheeted lasers since cold space-time sheets can contain Bose-Einstein condensates of ions and their Cooper pairs. If the system contains population inverted many-sheeted laser for which the increment of Zero-Point kinetic energy corresponds to the energy of photons associated with negative energy MEs, the absorption of negative energy photons gives rise to a phase transition-like dropping of particles to larger space-time sheet by the induced emission mechanism. The control signal represented by negative energy MEs can be amplified if a critical number of particles drops to the larger space-time sheet.

This control mechanism allows an instantaneous motor control in which intention is transformed to desired represented by negative energy MEs and generates in the Geometric-Past a reaction representing the desired response (say, neuronal activity giving rise to a motor action). This process probably involves entire hierarchy of magnetic selves realizing their intentions as desires communicated to lower level magnetic selves and the lowest level corresponds to the regions of brain responsible for liberating metabolic energy.

The simplest possibility is that the transformation of the intention to action corresponds to p-adic-to-real phase transition for negative energy topological light ray. It seems, however, that generation of p-adic scalar wave pulse transformed to real one is more promising mechanism. When a scalar wave pulse moves in matter, charges end up to the space-time sheet of the scalar wave pulse and accelerate without dissipation. Instead of *brehmstrahlung*, the accelerated charges emit negative energy "acceleration radiation" having negative energy MEs as space-time correlates.

Since dissipation is negligible, this leads to a generation of a strong negative energy signal. The resulting negative energy photons in turn induce the phase transition-like dropping of particles of population inverted many-sheeted laser to larger space-time sheets liberating a beam of positive energy photons which is much more intense than the control signal consisting of negative energy photons. A good guess is that scalar wave pulses provide a fundamental control mechanism in living matter and that nerve pulse represents only a special case of this control mechanism.

Intentions could be transformed also to actions by generation of magnetic flux tubes: so-called wormhole magnetic fields [J5] correspond to pairs of magnetic flux tubes having opposite time orientations and therefore also opposite energies. Wormhole magnetic fields could be created by first generating their p-adic counterparts and then transforming them to their real counterparts in quantum jump. The phase transition-like changes of EEG spectrum involving emergence or disappearance of EEG band might be due to the generation of wormhole magnetic fields giving rise to EEG resonance frequencies via cyclotron transitions and thus represent motor actions of magnetic body [M3].

3.3 Applications of time mirror mechanism

Time mirror mechanism has become a cornerstone of the TGD-inspired theory of Consciousness and biological applications translate easily to technological applications which provide a fresh new look about how advanced civilizations might study the surrounding Cosmos.

3.3.1 Biological applications

Long-term memory, sensory perception, and realization of intentions as action, in particular motor actions rely on time mirror mechanism mechanism. The idea is simple. To remember is to "see" the brain of the Past. Ordinary seeing is based on reflection of light on an object. Seeing the brain of the Past is based on reflection of light in time direction by mirror mechanism.

The same mechanism explains remote mental interactions. Now reflection occurs in some other brain or some other system containing population inverted lasers.

The strange time delays associated with active and passive aspects of consciousness discovered by Libet [18] can be interpreted as due to the finiteness of light velocity and astrophysical size of the magnetic body, and thus lend support for the notions of magnetic body and time mirror mechanism.

Time mirror mechanism allows also instantaneous remote metabolism: system gets positive energy by sending negative energy topological light rays/photons to some system able to receive them. If the receiving system is population inverted laser, a cascade like process generating positive energy photons propagating to the future and to the system which sent the negative energy photons. The cascade results because the probability of bosons to drop in ground state is proportional to the number of bosons already in ground state. This mechanism makes biological system extremely flexible since any part of it can get energy instantaneously if needed.

3.3.2 Instantaneous quantum remote-sensing?

Ordinary remote-sensing technology is limited by the finite velocity of light making it impossible to remote-sense actively objects that are too far away. The time mirror mechanism suggests a technology of active remote-sensing based on time reflection at the studied object and thus involving no time lapse, making possible remote-sensing of arbitrarily distant -- even astrophysical -- objects due to the possibility of amplification in reflection and the fact that topological light rays are "outside" the space-time and the interaction with matter is very weak. The only additional condition is the presence of the many-sheeted population reversal. This condition could be satisfied for living matter, at least. The Dela-Warr camera [35] might be based on this mechanism. **[SS: also archived under "Dr. J>A. Ginsberg..." at [doc](#) [pdf](#) [URL](#)]**

Even more science-fictively and a little bit of tongue-in-cheek, one can consider also the possibility of communicating with the civilizations of the Geometric-Future by using population inverted lasers. Send to the Geometric-Future classical k-bit signals (k harmonics of the fundamental) at p-adic frequencies $f(n,k)$ to tell that we have discovered p-adic cognitive codes and wait to see whether the population inverted lasers at these frequencies return to the ground state with an abnormally high rate!

One can easily imagine simple codes for communication. For instance, for p-adic length scales corresponding to visible wavelengths, the typical number of bits would be 163.

3.3.3 Remote utilization of energy

In the technological context remote metabolism would translate to a remote utilization of energy stores making unnecessary the costly transport of the fuel. Only the negative energy signal of critical intensity would be required to generate an amplified positive energy signal from the Geometric-Past providing the energy instantaneously and over long distances. Since many-sheeted lasers defined by space-time sheets of many-sheeted space-time are everywhere (energies correspond to Zero-Point

kinetic energies), the spaceship could get its energy almost in any environment which is sufficiently many-sheeted.

The need to carry large amounts of fuel and the limitations posed by the maximal classical signal velocity are the basic problems of the space technology. The technological variant of the remote metabolism might provide at least a solution to the fuel problem. The work with the Searl machine suggests that phase conjugate laser beams could also generate antigravity effects [G2].

3.3.4 Sharing of mental images and *telepathic* communications

The time mirror mechanism allows also the system of Geometric-Present to entangle with that of the Geometric-Past. This means that the systems of Geometric-Present and -Past share mental images. This could be the mechanism of episodal memory in which events of Geometric-Past are re-experienced.

The mechanism also makes possible *telepathic* sharing of mental images. For the system in Future, the experience represents memory (not necessarily personal) and for the system of Past to precognition. It might be that the civilizations of remote Geometric-Future have developed this mechanism to a refined technology allowing them to directly experience what the civilizations of geometric past and future experience.

Encounters of UFOs and *aliens* could be this kind of remote contacts. They would be absolutely real encounters in the sense that the sensory perceptions are about real aliens but generated *telepathically*.

3.3.5 Plasma oscillation patterns as holograms

The so-called 4-wave interaction involves 4 laser beams: a probe beam and its phase conjugate and two laser beams in opposite directions and interfering to a standing wave [K4]. In bio-systems, the probe beam and its phase conjugate would be responsible for remote metabolism providing the energy needed to build the hologram by time mirror mechanism. Standing wave, in turn, would define a simple hologram serving as a fundamental sensory representation from which more complex sensory representations are constructed. If the oppositely moving laser beams have slightly different frequencies, the standing wave pattern moves. Nerve pulse could basically result in this manner.

Plasma oscillations of ionic charge densities represent standing waves since the plasma oscillation frequency does not depend on the wavelength so that the standing pattern repeats periodically. The metabolic energy needed to build up plasma oscillation patterns would be obtained by time mirror mechanism using wave and its phase conjugate (probe beam and its phase conjugate).

This would be one reason for why ions are so crucial for a living cell. All atomic nuclei are completely ionized Z^0 ions and this would make possible further plasma oscillations. In fact, the Z^0 plasma frequency of water corresponds to the fundamental metabolic energy currency 0.44 eV so that metabolism could be used to build Z^0 holograms based on water molecules. Many-sheeted space-time predicts entire hierarchy of plasma frequencies coming as powers of 2.

3.4 Vision about the evolution of Life

The notion of many-sheeted space-time could allow to understand many puzzles related to the prebiotic evolution [19, 20]. There are many constraints on the models for pre-biotic evolution. The models have also many difficulties [21, 22].

3.4.1 Cognitive evolution proceeding from long to short scales is also present

General principles of TGD lead to an overview about how Evolution must have proceeded. Usually the evolution of Life is seen as an evolution proceeding from short to long length scales (e.g., atoms→molecules→cells→...). Also cognitive evolution must have occurred in parallel with the chemical evolution.

Since p-adically small means large in the real sense, cognitive growth must have proceeded from long length and time scales to short ones. Learning of a motor skill and carving a statue by starting from a rough sketch and adding gradually details are good examples of the process. Magnetic flux tubes structure must have developed gradually more and more intricate by the emergence of local structures by a process analogous to a construction of a fractal. The resulting magnetic flux tube structures have in turn served as templates for the formation of bio-matter.

The study of field equations leads to a classification for the phases of matter according to the dimension of CP_2 projection. Magnetic field structures for which CP_2 projections have dimensions $D=2$ and $D=3$ have interpretation as phases analogous to ferromagnetic phase and spin glass phase respectively and $D = 2 \rightarrow 3$ phase transition would be presumably induced by the interaction of flux tube structures with bio-matter and lead to the extremely complex but organized phase identifiable as living matter. The $D=4$ phase would in turn correspond to chaotic phase analogous to a demagnetized phase.

These ideas lead to a rather detailed vision about how the pre-biotic evolution might have proceeded.

A. Standard vision about pre-biotic life is problematic

The prevailing mechanistic world view forces to conclude that Life emerged accidentally in young Earth during a relatively short time period of about 0.3 billion years. On basis of extensive computer simulations, one can fairly say that a spontaneous generation of life in primordial ocean seems extremely implausible [21].

TGD replaces materialistic view with a continual re-creation in which classical universe in 4-dimensional sense is replaced by a new one in each quantum jump. p-Adic length scale hypothesis allows to formulate the notion of evolution precisely as a generation of increasingly larger space-time sheets characterized by preferred p-adic primes meaning also a sequence of symmetry breakings.

Macroscopic and even astrophysical quantum coherence becomes a key features of living matter. The theory is partially non-deterministic also in the Classical sense but the absolute minimization of Kahler action and self-organization lead to Darwinian selection of selected patterns.

