

# **Crisis of Contemporary Theoretical Physics and the Truth in the Mirror of Dialectical Logic (The Unity Principle)**

**Peter Kohut<sup>1</sup>**

## ***Abstract***

The **TRUTH** of our existence has not been detected by science so far. Why does theoretical physics know nothing about the essence of space, matter, energy and time? How can we come to the true knowledge about our existence? Let us look at the reason of critical situation in contemporary theoretical physics and show how critical logical thinking and reasoning can open the door to the truth. I am sure that fair people with open mind want to feel a fresh wind of strong logic leading to the knowledge of truth. A great desire of Man is to find a true meaning of our life and the essence of being. The reality looks like disintegrated into many different and independent spheres, but we feel intuitively that a great variety of existing forms should have a common basis. Many philosophers and scientists have correctly expressed the Unity Principle by the sentence: **“Everything is connected to everything else”**, but nobody has detected its essence. On the base of dialectical logic the **Unity Principle** is discovered showing not only the exact mechanism how the physical Universe works, but also the essence of consciousness and subsequently personal God representing the whole self-aware and self-creating reality of the highest complexity.

**Keywords:** truth, lie, theoretical physics, mysteriousness, crisis, unity principle, dialectical logic, quantum dipole, God, consciousness, syntropy, evolution

## ***A Deep Crisis of Contemporary Theoretical Physics***

There are many reasons why contemporary theoretical physics experiences a very deep crisis. **Missing critical thinking and logical reasoning** is replaced by production of speculative and false assumptions with consequent complicated formal mathematical games having nothing in common with physical reality. Thousands of theorists are involved in scientific research. They create their

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theories and models on the base of accepted dogmas. By the rules of **formal logic** and sophisticated mathematical techniques they produce their mysterious **virtual realities** and try to persuade us that the reality is dependent on mathematical models (so-called “**model dependent realism**”) and can be understood only through their “theories”. **Stephen Hawking** said that we cannot ask if a model corresponds to reality, because **we have no independent test of what reality is** and all we can ask is whether the predictions of the model are confirmed by observation. It is a typical positivistic and post-positivistic attitude leading to the wrong conclusion that the reality is unknowable and meaningless. But people searching for the truth cannot accept such a post-positivistic ignorance and nihilism. We will disclose the real meaning of reality and truth of our existence in detail as only the knowledge of the truth can help save our endangered civilisation and guarantee the future successful development of science.

If physicists have no key to final truth it does not mean its absence. Theorists are pure technicians, but no thinkers, their ideas and speculative phantasies about reality are built on wrong hypothesis and false assumptions - axioms. With their attempts to overcome existing and appearing paradoxes by other wrong assumptions, the picture of reality is becoming more and more complicated and even a very sophisticated mathematics cannot help. The jungle of mysteries they produce is impassable. Theorists will never realize that their speculations are built on wrong fundamentals (dogmas) of previous incorrect theories as well as unphysical illogical and irrational assumptions, inappropriate mathematical idealisations and abstractions. Instead of searching for simple and clear answers to basic unanswered questions they try to unite mutually **incompatible theories like Einstein's general theory of relativity and quantum physics** in order to come close to the myth of the unified **TOE** (theory of everything). If we do not disclose the truth by strong critical logical thinking and deep spiritual insight, no sophisticated mathematical techniques can help but only complicate the situation more and more. It is remarkable how precise is Nietzsche's declaration that all scientific notions used for explanation of the world are pure fictions and everything we consider to be a scientific truth is only a useful kind of mistake and lie that is necessary in order that people can live in a world having no sense.

Fortunately, a deep crisis touches mainly mainstream theoretical physics. Better is the situation with **experimental physics** developing and relying mostly on results verified experimentally, e.g. physics of low temperatures, electronics, nanotechnology, optics (lasers, electron microscopes), physics of new (solid) materials, astronomy and astrophysics, geophysics, medicine physics, quantum informatics, etc. Those are spheres to which theoretical physics should focus its main efforts in order to achieve practical and useful results, e.g. new technologies. Of course, many theoretical physicists deal with theoretical problems of experimental physics. In that case they do not overstep the **phenomenological level** of reality and, for this purpose, positivistic scientific methodology is sufficient with its effective instruments like analytical and mathematical techniques of quantum mechanics or classical physics.

My criticism is oriented just towards contemporary mainstream theoretical physics, because it tries to penetrate into the **ontological level** of reality using only insufficient instruments of positivistic scientific methodology, whereby the essence of existence is unachievable and can result to only undetectable mysteries. Mainstreamers must feel markedly that the impenetrable barrier is becoming stronger and stronger with their attempts to break it. As positivistic scientific methodology cannot help they even leave it and use pure abstractions and irrational speculations accumulating motley mathematical constructions after one another in order to solve their fictitious problems. They try to persuade us that the “ugly” beauty of their theories ought to be the criterion of truth, but their confusion and scepticism is increasing and their dreams of TOE are falling to the

grave. Contemporary irrationalism and mysteriousness are typical features of our postmodern society and the failure of mainstream theorists is presented as a consequence of mysteriousness of our Universe. At the same time they warn us that their mysteries have nothing in common with God. They present themselves as orthodox scientists making top science where is no place for God, thereby for the solution of the so-called “**anthropic principle**” they offer the idea of **multiverse** where, among infinite number of universes resulting from their theories, there is also an unimaginable quantity of  $10^{500}$  universes roughly similar to ours, as only in that case almost impossible fact would be likely that our Universe, with all necessary conditions for our existence, can be a result of a pure blind random.

**Can we know the TRUTH** and the nature of our Universe? **Yes, we can** and I am going to detect it. Already **G.W.F. Hegel** showed in his rational philosophy that there are no hidden secrets or realities inaccessible by our **critical rational thinking**. His philosophy was optimistic and his **dialectical logic** - very effective and promising instrument. Hegel disclosed brilliantly that the world is rational and dialectical and therefore accessible by our rational thinking and dialectical logic. It is impossible not to come to the knowledge of truth if we apply strong critical thinking and logical reasoning as well as contemporary level of knowledge following from successful quantum mechanics which and showing a **quantum** character **and mutual interconnectedness** of reality. Although all indications exist already for a long time, theoretical physicists have not found the exact mechanism how matter, energy, space and time are **quantized and structured at the basic quantum level**. Why are they incapable to use a rigorous logic to find correct answers?

It is very sad that **dialectical logic**, as the most effective instrument of search for correct answers to ontological questions, had been removed finally, thanks to **philosophy of positivism**, from the scene already in the 19-th century and replaced by **formal logic**. Consequently the development of dialectical logic was abrupt. Needless to say, formal logic is necessary for scientific research, but insufficient with respect to ontological questions. **Positivism with its pragmatism and empiricism** became a basis of **scientific methodology**. It has limited scientific research to only what is accessible by our senses and instruments. Positivism replaced **Hegelian dialectical rationalism** in which classical philosophy had achieved its apex. Positivism tried to create scientific principles based on the rules of formal logic and experiment, where **axiomatic approach** became a starting point. But contemporary theorists even overreach and deny the positivistic scientific method and build their theories on **undetectable fundamentals** (virtual bosons, quarks and gluons, one-dimensional strings, additional hidden spatial dimensions, etc.) and predict undetectable effects (**string theories**) or gradually adapt their speculative conceptions to unexpected results (**QCD – quantum chromo-dynamics**). Mainstream theoretical physics is now totally fruitless although positivistic pragmatism requires that science should lead to useful practical results. Mathematical effects and so-called “discoveries” like the Higgs boson have no practical meaning as well as give no answers to basic ontological questions. The picture of reality is becoming more and more complicated, illogical and mysterious and the number of various fruitless branches of theoretical physics is huge and increasing. All knows that theoretical physics enters the greatest crisis, but mainstream theorists present this situation as a manifestation of contemporary postmodernism not seeing that the emperor has no clothes. It is a crisis within the deepest foundations of physics therefore our **profound revision of fundamental physical principles is inevitable**.

String theorists even try to persuade us that despite their long-term fruitless research they produce very interesting mathematical effects and so represent the only promising way to the unified **TOE (theory of everything)**, declaring their exceptional position in science as “**the only game in town**”. Yes, they are really right, because their “research” is only a game and their TOE is becoming the **TON (theory of nothing)**. String theories are becoming a strong warning and model for future

generations how not to do science. It would be much better to have no game in town than that one. It is hardly believable that so many physicists are dealing with it. Contemporary irrationalism of theoretical physics is a caricature of science and exhibits a deep decadence of human thinking. A great boom of string and other nonsensical theories is the evidence of a great crisis in science.

Theoretical physics oriented its effort originally to explain experimental results on the base of **axiomatic assumptions and mathematical models** with consequent mathematical theories built according to the rules of formal logic. If some theories predicted new results confirmed experimentally, e.g. quantum mechanics, they were accepted as useful. For example, Einstein's incorrect **local theory of gravity** predicts quite correctly the **deceleration of processes (time dilation)** as a function of **gravitational potential**, though gives no answers about the essence of gravity and represents space-time as only a pure continuum without any internal structuration and quantization, supposing incorrectly that gravity is propagating by **gravitational waves** moving with a limited speed of light. All theories of gravity must be unsuccessful and incorrect without knowing the exact mechanism how space, including vacuum and time are **quantized and structured at the basic quantum level**. If theories are based only on formal assumptions replacing inadequately the physical reality with mathematical formalism, they cannot come to **ontological truth** which must be grasped by profound critical thinking at first and only afterwards its quantitative aspects can be described correctly by mathematics.

Einstein's **special theory of relativity (STR) in its Minkowskian interpretation** is the first theory being only a pure mathematical game having no relation to the physical reality. This theory is wrong in its initial two assumptions (axioms) and subsequently in its results like **relativity of simultaneity** and **length contraction**. Motion of physical objects towards real physical surroundings (vacuum) is replaced in STR by a **mutual uniform motion of mathematical coordinate systems in empty mathematical space-time** where real physical space is replaced by pure emptiness. In contrast with STR the factual deceleration of processes (time dilation) in objects moving towards the **real physical vacuum** is a consequence of their increasing local pressure (touch interaction) on the vacuum thanks to their increasing speeds. As moving objects can have different relations with the vacuum, time (speed of processes) decelerates in objects with more **intense local interaction (pressure)** comparing to others. Also bodies in places with **different gravitational potentials** have a different interaction (mutual pressure) with their surrounding space (vacuum). We will show later that the vacuum is physical and created of **direct non-local quantum connections** connecting celestial bodies mutually. Every object is connected to the whole Universe by direct non-local quantum connections creating its own external vacuum that it drags during its motion. That is the reason of **negative result of M-M experiment**. Deceleration of processes (time dilation) has a physical reason missing in STR. Saying that experiments confirm SRT is a lie as all experiments including **GPS** confirm that clocks (or processes) decelerate only in objects moving by a certain speed towards real physical surroundings in contrast with SRT, where time dilation is only a seeming unreal phenomenon according to which clocks decelerate in object B from the viewpoint of object A, while from the viewpoint of object B they decelerate in the object A, if objects A and B are in a mutual uniform motion. These two **mutually symmetric declarations** are untestable as well as relativity of simultaneity subsequently. All experiments just disprove the validity of STR showing that the so-called time dilation is an **asymmetric phenomenon** nascent in conditions quite different from those in STR. It means time dilation results from mutually asymmetric relations of moving objects towards the real physical surroundings (vacuum).