B. Did Life develop in the womb of Mother Gaia?

A stable star and planet providing appropriate conditions such as temperature for liquid water is needed. The many-sheeted view about Life widens dramatically the spectrum of possible environments for the pre-biotic evolution. In fact, the interior of the many-sheeted Earth could contain Mother Gaia's womb providing a shielded environment for the evolution of life instead of the rather harsh environment defined by the primordial atmosphere and ocean.

The womb would be located somewhere below the boundary at which $k=137$ atomic space-time sheets transform to very hot $k=131$ space-time sheets. This should occur when the thermal de Broglie wavelength becomes equal to the p-adic length scale $L(131)$.

The transition occurs above the crust-mantle boundary (1300°K). Below the 131-137 boundary, the temperature at $k=137$ atomic space-time sheets diminishes and the range of temperatures could cover also room temperature. Mantle-core boundary (4000°K) is a good candidate for the surface at which the temperature at $k=137$ space-time sheets is near to room temperature.

In a sharp contrast to the standard wisdom, something like a mirror image of the biosphere should exist at the other side of the mantle if one takes many-sheeted space-time seriously. The hot $k=131$ space-time sheets yield a thermal radiation with wavelengths containing ordinary metabolic energy currency about 0.5 eV. The dropping of ions O, C, N from the hot $k=131$ space-time sheets to larger space-time sheets generates light at visible frequencies replacing solar light so that even intraterrestrial counterpart of photosynthesis could develop. The dropping of oxygen atoms could make also possible development of oxygen based metabolism.

C. Was chemical evolution guided by the magnetic body of Mother Gaia?

The notions of many-sheeted body, topological field quantization, and classical Z^0 modify profoundly the views about chemical evolution.

1. Atoms like C, N, and O and smaller amounts of P and S giving rise to bio-monomers and metals like Al, Fe, and Zn are the basic building blocks. The formation of various chemical bonds like hydrogen bonds, covalent bonds, and peptide bonds could involve many-sheeted physics in a nontrivial manner.
2. The formation of biological monomers (amino acids, nucleotides, fatty acids, sugars) is an essential element of Life. Except for DNA nucleotides, basic monomers evolve in the circumstances simulating to what have been believed to be the primordial atmosphere. These bio-monomers are found even in the interstellar space and in galactic clouds. The question is not whether the pre-biotic life can develop but whether our recent-day materialistic science allows to understand how it develops.

The standard wisdom about primordial atmosphere as a reducing environment (containing no oxygen) indeed leads to grave difficulties. Also the concentrations in the primordial ocean seem to be quite too low for the bio-monomers to be synthesized [22]. Magnetic flux tube structure of the magnetosphere acting as a nervous system and a metabolic circuitry of the magnetic Mother Gaia could make possible controlled metabolism already during the pre-biotic period and allow to circumvent these difficulties.

3. The formation of the biological polymers such as proteins, nucleic acids, lipids, and carbohydrates occurs universally by dehydration. The problem is that in water environment polymers are unstable against decay by hydration: it would seem that a metabolic energy feed is required already at this stage to guarantee non-equilibrium situation. The solution to the difficulties could be quantum control from the magnetic flux tubes of magnetosphere providing primordial metabolism with the same universal energy currencies as associated with the recent metabolism.

Phosphate-sugar polymers form the backbone of nucleic acids and metabolism is based on ADP and ATP formed from adenine and phosphate ions. It has been already earlier found that the generation of ATP and its metabolic utilization involve the flow of protons between the atomic space-time sheets and some larger space-time sheets (say, the magnetic flux tube of Earth) [K6].

It will be found that this mechanism is involved also with the dehydration leading to polymerization and phosphorylation. The reversal of this process also implies the instability of DNA in an ordinary aqueous environment.

4. The assembly of these macro-molecules into organized aggregates like chromosomes, microtubules, and cell organelles could involve many-sheeted physics. Classical Z^0 fields generated by nuclei which are completely ionized Z^0 ions, are screened by neutrinos but not locally since the size of neutrinos is much larger than the size of the nucleus.

Classical Z^0 fields -- besides explaining chiral selection of bio-molecules -- could be a central tool in the control of the molecular engineering since Z^0 tidal forces allow to distinguish between nuclei with different $A-Z/A$ ratios.

5. Also the emergence of catalysts, metabolism, and the membrane bound structures should be understood. Superconductivity at magnetic flux tubes and its breakdown (as well as the possibility of negative energy MEs having phase conjugate laser waves as standard physics counterparts) are expected to be especially relevant for the catalytic action. Bound state quantum entanglement in Macroscopic length scales is also an absolutely essential part of this mechanism.

Intentional action realized in terms of negative energy MEs and appearing already at the molecular level is expected to become an increasingly important aspect of catalytic action when the complexity of the structures increases. In TGD framework, a primitive many-sheeted metabolism is present from the beginning and becomes only refined during evolution. Most importantly, metabolic currencies are constants of nature by the p-adic length scale hypothesis.

Self-organization in many-sheeted space-time is expected to automatically lead to the generation of the gel phase as a possible predecessor of membrane bounded structures as well as of membrane structures themselves containing liquid crystal water stabilizing also DNA nucleotides.

D. Emergence of the Genetic Code

The emergence of the Genetic Code has remained a mystery in various scenarios of pre-biotic evolution. The TGD-inspired solution of the puzzle came from a rather unexpected (or should one say unrespected) direction.

Chilbolton and Crabwood crop formations [51, 52, 53, 54] led to the realization of the exact A-G symmetry and slightly broken T-C symmetry of the Genetic Code. These symmetries strongly suggest that the evolution of the triplet code occurred as a fusion of singlet and doublet codes. One ends up with a detailed model for how this happened by using some hints provided by Chilbolton crop formation [51, 52] and the structure of tRNA molecule carrying in its fossilized parts detailed information about the evolution of the code.

Nanno-bacteria [23, 24] might correspond to some predecessor of the recent genetic code. Nanno-bacteria accompany mineral structures and actively manipulate them. This conforms with the view that mineral interfaces have been indeed important for the evolution of polymers.

Introns are the basic mystery of DNA. TGD predicts that language is a universal phenomenon. It appears already at prokaryotes and is based on genetic code realized as temporal field patterns and at level of eukaryotes introns define memetic code (code word has 126 bits) besides genetic code and define kind of higher level language. Memes represented as sequences of 21 DNA triplets and expressing themselves as field patterns associated with MEs would realized this higher level universal language.

3.4.2 Plasmoids as primitive lifeforms?

If the self-organization leading to the generation of Life proceeds from magnetic body of to the biological body then simple many-sheeted topological quanta containing plasma, **plasmoids** should be the simplest life forms.

For instance, plasmoids could carry torus like magnetic flux configurations. The flux tubes of magnetic field can form extremely complex knotted and linked structures. This topology provides almost enormous representational capacity and one can wonder whether opportunistic Nature could really have failed to notice this opportunity.

Perhaps the simplest plasmoids (even ball lightning!) might be regarded as the magnetic counterparts of the simplest monocellulars. Note that small plasmoids should be generated also when supra-currents in bio-matter leak out from the magnetic flux tubes. Neural circuits might be accompanied by plasmoids responsible for the self-organization of the ordinary matter around them.

The Zero-Point kinetic energy liberated when particles drop from, say, atomic space-time sheets to the space-time sheets magnetic flux tubes would define basic metabolic energy quanta for the plasmoid. Therefore metabolic energy quanta would be by p-adic length scale hypothesis universal and same everywhere in Universe. **Thus metabolism would not be result of biochemical evolution but precede it.** Plasma oscillation patterns at plasma-frequency are ideal hologram like sensory representations built using time mirror mechanism so that plasmoids could have primitive sensory systems.

1. Plasma sheet as a 'microchip'

There is a fascinating finding about the 'memory chip' character of the organization of the ionic velocity distribution in the plasma sheet [43] at the night side of the Earth's magnetosphere. The belief was that the distribution is a Maxwellian thermal distribution. But a complex organization of the number of ions as a function of speed and direction relative to the direction of the local magnetic field has been detected [43].

By coloring the bins representing small volumes of the velocity space, one finds that 3-dimensional features like "eyes" and "wings" appear! The proposed interpretation is that these features codes the history of ionic currents. One cannot exclude the possibility that these ionic currents could reflect even our sensory experiences. The prediction is that also other transition regions (in particular magneto-pause) should exhibit similar complex self-organization patterns.

2. Plasmoids in the laboratory

It seems that one of the most craziest predictions of the TGD-inspired theory of Consciousness has been realized at laboratory. A quite recent report tells about plasmoids generated in a simple diode involving plasma generator creating plasma column between itself and the positively charged anode [25]. The plasmoids are self-organizing structures able to evolve in a period of few microseconds. They possess many properties that lifeforms are expected to have.

Plasmoids:

- (i) grow from micrometer size up to cm size;
- (ii) replicate by simply dividing into two pieces;
- (iii) have an outer negatively-charged surface separating the positively-charged interior from the environment and obviously analogous to the cell membrane. Hence the plasmoid is analogous to a capacitor and the exchange of matter with the environment could correspond to a di-electric breakdown essential for qualia in TGD based model of the sensory receptor;
- (iv) possess a metabolic cycle involving the transfer of matter between the interior of the plasmoid and environment. This cycle is seen as a periodic generation of visible light at specific frequencies: the light balls are typically found to be red or yellow. The frequency of metabolic oscillations is at 25-45 kHz frequency range;
- (v) are able to communicate by generating electromagnetic radiation by inducing vibrations in the receiving plasmoid at the same frequency.

These findings give valuable hints concerning the more detailed modelling the "biology" of plasmoids.

Plasmoids are in a key role in the TGD-inspired model of pre-biotic evolution discussed in [L4]. For instance, one can ask whether the preferred colors might be interpreted in terms of quantized increments of Zero-Point kinetic energies liberated when atoms or ions (such as C, N, and O) drop from the hot $k=131$ space-time sheets (temperature being of the order of the Zero-Point kinetic energy) to larger space-time sheets.

3. Plasmoids and the emergence of dark H_N -atoms

As already discussed briefly, the notion of dark N-atom leads to a new vision about hydrogen bond and water and allows us to identify a fundamental mechanism of catalysis. For instance, H_N atom at $k=1$ level of dark matter hierarchy can be regarded as a space-time sheet folded λ times in radial direction. Single electron energies are in the lowest order approximation same as for ordinary hydrogen atom and the sizes of H_N - and H-atoms are also same.

What is new that the number of electrons can range from $N=1$ to $N = \lambda \approx 2^{11}$. This means that H_N -atoms define ideal letters for the names of molecules obtained by replacing ordinary hydrogen atoms capable of forming hydrogen bonds with H_N -atoms. The fusion of H_N - and H_{N_c} -atom ($N_c = \lambda - N$) is strongly favored since it gives rise to λ -atom expected to be especially stable as a full electron shell.

The identification of the hydrogen atoms of hydrogen bonds as H_λ -atoms leads to a general vision about how symbolic representations appear at the molecular level and how the extreme selectivity of bio-catalytic is due to the enhanced probability molecules with name and conjugate name to fuse to hydrogen bonded reaction complex and spitting out one proton dropping to a larger space-time sheet and liberating metabolic energy quantum in this process kicking the reaction complex over the potential wall to the final state. Also, the exceptional role of water in the evolution of Life can be understood.

How the first H_N atoms did emerge becomes the basic question about pre-biotic evolution. A plasma phase containing free electrons seems to be a necessary prerequisite if one takes seriously the hypothesis that the increase of Planck constant as a phase transition taking place as gauge interactions become so strong that the perturbative treatment fails (color confinement of quarks is good example of this phenomenon).

This supports the view about plasmoids as predecessors of molecular lifeforms. Also encourages to take more seriously the crazy sounding idea that hot temperatures (say those prevailing in planetary interiors or even solar photosphere) are a necessary prerequisite for the emergence of plasmoids and possible N-molecular variants of Life [N3, L4].

3.4.3 Dark matter hierarchy and evolution

Dark matter hierarchy leads to an amazingly concrete picture about evolutionary hierarchy allowing us to identify the counterparts for concepts like mineral, plant, and animal kingdom that we learned during schooldays and ceased to take seriously as students of theoretical physics as we learned that other sciences are just taxonomy. Even more, a view about what distinguishes between prokaryotes, eukaryotes, animal cells, neurons, EEG, and even about what makes cultural evolution becomes possible.

There are 2 hierarchies involved with the dark matter hierarchy. The dark levels associated with weak bosons for which $k_W=1$ corresponds to the p-adic length scale about $L_W(1) \sim 1$ Angstrom with exotic weak bosons corresponding to $k=113$ (rather than $k=89$ as for ordinary weak bosons). There is also electromagnetic dark hierarchy and in a given length scale, one has $k_W = k_{em} + 2$.

In a given scale, the weak sector would be ahead in evolution by 2 units so that weak dark bosons can be associated with more abstract functions like cognition and planning whereas em level would be related to simpler functions.

Ordinary matter corresponds to $k_W=k_e=0$ and ordinary value of \hbar and higher levels correspond to scaled-up values of \hbar with scalings λ^k , $\lambda \sim 2^{11}$. This mean scaling-up of various quantum length scales and also the sizes of space-time sheets by λ . It seems that magnetic flux quanta are the primary structures forming hierarchy of this kind and large \sim means that cyclotron energy scales expressible as $E = \hbar(k)eB/m \propto \lambda$ so that an arbitrarily weak magnetic field strength can in principle correspond to a cyclotron energy above thermal threshold at room temperature.

The appearance of space-time sheets zoomed up in size by a power of λ means the emergence of new levels of structure and it is natural to identify big leaps in evolution in terms of scaling of \hbar by λ and emergence of new large magnetic flux sheets satisfying magnetic flux quantization condition with the unit of flux scaled-up by λ . This leap is a quantum leap but in different sense as usually thought.

The emergence of higher dark matter levels would basically mean the integration of existing structures to larger structures. A good metaphor are text lines at the pages of book formed by magnetic flux sheets whose width is scaled-up by λ as the new level of dark matter hierarchy emerges.

This conceptual framework gives rather strong guidelines for the identification of the levels of evolutionary hierarchy in terms of dark matter hierarchy. The outcome is a detailed vision about big evolutionary leaps discussed in [\[L2\]](#) in detail.

3.5 Could simple lifeforms be induced by intentional Action?

Since life would involve self-organization of magnetic flux tube patterns, one can consider the possibility that intentional actions could induce this self-organization and in a well-defined sense give the "spark of life" to the dead matter.

Obviously, the highly-advanced civilizations of the Geometric-Future might have developed a kind of spark-of-life technology. And using the time mirror mechanism, they could induced self-organization inducing life in the remote Geometric-Past. Perhaps we are doing this all the time for our brains of the Geometric-Ppast when we remember.

There is some support for this wild speculation. William Tiller in Stanford University has carried out impressive experimental work with what he calls "intention imprinted electronic devices" (IIED). His results challenge that standard assumption that the intentions of experimenter do not affect the experimental apparatus [\[38, 39, 40\]](#). The simplest explanation for the findings is that intentional action induces magnetic self-organization of IIED and of the target material used in experiments. For instance, purified water develops pH-, temperature-, and conductivity-oscillations and its pH becomes sensitive to external magnetic fields.

3.5.1 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 1,500 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 where 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 3 frequencies (5.0, 8.0, and 9.3 MHz) [\[41\]](#).

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 possible effect on the larval development time was studied.

The results from various arrangements were compared with control targets (i.e., no FC, no CD, no IIED).

3.5.2 Experimental findings

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.

A.. 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, 4 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.

B. "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". 3 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 $\sim \Delta \text{pH} = 0.1$ 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 the phantom DNA effect.

Oscillation amplitude had peaks at the harmonics of fundamental frequency $f_1 = 1/T_1$, $T_1 = 36:6$ minutes with 3 lowest harmonics being very clearly visible [40]. Also $T_1 = 51:2$ 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} -to- 5×10^{-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 0.6 units. One can say that the target had become sensitive to the effects of external magnetic fields.

3.5.3 Explanation of the pH oscillations in terms of the general model of Intentional Action

The findings described above support the notion of magnetic body as mediator of the Intentional Action and provide a connection with the general TGD-based vision about pre-biotic evolution. The following general model for the effects suggests itself.

A. Intentional Action induces magnetic self-organization of the control device and target

The magnetic body of IIED becomes a part of the intentional agent. Also the magnetic body of the target (purified water, etc.) partially fuses with that of IIED. Even more, the general model for the pre-biotic evolution [L4] suggests that the intentional action mediated via the IIED induced a self-organization of a p-adic hierarchy of topological field quanta of magnetic field in the target system.

This kind of hierarchy is associated also with DNA in the TGD based model for the effects of laser radiation on DNA observed by Gariaev [44]. The generation of magnetic structures in shorter length scales is what one expects the intentional action to generate since intentional "growth" proceeds quite generally from long to short length and time scales.

The simplest candidate for the time scale of oscillations varying in 10-100 minute range is as the time scale associated with the cyclotron frequency of magnetic field quanta responsible for the intentional action. The cyclotron period of proton lies in 10-100 minute range for a magnetic field strength varying in the range of 27.8-278 pT. For $T_1 = 36.6$ minute period, the field strength would be 75.9 pT. The corresponding magnetic length is 4 mm and near to $L(188) = 3:7$ mm.

The harmonics of the fundamental f_1 could correspond to the quantized values of the magnetic flux coming as integer multiples of the basic flux with the strength of magnetic field quantized to integer multiples. Similar quantization of the Z^0 magnetic field strength is assumed in the TGD-based model of hearing [M6].

Cyclotron oscillations in the magnetic field could induce by some mechanism a periodic flow of protons between the magnetic flux tubes and the atomic space-time sheets of water and in this manner affect pH. pH-fluctuations would in turn induce temperature and conductivity fluctuations as side effects. Both $T_1 = 51.2$ min and $T_1 = 36.6$ min appear and have ratio very near to $L(k+1)/L(k) = \sqrt{2}$.

If this finding is taken at face value, the magnetic flux quanta must be magnetic sheets for which magnetic flux scales as the inverse of the thickness $d=L(k)$ of the flux sheet having constant size in the second transversal dimension.

B. Scaling law of homeopathy and frequencies of pH-oscillations and microwaves

The experiment involves 2 frequencies: the ULF frequencies associated with the pH-oscillations and the frequencies associated with the microwaves generated by the control device. Since intentional action compensates for the entropic effect of microwaves, these frequencies must relate to each other and generalized scaling law is an excellent candidate in this respect.

The TGD-based model explains and generalizes the scaling law of homeopathy which states that low and high frequencies having ratio $f_h/f_l = 2 \times 10^{11}$ accompany each other. Cyclotron oscillations with frequency f_l would result when charged particles drop from smaller space-time sheets and liberate the increment of Zero-Point kinetic energy as a radiation with frequency f_h .

Also the reverse of this process could occur with generation of negative energy photons at frequencies f_h and f_l . The emission of 2 photons is needed to guarantee momentum conservation since the momenta of charged particles are so small as compared to photon momenta.

The generalized scaling law predicts

$$f_h/f_l = \Delta E_0 = E_c(k_2)$$

where $\Delta E_0 = E_0(k_1)/E_0(k_2)$ is the Zero-Point kinetic energy increment when a charged particle drops from the space-time sheet labeled by k_1 to the sheet labeled by k_2 . $E_c(k_2)$ denotes cyclotron frequency at the magnetic flux tube labeled by k_2 .

The factor f_h/f_l varies but does not depend on the mass of the charged particle and by the quantization of the magnetic flux are apart from a numerical factor proportional to the ratio $p_2/p_1 = 2^{k_2-k_1}$ defined by the p-adic primes $p \approx 2^k$ for the two space-time sheets in question.