Einstein's fatal failure by derivation of the famous formula  $E=mc^2$ , well known already before him, is analysed in detail in my paper [3]. This formula is classical but not relativistic, resulting directly

from Maxwell's theory of electromagnetism. Einstein became a great protecting shield for theoretical physicists and criticism of his theories is prohibited and strongly persecuted although they have fatal consequences for theoretical physics opening the door to wrong dogmatic conceptions and inappropriate speculative procedures replacing physical reality by inadequate and false mathematical and logical idealisations. **String theories** are the clearest manifestation of this irrational marasmus and the situation in cosmological theories is not much better. The Standard Model of particle physics, mainly its QCD theory, is also a successful producer of virtual mysteries. It is the ugliest theory or model ever proposed with its absent and undetectable hidden virtual realities: 36 quarks and anti-quarks, 19 or more free parameters, 3 generations of redundant particles, bunches of gluons, Yang-Mills particles, W, Z and Higgs bosons, etc. One must be crazy to try to find a rational and logical sense within this heap of nonsenses. Funny and embarrassing was the last mob scramble for the **chimera of Higgs boson** within **LHC** (Large Hadron Collider), rewarded even by the Nobel Prize. Of course, the billions of euros of public money being spent for world's most expensive experiment had to be justified. Will this mob madness continue by search for the SUSY (super-symmetry) partners of known particles at energies until 14 TeV (trillion electron-volts)? It seems yes, because we need to confirm our mysteries irrespectively of the costs. "Detection" of the Higgs boson is presented as the greatest scientific result of the last period although it says nothing about the essence of reality. Physicists are even incapable to explain what the Higgs field is like. What is the relation between point-like Higgs boson and its field? Is this field continuous or quantized, structured? If Higgs field exists through whole space, how is it related to space (vacuum) and other fields - electromagnetic, strong and gravitational? How are these different fields interconnected and how do they interact mutually? If all elementary particles are point-like, why do they differ by their mass and other properties (spin, charge)? What does give them their different qualities, what is the reason of their difference? Why do they take different masses from Higgs? Why photons do not take mass from Higgs? Physicists do not know the essence and source of energy and matter, but they need Higgs! Why? They declare their ugly Standard Model is completed, but are we closer to the true knowledge about our existence? No! The more scientific results contemporary theoretical physics produces the more distant we are from the truth. The Higgs boson of particle physics as well as dark energy and black holes of cosmology are other great leaps to the territory of mysteries where string theories already dominate. Latest Brian Green's book "The Hidden Reality" is an unplanned and unwanted indictment of contemporary postmodern science showing exactly why string theories represent a pinnacle of scientific nonsenses. We can make mistakes, but it is hard to believe that thousands of physicists are dealing with such nonsenses.

List of some mysteries of contemporary theoretical physics:

#### **Mysteries of the Standard Model of particle physics:**

- virtual photon as mediator of electromagnetic interaction in QED (quantum electro-dynamics)
- virtual quarks and gluons and their asymptotic freedom in QCD, quark-gluon plasm
- virtual bosons  $W^+$ ,  $W^-$ , Z in the theory of electroweak interaction
- Higgs boson and Higgs field

#### **Mysteries of String Theories:**

- one dimensional vibrating and oscillating open or closed strings

- eleven dimensional space-time with extra spatial dimensions hidden under the Planck scale and compactified into the shape of Calabi-Yau manifolds
- graviton as a mediator of gravitational interaction
- various dimensional D-branes and p-branes
- prediction of at least  $10^{500}$  universes roughly similar to ours
- SUSY (super-symmetry) partners of known particles

### **Mysteries of cosmology:**

- black holes with their singularities and imaginary time
- dark matter
- dark energy as a source of seeming acceleration of cosmic expansion
- gravitational waves
- multiverse, baby universes, bubble universes, our copies in parallel universes, ..... wormholes

Let us leave this land of mysteries and breathe a fresh air from a completely different sphere. The whole reality (universe) is dialectical, so it is accessible by our rational dialectical thinking. Dialectical logic achieved a high level in Hegelian rational philosophy at the first half of the 19-th century. The basic rules and categories of Hegelian logic were presented in his publication “**Science of Logic**”. It is very sad that its future development was abrupt. Because of insufficient scientific knowledge in his period, Hegel could not develop a dialectical logic to its final level and so detect the basic mechanism of reality - its **Unity Principle**, but his deep insight into the dialectical nature of reality was very promising. He had made profound analysis of such philosophical categories and relations like “something-other”, “unity of opposites”, “one-many”, “whole-part”, “repulsion-attraction”, “unity-diversity”, “continuity-discontinuity”, “locality - non-locality”, “negation of negation”, “quantum-quantity-quality-measure”, “finitude-infinity”, “essence-phenomenon”, “subject-object”, etc.

If quantum physicists were familiar with Hegelian dialectical logic, they could solve all interpretational problems and seeming mysteries of quantum physics as well as made the greatest contribution to rational philosophy detecting the essence of existence. Certainly, quantum mechanics represents a great achievement of theoretical physics in the 20-th century with many practical and useful results, but it could also represent the greatest achievement of human mind, if theorists knew dialectical logic and were not limited by philosophical positivism. Even philosophers are unable to detect the essence of quantum phenomena from the viewpoint of dialectical logic as they are not trained in dialectical critical thinking and do not understand quantum physics quite well. They can talk about history of philosophy and dialectics, but cannot think dialectically and solve ontological questions of our existence. As nobody understood the essence of quantum phenomena they have remained mysterious. Certainly, we have no rights to criticise the founders of quantum mechanics, as their scientific achievements are great, but this fact cannot apologize a very deep crisis of contemporary fundamental theoretical physics producing irrational and mysterious speculations having no useful practical effects, but fatal consequences for human knowledge. Theoretical physics has lost touch with reality and its “results” cannot be verified experimentally. What they are presenting as a confirmation of their predictions is only an illusion that has quite different and much simpler explanation from the viewpoint of the true knowledge.

If somebody has courage to criticise contemporary mainstream theories or Einstein’s relativity theories, he is automatically labelled a **crank** at least, and his academic carrier is destroyed. There

is **no democracy and scientific freedom, only hegemony of mainstream viewpoint supported by mass-media propaganda**. Despite that or just because of that the community of scientists, criticising mainstreamers or Einstein's theories, is growing rapidly. New non-profit scientific institutions and organizations are arising around the world opening the door for non-mainstreamers. One of the most influential is the NPA - Natural Philosophy Alliance (<http://www.worldsci.org>) as a worldwide forum for critical analysis of mainstream science and an exchange of new ideas. Although non-mainstreamers meet also problems by searching for correct solutions of basic questions, they create a competitive atmosphere with respect to mainstream ideology. **A new great revolution is knocking at the door of science**. Contemporary speculative and ossified post-positivistic irrational dogmatism must be replaced by critical logical thinking and deep spirituality. People desire and wait impatiently for the true knowledge of our existence because contemporary darkness is very frustrating.