The scaling law of homeopathy in its basic form and p-adic length scale hypothesis suggest that f_h/f_l is related by a power of 2 to $f_h/f_l = 2 \times 10^{11} \sim (200/256) \times 2^{38}$ so that one has

$$f_h/f_l = 2 \times 10^{11} = (200/256) \times 2^n$$

where the integer n varies.

The generalized scaling law suggests that the frequency of pH oscillations corresponds to f_l . The frequencies of microwaves would correspond to f_h identifiable as the Zero-Point

kinetic energy of proton liberated when it drops from space-time sheet generated by the intentionally induced magnetic self-organization.

C. The mechanism of Intentional Action

The control device generates microwaves and the intentional action should compensate the effect of the control device. The model of the intentional action based on the time mirror mechanism supports the view that negative energy MEs and photons are involved. Phase conjugation means essentially time reversal. And it could compensate the entropic effect of the ordinary microwaves generated by IIED and acting as a stressor in case of fly larvae. This also conforms with the fact that **phase conjugate microwaves and ULF waves can penetrate the Faraday cage.**

The microwave radiation at frequencies f_h could induce a flow of protons between $k=167$ space-time sheets and larger space-time sheets by providing the needed Zero-Point kinetic energy to kick protons to $k=167$ space-time sheet. Negative energy (phase conjugate) microwave photons would induce the reverse process. By the basic mechanism of induced emission (now induced dropping), this in turn could induce the flow of protons from atomic space-time sheets to smaller space-time sheets as a kind of domino effect and lead to a new flow equilibrium would result with different pH.

The pre-requisite of this mechanism is that the hierarchy of the magnetic flux tubes characterizing also DNA is present in the target. The IIED affected by the intentional action would give rise to this magnetic hierarchy unless it already exists. IIED would play a role similar to an object received by the **person to be healed from the healer (or vice versa) in remote healing.**

A more detailed space-time description for what happens might be as follows.

1. ULF and microwave fields are coherently superposed inside MEs (incoherence would mean microwave MEs inside ULF MEs) so that the corresponding transversal magnetic and electric fields are precisely parallel by the highly non-linear properties of MEs. ULF frequencies correspond naturally to harmonics of cyclotron frequency because of the strong coupling to cyclotron phase transitions of the Cooper pair Bose-Einstein condensate.
2. MEs serve as temporary bridges connecting the boundaries of $k=169$ and $k=188$ space-time sheets and the oscillating electric field of ME is orthogonal to the boundaries. By Quantum-Classical correspondence, the microwave frequencies associated with ME as well as the voltage along the bridge correspond to integer multiples for the energy of a microwave photon. The same mechanism based on Z^0 MEs underlies the TGD-based model of nerve pulse.
3. The superposed ULF and microwave frequency electric fields inside ME induce a periodic flow of the protonic Cooper pairs forth and back between the superconducting flux tubes of the Earth's magnetic field ($k=169$) and magnetic flux tubes of the field $B_1(k=188)$. Microwave part induces a rapidly oscillating force superposed to the slowly varying ULF part of the force.

The oscillatory flow of protons from atomic space-time sheets to larger space-time sheets affects the proton density at atomic space-time sheets causing pH oscillations.

D. Do the 3 peak frequencies for pH-oscillations correspond directly to 3 microwave frequencies by the scaling law?

The scaling law would suggest that the 3 peak frequencies coming as harmonics of $f=1/T_1$, $T_1 = 51.2$ min correspond to 3 frequencies f_1 identifiable as cyclotron frequencies corresponding to the quantized values $n=1,2,3$ for the magnetic flux. The frequencies produced by control device producing microwaves in 1-10 MHz range are non-trivial [39, 40] and the first bet is that the frequencies given by the generalized scaling law must be in this range to compensate the entropic effects.

The generalized scaling law $f_n/f_1 = (200/256) \times 2^n$ with $n=33$ gives the frequencies $f_n=3.1$ MHz and its two harmonics 6.2 MHz and 9.3 MHz as counterparts of f_1 and its harmonics. The frequencies produced by the control device are 5.0, 8.0, and 9.3 MHz and not harmonics of each other. Note, however, that the highest frequency corresponds exactly to the third harmonic of f_1 .

Rather remarkably, $f_n=3.1$ MHz corresponds to the Zero-Point kinetic energy of a protonic Cooper pair at $k=169$ space-time sheet associated with the magnetic flux tubes of the Earth's magnetic field.

Thus protonic Cooper pairs could drop from the super-conducting flux tubes of the Earth's magnetic field to the magnetic flux tubes of ~ 76 pT magnetic field having $k=188$. This in turn would generate a cascade-like dropping of protons from the atomic space-time sheet so that pH is changed.

E. Correlation between pH and temperature oscillations and protonic Zero-Point kinetic energy

In the case of water at temperature $T=300^\circ\text{K}$, the amplitudes of oscillations are $\Delta T = 3^\circ\text{K}$ and $\Delta\text{pH} \sim 0.1$. If the density of protons satisfies $n = n_0 \exp(-\Delta E/T)$ where ΔE is most naturally the Zero-Point kinetic energy 0.4-0.5 eV of protons at the atomic space-time sheet, one has

$$\Delta\text{pH} = \frac{\Delta E}{T} \times \frac{\Delta T}{T} .$$

$\Delta\text{pH} = 0.1$ would require $\Delta E \sim 0.3$ eV which is quite near 0.4 - 0.5 eV.

The fact that the exponential $\exp(-\Delta E/T)$ happens to be near to the number $n/n_{\text{H}_2\text{O}} = 10^{-\text{pH}}$ gives further support for the idea that the Zero-Point kinetic energy at $k=137$ space-time sheet determines pH. (Or more generally, that the densities of various ions are determined by many-sheeted chemistry and by Zero-Point kinetic energies). If this interpretation is correct, $n(137)$ can be identified as the net density of protons including also protons bound to hydrogen atoms. The net density of protons at a given space-time sheet involves a degeneracy of states factor $g(k)$ so that one would have

$$n(137) = \frac{g(137)}{g(169)} \times n(169)$$

where $k=169$ refers to the superconducting flux tubes of the Earth's magnetic field. p-Adic fractality and p-adic length scale hypothesis imply that $g(k)$ scales as $1/L^3(k)$. This gives $g(169)/g(137) \sim (L(137)/L(169))^3 = 2^{-48} \approx 4 \times 10^{-15}$.

G. Sensitivity to the external magnetic field

The effect of the pH values depends on the direction of the external magnetic field B_{ext} . This could be understood if B_{ext} interferes with the magnetic field at some level of magnetic hierarchy induced by the magnetic fields in 0.1 nT range which mediate the intentional action.

pH is changed if the change of the magnetic field at these space-time sheets in the cellular length scale range affects the flow of protons between atomic space-time sheets and larger space-time sheets when 0.1 nT flux tubes with thickness around $100\mu\text{m}$ are present. This is expected to be the case if the thickness of the flux tubes is affected by the external magnetic field. The flux tubes in a given p-adic length scale could even disappear as a result of destructive or constructive interference.

Concerning the detailed model, there are 2 options.

- (i) If the magnetic field consists of flux sheets so that one has $B(k) \propto 1/L(k) \propto 2^{-k}$. In this case, the external field strength corresponds to p-adic length scale $L(k)$ related to the length scale $L(169) \approx 5\mu\text{m}$ by a scaling of 0.5×10^{-2} to 10^{-3} . The length scale varies between $L(149) = 0.5\text{nm}$ (thickness of the lipid layer of cell membrane) and 25 nm .

This option is supported at the level of DNA magnetic hierarchy by the findings of Gariaev about effects of laser light on DNA, and also by the fact that the ratio of $T_1=51.2\text{ min}$ and $T_k=36.6\text{ min}$ is very near to $\sqrt{2}$. This situation would result if the flux quanta at various p-adic length scales are quite generally obtained by scaling the flux tubes of the Earth's magnetic field in one direction by keeping the flux as constant.

- (ii) If the magnetic field consists of flux tubes $[B(k) \propto 1/L^2(k) \propto 2^{-k}] L(k)$ is related to $L(169)$ by a scaling by a factor 0.1 to 0.03 so that it is in the range 1.6 to $0.5\mu\text{m}$.

H. Phantom effect

A further strange finding is that the removal of both IIED and target does not eliminate the temperature oscillations of the air although their amplitude is reduced by a factor of about 10. The phantom effect can be understood if the magnetic flux tubes associated with $k=188$ magnetic field are present also in the air volume and are not affected by the removal of IIED and target so that the oscillatory flow of protons between $k=169$ and $k=188$ space-time sheets with cyclotron frequency continues and induces the oscillation of the proton density of air.

3.5.4 The effects caused by the quartz crystal

In some experiments, the removal of the target and IIED was followed by the addition of quartz crystal [41]. The quartz crystal was made of natural quartz (in order to avoid undesired intentional imprinting!) and had height $h=15.24\text{ cm}$ and minimum diameter $d= h/2= 7.62\text{ cm}$. The crystal was asymmetric in the vertical direction having apex pointing upwards.

The findings were following.

1. When the crystal was in a vertical direction, its presence sharpened the existing spatial phantom profile for temperature oscillations of air and somewhat amplified it.
2. When the crystal was turned to a horizontal direction, its presence immediately increased the temporal frequency of T-oscillations by a factor slightly larger than 2. The spatial profile became first almost flat and the amplitude weakened.

The interpretation of the stimulates several ideas and questions.

- A. Does the spatial profile of T-oscillations correspond to a standing wave resulting as an interference pattern of microwaves?

The spatial profile for the temperature oscillations is measured using spatial resolution $D = h = 15.24$ cm where h is the height of the quartz crystal. The profile is quasi-periodic with a period of $\lambda = 2D = 2h$.

Of course, experiments with a better spatial resolution would be required to deduce reliably the profile. But the measurements are consistent with a spatial oscillation having period $\lambda = 2D = 2h$. This kind of profile could result as an interference of 2 classical microwave beams propagating in 2 opposite directions and generating a standing wave with wavelength $2h$.

This kind of interference pattern is involved with the four-wave interaction producing phase conjugate waves. The interfering waves correspond to the reference beam and a beam opposite to it. The 2 additional beams correspond to beam and its phase conjugate, either of them generating the other one.