### *Space and Time*

Space remains a mystery so far. It is very strange, because simple but critical thinking and reasoning is sufficient to disclose all mysteries of our existence. The Universe is rational and knowable. I have published many papers on physics and philosophy where I have explained the essence of our existence including the nature of our physical Universe. But, according to my experience, the level of contemporary human thinking is so low and oblate that even simple logical deductions and explanations are hard to grasp. I am disappointed, but I see it is a worldwide phenomenon present not only in theoretical physics. We can apply correctly the rules of formal logic by our deductions, but we have a big problem to think, contemplate, ruminate and study the things in their significant mutual relations. Therefore my main aim now is to demonstrate the truth by many ways and from various viewpoints, step by step, as simply as possible and so give a basic lesson of critical dialectical thinking. **TRUTH must appear with its beauty if attacked by correct logic**.

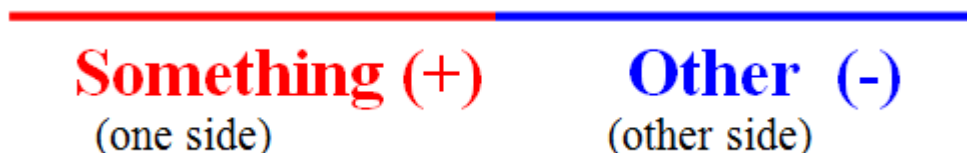
Now philosophical and theoretical problems are not grasped at the fundamental level, but replaced by inappropriate idealisations, illogical assumptions and consequent deductions following from the rules of formal logic and mathematics. As assumptions and axioms represent incorrect idealisations, the results must be also incorrect, even irrational and mysterious like the Standard Model of particle physics, where elementary particles are interpreted mistakenly as point-like entities. String theories have replaced these zero dimensional entities by one dimensional strings vibrating through hypothetical eleven-dimensional space-time and this nonsense is presented as a great achievement of human thinking. But they know neither why do strings vibrate nor what are the basic structural constituents of space-time. Their realities are hidden within Planck's scales. If they knew that Planck's scales just indicate that the whole reality is quantized and structured and therefore consists of **elementary quanta** they would understand there is no way to hide something there. The question is: what are the basic **elementary quanta of reality**? **How is the reality built of these elementary structural constituents?**

Certainly, no physical entity can be zero-dimensional or one-dimensional, as no physical object can exist without its spatial manifestation having zero volume. Such idealisations are inappropriate at the quantum level. If we do not understand how space and time are quantized and structured at the basic quantum level, we cannot explain their essence as well as the essence of gravity and other interactions. Why do theorists, unknowing the essence of space, try to put together Einstein's theories with quantum mechanics? Einstein theory of gravity is local while quantum mechanics is

non-local, it means, non-locality is its basic feature confirmed by experiments. Why don't they try to find the essence of non-locality? Having found it they could see the fundamental defectiveness of Einstein's theory of gravity. Even, his theory denies the existence of gravitational force replacing it by mathematical space-time curvature. The attempts to unite Einstein's gravity (general relativity) and quantum theory result in mysteries where solutions are searched at the level of absent mysterious black holes.

Let us apply a simple logic by our reasoning regarding space. If we look at the reality (existence) or the Universe as a whole, we can see that it is not a pure continuum, but it is structured. A **pure unstructured continuum is nothing**. So the whole Universe as space is **structured** and, at the same time, represents a **unity** in its internal structuration - **diversity**. As the Universe is structured, it must be built of its basic structural constituents. That is the reason why the Universe is quantized. But at the same time it represents the Unity. It means that its basic structural constituents must be interconnected. But connections are also structural constituents of reality (Universe). Does the Universe have many different basic building constituents or not? If we say yes, we must explain – why, what are these different constituents and what is the reason of their difference? If we say that only **one basic elementary structural constituent is sufficient**, we need only to find it and explain its essence. As connections are also structural constituents, they represent just what we are searching for. Connection is something that connects two aspects of reality, it means, it connects “something (one side)” to the “other (other side)” and at the same time, it is created of that both sides. In dialectical logic they are named **opposites** and their mutual relation - the **unity of opposites**.

Schematically it looks like:

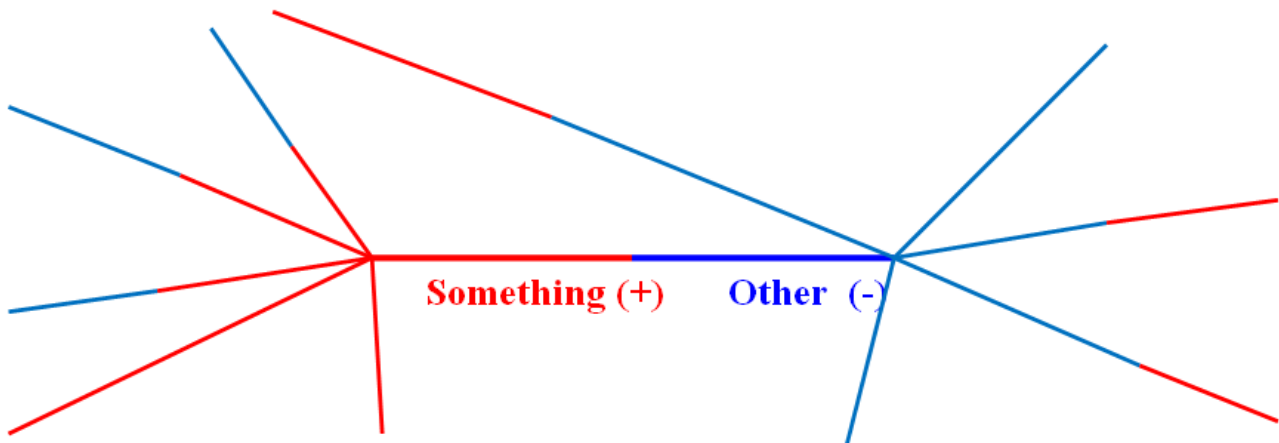


Even if we start our consideration at the highest level of abstraction we can see that **something exists**. But this something is nothing without its relation to the **other**. “**Something**” cannot relate to itself (**self-relation, self-reflection**) without its relation to the “other”, otherwise it is nothing. The other (-) represents the **limit** of something (+), through which it determines itself as a difference. “**Something**” and its “**other side**” are not two independent entities but only **two sides (opposites) of the same “one”**. It is irrelevant what side is “something” or “other” as both they relate to each other in order to relate to themselves. The whole “one” is a self-relation (self-reflection) only because it is a mutual relation of its two opposite sides. Any of these two opposites reflects itself into itself through its other side as through its own **limit (mirror)**. “Something” and “other” create a mutual positive and negative relationship, which cannot be static, but only dynamic in the sense that “something” repels from itself its “other” side by repulsion (negation), but at the same time holds and attracts it to itself by attraction (negation of negation). Repulsion and attraction are two opposite forces through which both opposite sides of the same “one” are in a mutual dynamic relation manifesting by motion – vibration, oscillation. Motion is **energy** as a result of mutual attraction and repulsion of opposites. Thus we have a clear definition of **energy as a measure of mutual attraction and repulsion of opposites**. This dynamic bipolar relation (+/-) represents the **elementary structural constituent** of which the whole reality (Universe) is made. We can name it an **elementary quantum dipole** or elementary **quantum connection**. Known particles as well as



space including vacuum are made of these quantum dipoles. The Universe is physical - spatial and material (energetic). **Matter is spatial and space is material.** The unity of the Universe means that all its aspects are made of the same constituents – quantum connections (dipoles). Elementary quantum dipole (connections) is an elementary quantum of space thereby the volume of space is given by the number of elementary quantum connections.

The whole reality is spatial and represents a network of elementary quantum connections where every something (+) is connected to all others (-) and reciprocally, which results naturally from dialectic relations “whole-part” and “one-many” as will be shown later.



There is no space and no energy outside quantum connections (dipoles) as only they create the whole reality. Quantum connections are not placed in space, but create it.

Contemporary theories separate matter from space, supposing space to be only an empty or unstructured surrounding in which material objects (entities) move. Space and time in Einstein's relativity theories is a pure mathematical “space-time” continuum. Before, space was as an empty continuum in which all material bodies moved. In Einstein's special relativity it was replaced by empty unstructured four-dimensional space-time continuum which was curved in general relativity thanks to presence of matter and energy. But this mathematical idealisation says nothing about the real quantum essence of space and time. Einstein's space-time is not structured and quantized. It is a pure mathematical continuum. As Einstein's theories have no idea about internal structuration and quantization of physical reality (space and time), they cannot lead to the true knowledge. It is very strange and absurd that theorists having not found how space and time are quantized try to unite Einstein's local theories with quantum non-local theory. It is like trying to put together water and fire. One excludes the other. As a result string theories become the greatest accumulator of illogical ideas.

Space is a basic attribute of every physical entity with its quantitative measure – volume. There are no entities without spatial volume. Point-like particles or one-dimensional strings are nonsenses inappropriate at the quantum level even as mathematical idealisations, because they deform the reality fatally. Space is not only a basic feature of everything, but at the same time it separates things from each other in the sense that it connects them together. Things can be mutually separated only if they are mutually interconnected. The internal structure of any thing is made of the same basic constituents as are connections through which things are interconnected. All things and their mutual connections are made of the same constituents – elementary **quantum connections (dipoles)**. They are **elementary quanta of space**. The Standard Model presents huge number of

different point-like particles (fermions and bosons) placed in the vacuum, which essence is unknown. How are point-like particles connected to the vacuum? Vacuum is a mystery that can be arbitrarily used to solve all miracles of the Standard Model. For example, it gives enormous energy for very massive virtual gauge bosons in order to mediate a weak interaction in electroweak theory. All these virtual mysteries are undetectable and hidden under the Plank scale. If we do not know the essence of the vacuum we can use it as a magic wand to solve all our theoretical problems. We will show later that the vacuum is made of long and weak quantum connections comparing to the short and strong connections that particles are made of. Therefore the vacuum cannot be a source of enormous energy needed for **nonsensical electroweak theory**. In cosmological theories space is only a surrounding where bodies move, while in particle physics it is a fluctuating vacuum with undetectable virtual fluctuations.

As elementary quantum dipoles (connections) represent elementary quanta of space of which every object is made and through which it is connected to the whole reality, it is impossible for any object to become a singularity like a black hole. Black holes represent nonsense which, in order to exist, must destroy the whole internal structure of previous star and change it into a pure singularity without any internal structure, but with infinite density. Black hole dreamers do not see the force that can stop the gravitational collapse as they do not know elementary constituents of which every object is made. As every elementary structural constituent represents an elementary quantum of space, its space cannot be destroyed. Analysing the dialectical relations “continuity-discontinuity and locality-non-locality” we will show that elementary quanta of space act not only non-locally but also push locally each other by their spaces. The stronger they are pressed together by gravity the bigger are their mutual repulsive pressures that stop gravitational collapse so that the **Schwarzschild radius** cannot be attained [4]. Black holes are mysterious not only from the viewpoint of space, but also time which is hidden under the Schwarzschild sphere representing an imaginary mathematical value (square root of a negative value) and so having no real physical sense. The real physical meaning of time is to be a measure for speeds of processes or motions measured through given standard cyclical processes like Earth rotation or atomic oscillations. At the Schwarzschild sphere time must stop, it means all processes must stop and freeze. Can black hole theorists explain the physical meaning of imaginary time in relation to physical processes or motions? Of course they cannot, so they say it is a mystery that we must accept as it follows from mathematical models where **imaginary time flows perpendicularly to our ordinary time**. Thus, time in their models is not a real physical phenomenon but only a pure mathematical coordinate. Neither space nor time has real physical meaning, both they are only mathematical symbols.

The question is - does the elementary motion exist as universal measure of all processes? We will show later that the whole Universe transits from its one quantum state to the following by elementary quantum jumps which define cosmic time for the whole Universe as a basic measure to which all local physical processes can be related.

### ***Photon as Elementary Quantum of Existence***

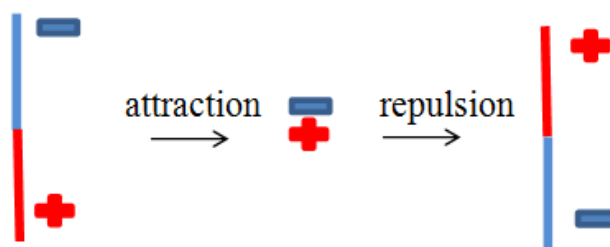
It is very strange that even a **photon** as an elementary quantum of light represents a mystery known as “**wave-particle**” **dualism**. Photon is a particle as well as a wave. How is it possible? What is the solution? Photon as an elementary quantum of free energy is a direct way to the essence of the whole reality, but inability of theorists to contemplate deeply and think logically prevents them to find a simple correct solution. All we know that the motion of a **classical harmonic spring oscillator** creates a sinusoidal wave as a result of two forces with opposite orientation - attraction

and repulsion. Sinusoidal wave is thus a consequence of both forces acting through harmonic oscillator. Photon creates sinusoidal wave during its flight. It means it must be a quantum oscillator which oscillations result from internal bipolarity of two opposite forces – attraction and repulsion.

### Photon is a quintessence of dialectical bipolar nature of reality.

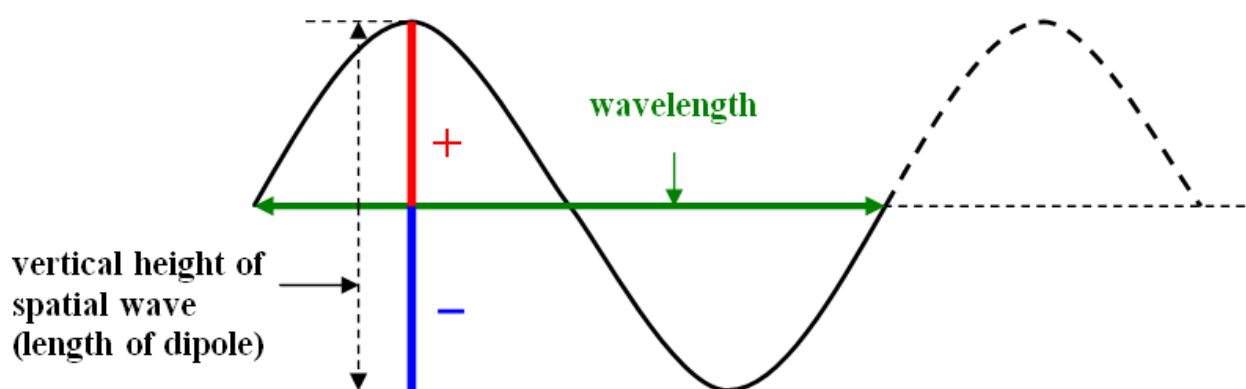
The greatest mistake of theoretical physics is the idea that elementary particles must be point-like entities without any internal structure and with zero volume. Even a photon as the simplest particle cannot be a point-like entity without internal structure. The photon is a simple quantum dipole consisting of two opposites (opposite poles, sides, charges) and consequently a holder of elementary quantum of space and energy. It is an elementary particle that oscillates thanks to attraction and repulsion of its opposites creating perpetually a sinusoidal wave during its flight manifested outside as an electromagnetic wave in relation to a measuring apparatus.

**Photon  $\gamma$  (+/-)** as elementary oscillating quantum dipole is the simplest particle:



**Photon as a quantum of radiation (light)** is a free elementary quantum dipole +/- which, thanks to mutual attraction and repulsions of its opposite poles, performs a permanent **oscillation (vibration, pulsation)** manifesting outwards as an **electromagnetic wave** during a flight. This fact is a consistent and factual explanation of the “**wave-particle**” **duality** of the light. Only a bipolar dynamic unity of opposites can result in photon’s oscillation (motion, energy).

### PHOTON = FREE OSCILLATING QUANTUM DIPOLE (+/-)



The photon is an elementary **quantum oscillator**. If we express its oscillation as rotation, its length is given by a diameter of rotating quantum dipole. Rotation projected to the perpendicular plane looks like oscillation. It is irrelevant if talking about rotation or oscillation (pulsation, vibration), as these motions are manifested outwards in the same way. Photon is an elementary quantum of energy. The essence of energy is also unknown for contemporary physics. Energy of a photon as a

measure of its motion (frequency of vibrations) can only result from mutual attraction and repulsion of its opposites.

Planck's equation  $e_i = h\nu_i$  shows that energy of a photon is given by the speed of its vibrations (frequency). It is hardly believable that the essence of photon's vibrations has not been detected until now. It is due to inappropriate idealisation of elementary particle as a point-like entity with its mysterious "particle-wave dualism resulting in impenetrable and undetectable virtual realities.

Photon performs two types of motion: horizontal and vertical. Horizontal motion represents its flight as a consequence of its dragging by cosmic expansion. Vertical motion is manifested by its oscillation (rotation) thanks to mutual attraction and repulsion of its opposite poles. Photon does not move "in" a free space-like vacuum, but thanks to its external quantum connections, it moves "towards" all other parts of the Universe. Simplicity of a photon allows its perfect oscillation (vibration) in a plane of its flight. Such is the nature of the speed of light as one of the basic physical constants unknown until now [7].

Photon's oscillations can be presented as rotations of a quantum dipole with a circumferential velocity  $v$ :

$$v = 2\pi r_i / T_{ot} = \pi d_i \nu_i$$

$T_{ot}$  – time of one rotation of a quantum dipole,

$\nu_i$  -  $1/T_{ot}$  – frequency of quantum dipole oscillation,

$r_i$  - radius of dipole (half of its length),

$d_i$  - length of dipole.

$$e_i d_i = h\nu/\pi$$

Later we will show from the viewpoint of dialectical logic that the value  $e_i d_i$  is **the same (constant) for every quantum dipole (connection)** and represents the **basic cosmic law** from which other very important laws follow, e.g. Newton's and Coulomb's laws. It means **the shorter the quantum dipole, the higher its energy**. The longer it is, the lower its energy. Energy of very long quantum dipoles, connecting celestial bodies mutually and creating the cosmic vacuum, is very small, but their quantity is enormous. The vacuum is a holder of energy of quantum connections (dipoles) connecting physical objects mutually.