- B. Does the quartz crystal act as an amplifier?

The orientation of the crystal is obviously important. This encourages us to think that the incoming signal enters from a vertical direction and is amplified by the quartz crystal so that the vertical dimension determines the resonantly amplified wavelengths. Perhaps magnetic flux tubes of B_1 and the Earth's magnetic field B_E are in this direction.

It could be that the light-like vacuum current of ME generates positive or negative energy coherent photons with an intensity distribution having maximum in the directions orthogonal to MEs and that the presence of the quartz crystal amplifies the vacuum current inside ME. Alternatively, it could be enough that quartz crystal amplifies the classical fields associated with MEs.

The height h of the quartz crystal is one half of the microwave wavelength. Hence, it could act like an absorbing or emitting half-wave antenna. The fundamental frequencies associated with the microwaves would correspond to $f_1 = c/2h \approx 1$ GHz for the vertical crystal and $f_2 = c/2d = 2f_1 \approx 2$ GHz for the horizontal crystal.

For the vertical crystal, $\lambda_1 = 2h = 2D = 30.48$ cm would be the wavelength of the spatial profile which conforms with observations. For the horizontal crystal period would be $\lambda_2 = 2d = 15.4$ cm. The observed spatial profile immediately after the turning of the quartz crystal to

horizontal position is flat in consistency with this prediction. It should be easy to check out whether the oscillatory pattern is present by improving the resolution.

C. Are population inverted many-sheeted masers involved?

The frequencies f_1 *resp.* $f_2 = 2f_1$ are rather near to the Zero-Point kinetic energies of a protonic Cooper pair for $k=153$ *resp.* $k=152$. In the case of electronic Cooper pairs, one has $k=164$ and 163 (the ratio of proton and electron masses is near to a power of 2: $m_p/m_e \approx 2^{11}$). Perhaps many-sheeted population inverted microwave lasers are involved and time mirror mechanism induces dropping of protons to large space-time sheets or the reverse process.

$k=152$ and $k=153$ correspond to length scales $\sqrt{2} \times L(151)$ and $2 \times L(151)$ where $L(151)=10$ nm corresponds to the thickness of the cell membrane. The four-wave interaction suggested by the interpretation of the spatial profile would presumably involve many-sheeted laser mechanism at the microscopic level.

D. Scaling law of homeopathy is satisfied

The approximate doubling of the ULF frequency of T-oscillations when the quartz crystal is turned to a horizontal position is consistent with the generalized scaling law of homeopathy. The ratio f_h/f_1 of frequencies of microwave and ULF oscillations occurring at 51.2 min period is $3:1 \times 10^{12}$ for $f_h = f_1$ and $6:2 \times 10^{12}$ for $f_h = f_2$. In a good approximation, this ratio differs by a factor 24 *resp.* 25 from $f_h/f_1 = 2 \times 10^{11}$.

These findings support the scaling law of homeopathy; time mirror mechanism as a microscopic part of the four-wave interaction utilizing many-sheeted population inverted lasers; and quartz crystal as an amplifier of intentional action. Much remains however poorly understood. In particular, the question how the phenomenological description of the four-wave interaction and time mirror mechanism could be integrated to a more comprehensive theory, remains open.

[StealthSkater note: Didn't alleged Area-51/S4 microbiologist Dan Burisch claim that a form of quartz was responsible for his so-called "Ganesh particle" which allowed quantum consciousness to be imbedded in a material biological host (see the "[Burisch](#)" page at => [doc](#) [pdf](#) [URL](#)) ? Note that I am not implying that the much-criticized Burisch is as well theoretically-grounded as Dr. Pitkanen but rather did the former borrow his idea from those of the latter (and others) and then add his "spin" to it?]

4 How advanced civilizations could study the Cosmos

Space travel is not the best manner for the advanced civilization to study the surrounding Cosmos. Rather, the time mirror mechanism seems to provide almost unlimited opportunities to achieve this.

Chilbolton (see [Fig. 8](#)) and Crabwoodcrop circles suggest that aliens could be either intraterrestrial life forms or ourselves in a relatively remote geometric future. The TGD based new physics suggest also a natural solution to the Fermi paradox ("Where are they all?").

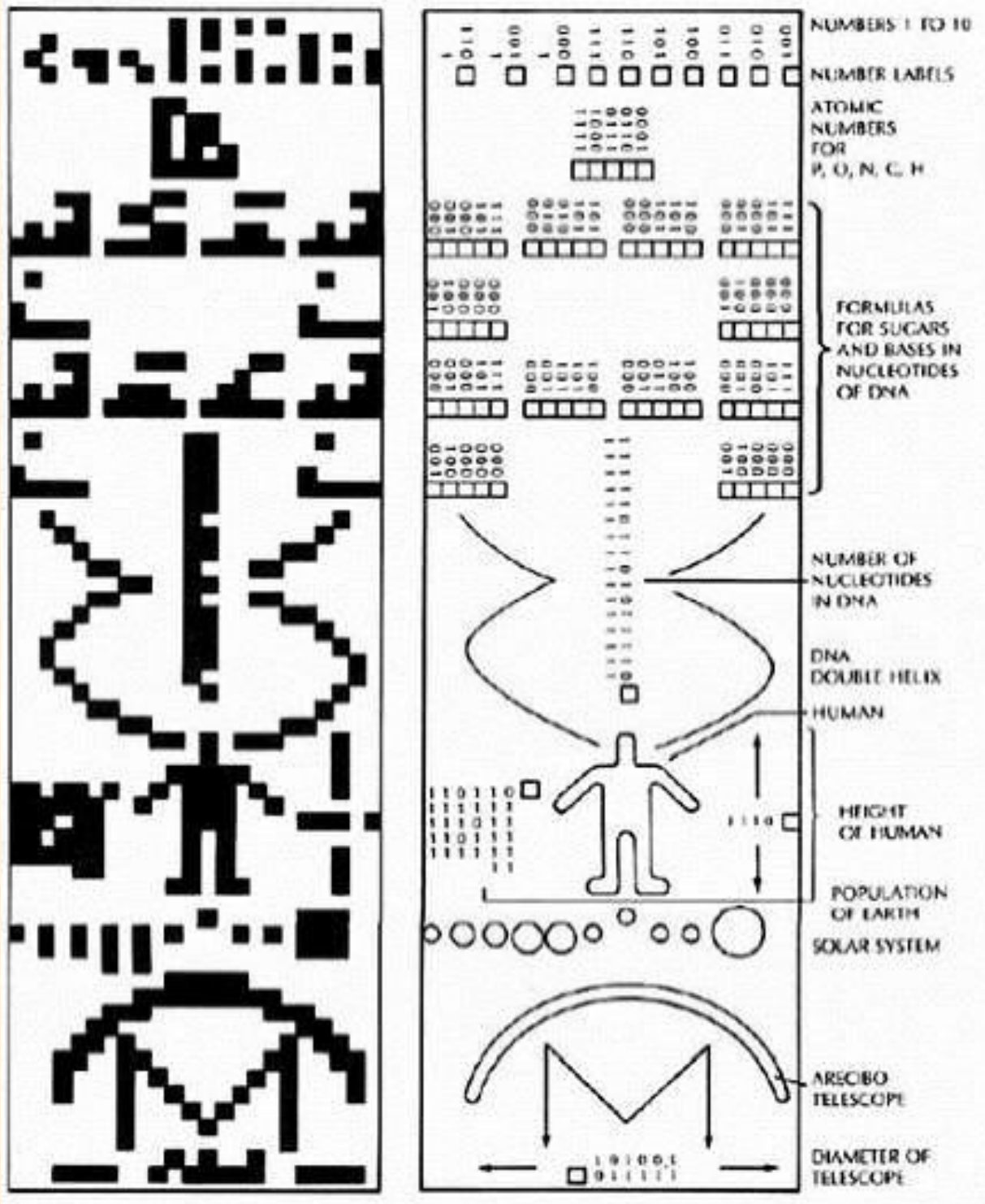


Figure 7: Arecibo message provides information about us.

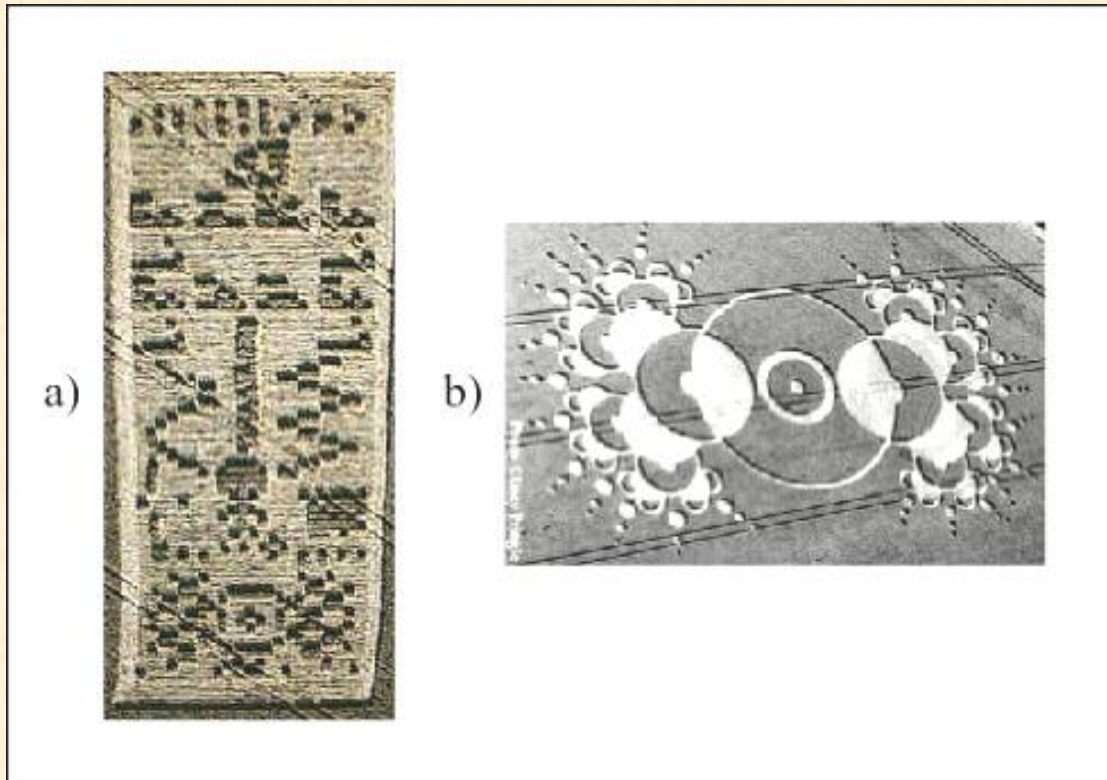


Figure 8: Chilbolton crop formation of (a) is made using the same format as Arecibo message and can be interpreted as providing information about the constructors of the formation. Figure (b) is the counterpart of radio antenna used to generate the message. A possible interpretation is as magnetosphere which suggests that the conscious entity responsible for the generation of crop circles is entity magnetosphere (the "brain" of Mother Gaia).