Photon represents an elementary quantum dipole. As everything is made of elementary quantum dipoles (connections), we can say that everything is made of light (energy), which can exist in a form of free flying photons, or be bound in a form of basic particles (protons and electrons) as well as the vacuum. The knowledge of the **essence of Light** is the way to understanding the **essence of existence**.

Jesus Christ as the Son of God declares: ***"I am the Light of the world" (John 8:12)***

John evangelist defines the essence of Jesus Christ by the words:

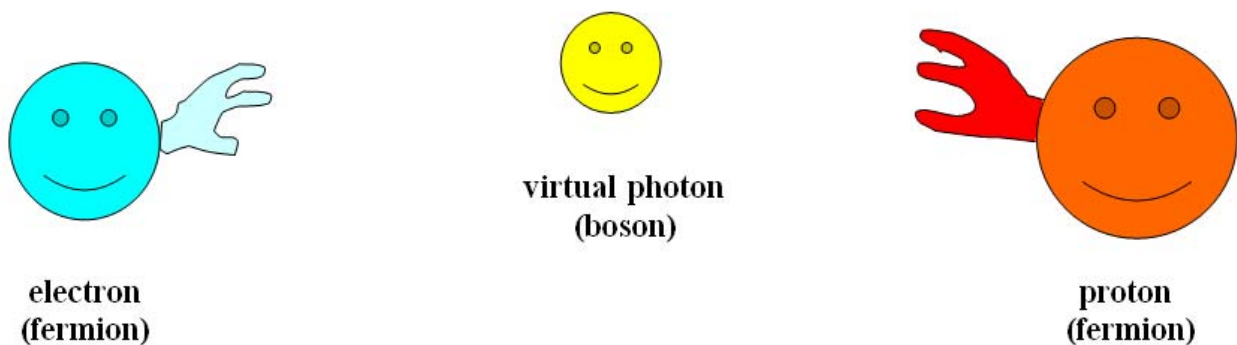
***"The true light that gives light to everyone was coming into the world. He was in the world, and though the world was made through him, the world did not recognize him. He came to that***

*which was his own, but his own did not receive him. Yet to all who did receive him, to those who believed in his name, he gave the right to become children of God”*

Christ is the Light (energy) which the world (Universe) is made of. Everything is made of elementary quanta of energy – Light (photons = quantum dipoles).

### ***Dialectical Relations “WHOLE-PART, CONTINUITY-DISCRETNESS”***

Contemporary physics divides the whole reality into its parts mechanically unknowing how these separated parts are interconnected mutually after their separation. Mechanical separation of parts from the whole means the destruction of their mutual relations, so that these parts can come to mutual interactions only through **local touch contacts**. **Localism** dominates in contemporary theoretical physics, where mutual interactions between “point-like” particles are declared to be a result of mutual exchange of virtual point-like bosons moving with a limited speed of light. It is very strange that such a naïve mechanical interpretation of interactions between particles was incorporated into the Standard Model although **non-locality** results directly from quantum mechanics. This naïve understanding follows from **Feynman’s interpretational failure** in his QED (quantum electrodynamics), where electromagnetic interaction is interpreted mistakenly as an exchange of virtual photons between charged particles by a limited speed of light as shown:



Electron and proton exchange a virtual photon creating their mutual **electromagnetic interaction**. This naïve interpretation of electromagnetic interaction meets the following serious problems:

- How do the electron and proton know where is their corresponding partner in order to exchange a virtual photon if there is no direct mutual relation between them? How does the moving virtual photon know where is the target fermion in order to mediate the interaction if it does not carry any information about it? Do virtual photons only fly freely between electrons and protons in empty space, accidentally collide with them and cause an electromagnetic interaction? But if particles are point-like, how can they hit each other in a huge free space? How does the virtual photon know what type of interaction to mediate – attraction or repulsion?

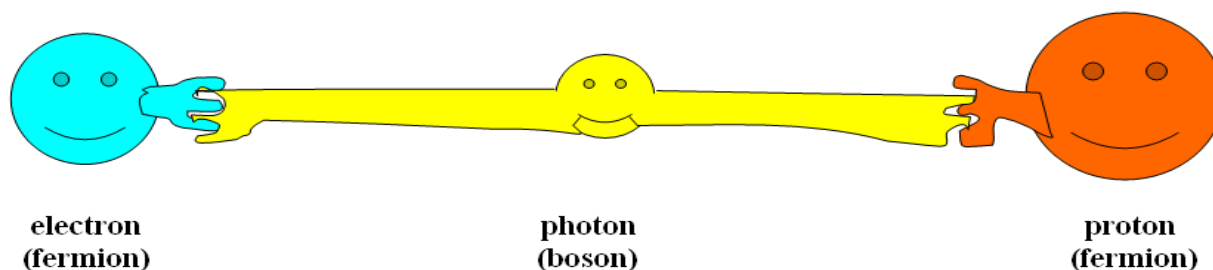
Virtual photon can fulfil its mission only if:

- it is aware of destination and motion of target particle, it means, it must contain the future destination address and be capable to distinguish between target and non-target particles,

or

- charged particles sense each other directly before exchanging virtual photons.

This simple logical analysis leads to the only correct conclusion that the virtual photon is a direct non-local connection between charged particles:



In above interpretation the photon represents a direct connection (relation) between the electron and proton. It is not a virtual photon as an object of mutual exchange between particles, but a real quantum connection (+/-) whose structure is the same as the structure of a free photon.

Einstein's dogma of local action does not allow virtual photon to know where charged particles (electrons, protons) are, but nevertheless, virtual point-like photons come to and go from a concrete point (electron, proton) in order to transfer an electromagnetic interactions to all other electrons and protons in the near and distant surroundings - even in the whole Universe.