4.1 Why space travel is not a good idea

There are several arguments suggesting that space-travel over very long distances is not a good idea.

1. Direct encounters of lifeforms which are at different evolutionary level would be probably lethal since immune systems would not be compatible. Thus there is no good reason for long space-travels.
2. With current technology, the amount of fuel needed makes it impossible to get very far. But remote utilization of energy by the time mirror mechanism could resolve this difficulty. Many-sheeted population inverted lasers might be everywhere and provide the needed energy. TGD suggests mechanisms making it possible to reduce the inertial mass of the space-ship dramatically. This kind of featherlight spaceship could behave as UFOs are found to behave.
3. The finite value of the light velocity poses the most severe constraints. Time dilatation in principle allows the space-ship moving with sufficiently high velocity to get to arbitrary long distances in arbitrarily short proper time experienced by the crew. The problem is, however, that the civilization that send the crew to the flight could suffer extinction during the first days (as experienced by travelers) of the travel. Note, however, that time mirror mechanism could allow to circumvent this difficulty.

4.2 Time mirror mechanism as an ideal tool for the study of the Universe

The time mirror mechanism suggest a solution to the problem of communicating with civilizations in distant galaxies and light velocity ceases to be problem. Remote sensing in principle makes possible an active instantaneous scanning of arbitrarily distance galaxies. Remote motor control is also possible and in principle makes it possible to use simple lifeforms like plasmoids to perform desired tasks.

These plasmoids could also serve as quantum mediums making sharing of mental images possible. This would give rise to a remote sensory system. Also communications with the civilizations of the Geometric-Future could be possible. p-Adic frequencies coming as half octaves of the frequency **10 Hz** are excellent candidates for preferred frequencies and one can assign to each of these p-adic frequencies hierarchy of cognitive codes that with definite duration of code word and number of bits. **[StealthSkater note: doesn't 10Hz fall into the ELF category of the EM spectrum? And isn't that what Paul Bennewitz claimed to be monitoring at the nuclear storage facilities of Kirtland AFB in New Mexico which he interpreted to be UFO activity> See the "Bennewitz_1" file at => [doc](#) [pdf](#) [URL-doc](#) [URL-pdf](#) (also at the "UFO#Salla" page at => [doc](#) [pdf](#) [URL](#) and the "UFO#Coppens" [doc](#) [pdf](#) [URL](#)).]**

Field patterns realizing these codewords could provide means of communication with civilizations of both the Geometric-Future and -Past. ET experiences might have interpretation as a sharing of mental images induced by encounters with the plasmoids generated during the tectonic activity. Abduction experiences could represent real encounters with plasmoids.

Plasmoids could be seen an ideal realization for a living space-ship drawing its energy from environment. UFOs might be plasmoid structures emitted from the plasma sheet of some planet of a distant stellar system which have managed to penetrate through the cusp region of the magneto-pause of Earth which serves as a magneto-immune system preventing the penetration of solar and other interplanetary magnetic life forms inside magnetosphere.

A civilization at a sufficiently high level of development could even intentionally generate magnetic self-organization patterns leading to birth of plasmoid-like lifeforms. The somewhat ghostly crew of a magneto-UFO could consists of magnetospheric sensory representations for the inhabitants of this planet but this would not diminish the reality of the experience. Space travel of mental images would not require transfer of huge amounts of fuel through the Cosmos and light velocity would not be a limitation for the communications. There are good reasons to believe that higher levels of the self hierarchy have discovered mental space travel long ago even if we have been able to invent it!

4.3 What are "aliens"?

The first possibility is that "aliens" are *extraterrestrials*. In this case, one cannot say much more. If one takes crop circles as an attempt of aliens to tell something about their civilization, one ends up with much more detailed speculations.

Chilbolton and Crabwood crop formations are the most fascinating of these messages [\[51, 52, 53, 54\]](#). The Chilbolton and Crabwood crop circles allow to even deduce rather precise information about the genetic codes of the alien lifeforms. The second genetic code involves 80 DNAs and 23 aminoacids. This would mean that the civilization in question might be at a much higher evolutionary level than we

are and could have developed anti-gravity technology a long time ago. I have discussed the interpretation of these formations in [N3]. [SS: also archived at www.stealthskater.com/Pitkanen.htm#Plasmoids]

The fact that the Chilbolton message appeared so soon after the sending of Arecibo message providing information about human kind as species and had same format as Arecibo message could mean that the constructor of the messages is inside or at least in the vicinity of the Solar System.

A plausible hypothesis is that the magnetosphere of the Earth (or possibly also of the Sun) -- defining kind of collective conscious entity having various biological lifeforms as its "cells" -- has generated the crop circles using the same basic mechanisms as magnetic bodies use to generate generalized motor actions in biological bodies. The magnetosphere could communicate its own higher level knowledge to us or could mediate a message from somewhere.

4.3.1 Do crop circles tell about solars or intra-planetaries?

If the crop circles are generated by control signals based on positive energy topological light rays, the constructor of the message -- and perhaps also the civilization about which the message tells -- can be at most at a distance of few light decades. Indeed, the Chilbolton message suggests that the aliens live at Earth, Mars, and Jupiter and perhaps even in Sun.

The Sun is smaller than in Arecibo message. Which might mean that the aliens live in below the corona, perhaps at the magnetic flux tubes of the convective zone carrying magnetic fields of order 0.2 Tesla for which electronic cyclotron radiation is at microwave range. The question is where in Earth's magnetosphere could aliens be hiding. The Freudian answer is that since they are not visible, they must lurk in the cellar -- i.e., underground.

One can indeed build a vision about alien life based on this idea and consistent with the hints provided by the crop formations.

4.3.2 Do crop circles tell about futuro-terrestrials?

If the crop circles are generated by communications involving negative energy photons (phase conjugate light), then the signals responsible for the formation of crop circles arrive from the Geometric-Future. In this case, the civilization could be arbitrary far away from Earth.

The Chilbolton message, however, leaves only the possibility that the civilization is some other civilization or ourselves of the Geometric-Future after the colonization of Mars and Jupiter. This civilization must have invented the technology making it possible to apply time mirror mechanism to induce magnetic self-organization patterns leading to the generation of plasmoids serving as mediums for telepathic communications and able to perform simple tasks like construction of crop circles.

4.3.3 How far in the Geometric-Future might futuro-terrestrials live?

The Chilbolton message could even allow to estimate how far in the geometric future the civilization constructing crop circles is located.

1. The smaller size of Sun could indeed mean a smaller size of Sun. The Standard Model predicts that the radius increases very slowly so that this interpretation seems to be wrong in standard physics context. There are, however, highly controversial claims that Sun is shrinking with the rate of 0.1 percent per century [45]: $d\log(R)/dt = 10^{-3}/\tau \Rightarrow \tau = 100$ years.

The analysis of [46], however, led to a conclusion that only oscillations with a period of 76 years are in question. If the shrinking occurred for the entire Sun rather than only surface layers, the claimed rate for shrinking would mean that gravitational energy would be liberated with a rate $\dot{P} = \frac{GM_{\text{Sun}}^2}{R} \times \frac{d \log(R)}{dt}$ which would give $P \sim 10^{29}$ Watts. Which is much higher than the power $P \sim 4 \times 10^{26}$ Watts radiated by Sun by known mechanisms.

The presence of the classical Z^0 force could make possible considerable deviations from the standard stellar evolution and might be also needed to explain the oscillations of the Solar radius. The increase of the gravitational binding energy could be compensated by the increase of the repulsive Z^0 Coulombic energy so that the catastrophic conclusion could be avoided. One could say that gravitational and Z^0 force serve opposite tendencies compensating each other in the "solar homeostasis".

If the shrinking were real and would continue with the rate claimed in [45], one would have $R/R_{\text{present}} = \exp(-10^{-3}t/\tau)$. If the radius in Chilbolton message is by a factor $k < 1$ smaller than in the Arecibo message, the proposed interpretation implies that the message must have been sent from a temporal distance $t \approx \log(1/k) \times 10^3 \tau \sim 10^5$ years in the Geometric-Future. A more realistic estimate would probably increase the value of t by some powers of 10.

If this extremely light hearted argument were taken seriously, a breakthrough in time mirror technology is not to be expected during my lifetime!

2. There is also a second manner to estimate the value of temporal distance of crop circle artists from us. The Crabwood formation appeared one year and one day later than Chilbolton formation. A possible interpretation is as a message telling that the it takes one day more for Earth to rotate around Sun in the Geometric-Ffuture so that year is by one day longer.

(i) The mass loss of Sun causes the gradual weakening of the gravitational force of Sun causing the increase of the radii of planetary orbits and thus also of orbital periods. The rate for the increase of the orbital period is $\frac{d \log(T)}{dt} = \frac{dt}{\tau} = -\frac{1}{4} \frac{d \log(M_{\text{Sun}})}{dt}$. The rate of the Solar mass loss is believed to be mostly due to the energy liberated in fusion and one has in a good approximation $\frac{d \log(M)}{dt} = 10^{-13}/\text{year}$.

This gives $T(t)/T(\text{present}) = \exp(t/\tau)$. The lengthening of the year by one day requires a time $t \approx \tau/365 \sim 10^{11}$ years which is about one percent of the rough estimate for the lifetime of Sun and of the same order of magnitude as the estimates for the time parameter called the recent age of the Universe. In fact, the Sun is estimated to become a red giant within 7.5 billion years making life as we understand it impossible on Earth.

(ii) Also, cosmic expansion should affect the orbital radii of the planets. If the Hubble time t and radial coordinate r of Robertson-Walker cosmology with line element $ds^2 = dt^2 - a(t)^2(dr^2/(1+r^2) + r^2 d\Omega^2)$ correspond to the coordinates t_{PN} and r_{PN} of the Post-Newtonian approximation and if cosmic expansion can be treated adiabatically, the prediction is that the sizes of the planetary orbits increase are scaled as $L(a)/L(a_0) = a/a_0$ where a corresponds to M^+ lightcone proper time appearing as the scaling factor of Robertson-Walker metric and related to the Hubble time t by $(t/t_0) = (a/a_0)^{3/2}$.

By Kepler's law, one has $T \propto L^{3/2}$ so that the period of the planetary orbit would scale as $T \propto a^{3/2} \propto t$. One day per year lengthening would correspond to $\Delta T/T = 1/365 = \Delta t/t$. For $t = 5 \times 10^9$ years, this would give $\Delta t = 17$ million years.

- (iii) The estimate above is based on the neglect of perturbations caused by planets to each other's orbits. The multiple gravitational resonances between planets resulting --when the ratios of rotation or precession periods are integer valued -- are a route to chaos (in the sense of complexity rather than randomness) in the planetary system. Since the Z^0 force is also the $1/r^2$ force, this also holds true when the classical Z^0 force is taken into account.

These resonances can affect dramatically orbital parameters. Numerical simulations lead to the conclusion that the Lyapunov time of planetary system is 5-10 million years [47]. If this also holds true in the TGD Universe, then the parameter t for the future civilization (for which year is one day longer than for us) could be as small as million years. In any case, it seems that it takes quite a time to develop time mirror technology if this estimate makes sense.

4.4 Have more advanced civilizations performed genetic engineering at Earth?

A fascinating possibility that extraterrestrials, intra-terrestrials, or ourselves of the Geometric-Future have performed **genetic engineering**. There is some support that this might be occurring.

1. The first sensational finding was the outcome of Great Genome Project. The "head-scratching discovery" by the public consortium (as Science termed it) came when the human genome was compared with the genomes of our predecessors [26, 27]. It was found that human genome contains 223 genes not possessed by invertebrates. Contrary to what one might expect, these 223 genes could make an enormous difference.

The reason is that this number is more than two-thirds of the number of the 300 genes differentiating between humans and chimpanzees. So these genes could be the main determinant of the dramatic difference between humans and chimpanzees in standard genetics.

A possible explanation is that this difference is due to a genetic engineering carried out by a more advanced civilization [N3]. This genetic engineering might have induced the migration of Homo Sapiens from Africa and an explosive evolution of language and culture.

2. The second sensational finding reported towards the end of the year 2003 was that the genome of corals (which are the simplest lifeforms possessing neurons) seems to resemble much more vertebrate genome than it resembles genomes of flies and worms [28]. Corals resemble vertebrates in the sense that they have calcium carbonate skeleton. Corals are multicellular structures consisting of 2 cell layers analogous to scaled up versions of the lipid layers of cell membrane.

Thus coral colonies can be seen as organisms for which the role of cell is taken by corals and are in a very well special sense at a higher evolutionary level than us. The assumption that corals are intra-terrestrial or *extraterrestrial* lifeforms which have served as gene banks radiating their genes to the simple life forms in environment could explain the mysterious Cambrian explosion in which a large number of animal phyla emerged apparently from nowhere [29]. This speculative vision is discussed in [L1].

Aliens are not the only candidates for genetic engineers. Also magnetic Mother Gaia could be responsible for the genetic engineering. Even the magnetic Mother Gaia of the distance Geometric-Future. There are experimental findings [36] supporting that electromagnetic radiation can be imprinted by genetic information and that this genetic information can be transferred to the genome of developing embryos of even different species [K5].

Nothing precludes the possibility that genes/supergenes/hypergenes at some level of dark matter hierarchy can also code for genetic self engineering since these activities are after all very similar to other genetically coded bio-chemical activities. The computer analogy would be programs writing programs. The engineering genes would be activated by W MEs inducing plasma oscillation patterns.

The claimed effects could be understood if the interaction with geneticall- imprinted electromagnetic field pattern activates genes inducing genetic self engineering yielding the genetic modifications consistent with the pattern represented by the EM radiation.

The magnetic body would receive information about the desired outcome as electromagnetic field patterns emitted by other organisms (most naturally members of the same species). If these modifications are successful, the magnetic body is exposed to this information for long enough time to react and activate W MEs inducing the genetic program inducing the genetic program leading to the suggested genetic modification.

Hyper-genes [L2] integrating groups of organisms to larger wholes would be naturally involved with the mechanism. This mechanism would guarantee a rapid propagation of successful genetic modifications to the entire population and would be much more effective than the slowly occurring selection of random mutations. The possibly existing genes responsible for the genetic self engineering could be also introns and express themselves by activating nuclear RNA and process like reverse transcription.

4.5 Fermi paradox

The question "Where are they all?" is the best manner to formulate Fermi paradox. Fermi made estimates about the probability of intelligent life in Cosmos and ended up with the conclusion that intelligent civilizations should have already expressed their presence to us. There are many manners to achieve this.

1. The radiation generated by radio-wave communications leaks out to the interstellar space and should serve as a telltale signature about the presence of intelligence. The civilizations might be as willing as us to tell about the existence and might send to the interstellar space radio-waves telling about them as a lifeform. We have indeed sent the Arecibo message just in this purpose.

The communications based on Maxwellian radio waves might however represent a rather short period in the development of the civilization. Topological light rays allow precisely targeted communications without weakening and dispersion of the signal. And since the signal propagates outside the space-time sheets containing matter, the perturbations caused by the interaction with matter are small.

For these kind of communications, the leakage of the signals is minimal and the civilization remains invisible for civilizations which have not yet reached the technological maturity to receive and interpret signals travelling along topological light rays (possibly parallel to magnetic

flux tube structures serving as cosmic nervous systems). This is the safest option since civilizations like us might be very dangerous in their eagerness to declare Star Wars.

2. One might argue that high tech civilizations are doomed to produce a lot of entropy and the radiation resulting in this manner could also serve as a telltale signature. The discovery of the technology based on time mirror mechanism would however mean dramatic reduction in the entropy production. **Quite generally, the Second Law of Thermodynamics can be circumvented below p-adic time scale so that also the mad consumer period could be short lasting.**
3. The engineering achievements of these civilizations in astrophysical length scales might be one signature. It is not at all clear, however, whether we are able to see them. Presumably, living technology relying on magnetic self-organization of superconducting magnetic flux tube structures serving as an astrophysical "nervous system" is in question.

Magnetic flux tubes, however, quite literally represent dark matter [D4] to us and the established science has not yet even discovered the notion of magnetic body and is still trying to explain dark matter in terms of various X-ons.

4. "Star Wars" thinking would suggest that the civilization evolved to a high level technologically would build space-ships and start the conquering of other planetary systems. Macroscopic quantum coherence of dark matter in Astrophysical length scales, however, provides completely new methods of communication and control. It is quite possible that the *aliens* are just patiently waiting that we finally discover that **dark matter aliens** are here, there, and everywhere.

One might hope that this discovery does not require the emergence of the next level of dark matter hierarchy in the terrestrial biological evolution since it might not take place during this week.

5. These civilizations hardly see the trouble of transferring tons of material to foreign stellar systems since **the time mirror mechanism allows telepathic communications by sharing of mental images with civilizations of both Geometric-Future and -Past.** The encounters with UFOs and ETs might be just this kind of virtual meetings. But most terrestrial scientists take them as hallucinations. The explosive development of Science could be due to the sharing of mental images of more developed civilization. But it is difficult for us to even consider the possibility that we have not discovered all this by ourselves.

The time mirror mechanism could make even possible intentional induction of magnetic self-organization creating plasmoid-like lifeforms. The reports about intelligent lightballs appear repeatedly but most terrestrial scientists refuse to take seriously these reports. Crop circles might represent an extreme example about an attempt of advanced intelligence to get into a direct communication with us. But most scientists receiving monthly salaries refuse to even play with the thought that these formations might not be hoaxes.

On basis of these arguments, it seems that Fermi paradox tells much more about us than the surrounding universe. Our view about Consciousness and Life and Physics is so badly wrong that it leads to the conclusions that (a) Consciousness is illusion; (b) living beings are deterministic robots; and (c) Earth is the only living planet in the entire Universe.

We could, however, test the TGD-based vision. Perhaps some mad scientist starts someday to build **population inverted lasers at energies corresponding to p-adic frequencies and Zero-Point kinetic energy increments** in order to receive negative energy signals from the Future; begins to send phase conjugate waves to the Geometric-Past at these frequencies using p-adic cognitive codes (genetic code in particular [L1]); and starts to analyze carefully radio-wave patterns at the p-adic frequencies to see whether they contain some structure suggesting that the sender of the signal is intelligent.

4.6 Dark matter hierarchy as a solution of Fermi paradox?

The original version of this chapter was written few years before the ideas related to the quantization of Planck constant began to develop [A9]. The original stimulus came from the observation that the radii of the inner planets seem to correspond to the radii of Bohr orbits with a gigantic value of gravitational Planck constant $\hbar_{gr} = gMm/v_0$, $v_0 \approx 2^{11}$. The radii for the orbits of outer planets in turn correspond to $v_0 \rightarrow v_0/5$ [50].

The dependence of \hbar_{gr} on masses is fixed by the Equivalence Principle and $v_0 = 2^{11}$ corresponds in TGD framework to a fundamental constant expressible in terms of CP_2 radius, Planck length, and Kahler coupling strength [D6].

The general theory for the quantization of Planck constants [A9] predicts the spectrum of M^4_{\pm} and CP_2 Planck constants as integer multiples $\hbar(M^4_{\pm}) = n_a \hbar_0$ and $\hbar(CP_2) = n_b \hbar_0$ of the ordinary Planck constant \hbar_0 . The Planck constant \hbar_{eff} appearing in the Schrodinger equation using \hbar_0 as a unit equals to the ratio n_a/n_b having in principle all positive rational values.

The spectrum of Planck constants reflects a hierarchy of imbedding spaces characterized by finite subgroups of $SU(2)$ identified as a subgroup of $SL(2,C)$ in the case of M^4_{\pm} Planck constant and of $SU(3)$ in the case of CP_2 Planck constant (appearing in the commutation relations of corresponding isometry Lie algebras). The subgroup $G_b \subset SU(2) \subset SU(3)$ defines a covering of M^4_{\pm} by G_b -related points whereas the subgroup $G_a \subset SU(2) \subset SU(2,C)$ defines covering of CP_2 by G_a -related points. The covariant metric of M^4_{\pm} factor is scaled up by n_b^2 where n_b is the order of the maximal cyclic subgroup of G_b . Analogous result holds for CP_2 .

These copies of imbedding spaces are glued together to a tree-like structure such that $M^4_{\pm}(CP^2)$ are identified by isometry if $G_b(G_a)$ is same for the 2 copies. Each node involves in finitely many branches labeled by $G_b(G_a)$. One can say that 2 kind of matters in this hierarchy are dark with respect to each other if they reside at different branches of this structure.

If $G_a(G_b)$ is same for the 2 sectors, a phase transition changing the value of Planck constant $\hbar(CP_2)[\hbar(M^4_{\pm})]$ can occur and corresponds geometrically to a leakage been different sectors via an intermediate state which has 0-dimensional CP_2 projection or 2-dimensional M^4_{\pm} projection (time-like plane remaining invariant under $G_a \subset SO(3)$ containing the quantization axis for angular momentum). The points in the projection correspond to singular orbifold points for the G-covering in question.

Also, a spectrum of number theoretic values of Planck constants is predicted. n_a and n_b correspond for them to n-polygons constructible using only ruler and compass. The resulting model for planetary orbits predicts that the ratios of planetary masses should be given as ratios q_{ab}/q_{cd} of ratios $q_{ab}=n_a/n_b$ of these preferred integers. This is rather strong a prediction and satisfied within 3 percent.

Also an absolute prediction $G M m / v_0 = n_a / n_b$. Particles mass spectrum does not depend on the values of Planck constants whereas Compton length scales as n_a . For large values of \hbar_{eff} , the overlap

criterion for the formation of Macroscopic quantum phases is satisfied due to the large values of Compton lengths. In the case of gravitational Planck constant, the Macroscopic quantum phases would have an astrophysical size. Dark matter hierarchy would correspond to a hierarchy of increasingly refined levels of consciousness with an increasing span of long-term memory and planned action and utilizing the lower levels of hierarchy as sensory receptors and motor instruments.

In Biology, an especially important dark matter hierarchy seems to correspond to $\hbar(\mathbf{M}_{\pm}^4, \mathbf{k}) = 2^{11k}$, $\hbar(\mathbf{CP}_2) = \hbar_0$. Great leaps in Evolution could be understood as the emergence of a new level of this kind to the "personal" dark matter hierarchy realized as a hierarchy of magnetic bodies (topologically-quantized magnetic fields associated with the system) [M3]. The group G_a would most naturally act as symmetry group of dark magnetic body transforming to each other the flux tubes of the magnetic body representing topological quantized dipole type magnetic field having a full rotational symmetry before topological quantization. n_a would give the number of flux tubes.

If one accepts the model for the hierarchy of EEGs, the duration of the life cycle identified as a cyclotron time scale for a typical biologically-important ion gives a reasonable guess for the highest level of dark matter hierarchy involved. For instance, from the requirement that EEG photons have energy above thermal energy, the time scale of ordinary EEG would correspond to $n_a = 2^{11k}$, $k = 4$, and the duration of our life cycle to $k=7$. (In meditative states referred often to as "cosmic consciousness", the value of k might be much higher.)

In this conceptual framework, the answer to the question "Where are they?" would be based on the identification of "them" as conscious entities at higher levels of dark matter hierarchy and living at different branches of the imbedding space.

If all goes well, Civilization would sooner-or-later achieve an Omega point at which it becomes so convinced about the existence of this hierarchy that it initiates systematic attempts to build communications with higher levels of the hierarchy and perhaps "moves" more-or-less permanently to this branch of imbedding space which would naturally explain the Fermi paradox.

5. What UFOs are

The second key question concerns the interpretation of UFOs. Interpretation as plasmoids might be equivalent with interpretation as "living flying saucers" able to reduce their inertial and gravitational mass and using the time mirror mechanism to suck energy from environment.

5.1 UFOs as plasmoids

One of the most important findings about UFOs is their butterfly-like behavior. They can accelerate very rapidly and change their direction of motion instantaneously. Since this occurs without generation of shock waves, the only conclusion seems to be that their inertial and gravitational masses are very light.

Persinger has proposed a model explaining the experiences about encounters of *extraterrestrials* as hallucinations caused by the perturbations of Earth's magnetic field induced by the liberation of the tectonic energy at the lines of tectonic activity [37]. The model is based on well-established statistics about the effects of the perturbations of Earth's magnetic field on consciousness collected in mental hospitals. The lines of the tectonic activity are also accompanied by well-established luminous phenomena which suggests that the model could be naturally combined with the explanation of UFOs as this kind of luminous phenomena. **[StealthSkater note: Geologist Dr. Bruce Cornet correlated UFO**

anomalies/sightings with specific geographic points in the greater New England area. See the "UFO#Cornet" page at => [doc](#) [pdf](#) [URL](#)]

This suggests that UFOs might be plasmoids. These primitive lifeforms could use the time mirror mechanism to receive metabolic energy. And tectonic activity would be an excellent source of metabolic energy. Plasmoids -- being extremely light structures -- could easily follow the energy beam flowing from the spot of tectonic activity. The random variation of the beam direction could explain the random butterfly-like motion of UFOs often observed and very difficult to understand if UFOs are structures built of steel and copper.

This identification does not of course mean that plasmoids could not be living, intelligent spaceships. The lightness and ability to draw energy from the environment would make plasmoids ideal for this purpose.

5.2 UFOs made of copper and steel?

There is some evidence for "metallic" UFOs, too. In particular, the claimed Roswell case involving a "traffic accident" of UFO and dead bodies of *aliens* suggests that aliens and UFOs are real. The TGD-based model [G2] for the strange anti-gravity effects observed in rotating magnetic systems [49] leads to a mechanism which might be behind flying saucers.

The basic idea is that the space-time sheet of rotating magnet is connected to the space-time sheet carrying Earth's gravitational field by join along boundaries bonds. One can visualize them as threads connecting the rotating system to the environment. Along these threads, the gravitational flux created by the magnet flows to Earth's space-time sheet and these threads mediate the gravitational interaction.

Rotation causes the entanglement of the threads. When the rotational speed becomes high enough, the threads begin to split. This means that the ends of the split threads become carriers of **negative** and **positive gravitational mass**. Effectively, the gravitational mass of the magnet system remains to the Earth's space-time sheet and the mass of magnet system itself decreases and angular momentum conservation implies an acceleration of the spinning motion (pirouette effect). If the inertial mass is equal to the gravitational mass as the Equivalence Principle requires, a system which is as light as a feather results!

This mechanism might make possible flying saucers. For instance, the rotating system could apply the time mirror mechanism to generate the needed very fast motion making -- possibly -- mass loss. It could also accelerate and change direction of motion very quickly. The strange properties of UFOs suggest that if they are really flying saucers, a reduction of the inertial mass is indeed involved. Thus one might think of the possibility that plasmoid-like structure and a more rigid structure accompany each other in some cases. The rotating magnet system also involves plasma near its outer boundary and would in this case be due to acceleration of ions in radial electric field generate by the rotating magnet.

Plasmoid-like structures indeed involve magnetic flux tubes. And this suggests that they could rotate rapidly and in this manner reduce their gravitational and inertial mass.

5.3 Are flying saucers necessarily living systems?

The following arguments suggest that flying saucers are necessarily living systems.

1. As explained earlier, the study of field equations leads to the classification of basic phases of matter by the dimension D of CP_2 projection of the space-time sheet. $D=2$ would naturally

correspond to magnetic flux tube structure associated with non-rotating magnetic system. This phase is simple and analogous to a ferro-magnet.

As already found by Faraday, a radial electric field accompanied by a non-vanishing vacuum charge density is generated when a constant magnetic field is put into rotation. The non-vanishing charge density requires a 3-dimensional CP_2 projection. The conclusion is that rotation induces a phase transition $D = 2 \rightarrow 3$.

2. The phase transition implies a qualitative change in the structure of the magnetic fields and thus could explain the generation of magnetic walls observed in the rotating magnetic system [49]. What is fascinating that the $D=3$ phase corresponds to the living matter in the proposed classification. This would conform with the idea that the ADP-ATP machinery responsible for the metabolism is a molecular Searl machine.

Hence the strange effects observed in rotating magnetic systems might reveal the fundamentals of the **dead**→**alive phase transition**. This also suggests that plasmoids could be seen as flying saucers which are living just because they are flying saucers.

3. The increase of the dimension of CP_2 projection could generate join along boundaries contacts and wormhole contacts leading to the transfer of charge between different space-time sheets. The possibly resulting flow of gravitational flux to larger space-time sheets might help to explain the claimed anti-gravity effects.

[StealthSkater note: more on plasma lifeforms is at the "UFO#Plasmoids" page at => [doc](#) [pdf](#) [URL](#)]

References

[StealthSkater note: many of the following references are also archived on the "Pitkanen" page at => [doc](#) [pdf](#) [URL](#) and the "Science" page at => [doc](#) [pdf](#) [URL](#)]

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