Despite experimental evidence of non-locality theorists have a problem to accept it. As electrostatic force is a long distance one, every charged particle has to exchange virtual photons with an enormous number of protons and electrons in the Universe. It is remarkable that this absurd picture is accepted instead of much more logical picture of direct non-local connections (relations) between charged particles. It is because of Einstein's refusal of non-local actions. **Non-locality** as an instantaneous communication between distant particles is a fundamental consequence of quantum physics known as **entanglement** or **EPR non-locality**. If theoretical physics was not blocked by erroneous dogmas, it could detect that the vacuum is not empty space between point-like particles, but made of non-local connections between them. All particles and interactions are space-creating and space-carrying quantum connections.

Feynman represented virtual photons as only mathematical propagators of electromagnetic interaction. As he wanted QED to be relativistic, he preferred virtual photons moving with a limited speed instead of instantaneous connections. Electromagnetic force in QED is a consequence of mathematical existence of virtual photons. Such an approach was also transferred to other field theories like:

- quantum theory of electroweak interaction as an attempt to unify electromagnetic and weak interactions,
- quantum theory of strong interactions – quantum chromodynamics QCD,
- quantum theory of gravity as an attempt to quantize a gravitational field.

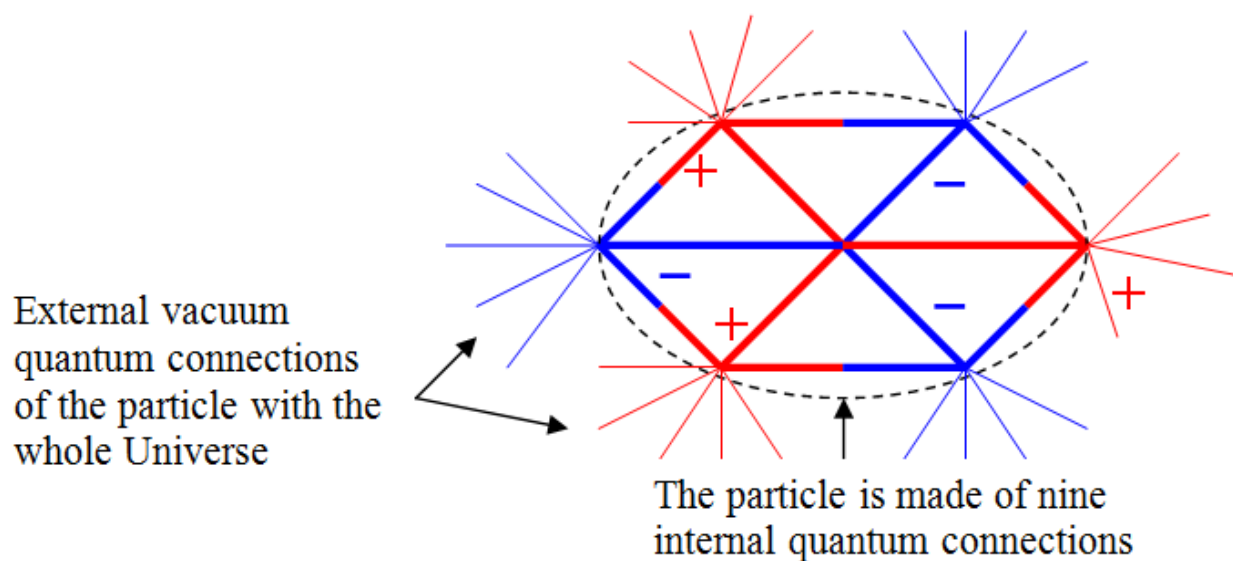
In these theories, the virtual particles – bosons are carriers of force fields. But in reality there are no virtual bosons as mediators of interactions, even they are undetectable. Except of a photon all other

bosons as real point-like particles (gluons, inter-medial bosons  $Z^0$  a  $W^\pm$ , Higgs boson, gravitons) cannot be detected directly. We will show later the meaning of their indirect detection by analysis of real structure and interactions of known particles.

At the basic quantum level the relation between the whole (Universe) and its parts can be only dialectical, not mechanical. If some part is separated from the whole, it is separated from all parts of the whole in the sense that this part remains connected to the whole, it means to all rest parts of the whole. As connections are also parts of the whole so all parts must be networks of connections. This is possible only if elementary parts are elementary quantum connections of opposites (quantum dipoles (+/-)). The quantum dipole (+/-) so represents the elementary structural unit of the Universe (space, matter, energy, information, consciousness). Every "+" pole is connected to all "-" poles of the Universe and reciprocally. **Everything is connected to everything.** Every separated part is connected to all other parts of the Universe. The principle of universal connection of everything to everything creates the general Unity of the physical Universe. This **Unity Principle** is a basic principle for the whole Universe following from its dialectics. It discloses the exact mechanism of spatial structuration and quantization and explains how the dialectical relation "continuity - discreteness" looks like.

Space can be continues and discrete (quantized) at the same time only if its elementary quanta are elementary quantum connections (+/-). In that case elementary quanta of energy are localised in elementary quantum dipoles and can be numbered (structuration, quantization), but at the same time their represent elementary quantum connections (+/-) connecting everything to everything, where every (+) is connected to all (-) and reciprocally. So the answer to the question whether the **reality is** continuous or discrete is very simple – it is **continuous and discrete at the same time**. Space consisting of elementary quantum connections is structured and quantized creating the dynamic network of elementary quantum connections in which all its energy is located. There is no space outside elementary quantum connections as just they create it.

Look at the scheme of a particle compound of three '+' and three '-' poles with nine internal connections (quantum dipoles) and indication of external connections:



Any particle or physical object is defined by quantum dipoles creating its internal structure as well as external quantum dipoles connecting the particle (object) to the whole Universe. Some quantum physicists say that it looks like the elementary particle reaches the whole Universe. They are really right, only they cannot say the reason - why?

External quantum connections of any object create its vacuum through which the object is connected (entangled) to all other objects of the Universe. Every object (including our EARTH) drags its own vacuum during its motion. We distinguish the vacuum in atoms, molecules and interstellar spaces. External vacuum quantum connections are much longer than inner connections in objects. It depends on the point of view which of them are external respectively internal. In an atom, internal quantum dipoles create particles (proton, neutron and electron) and their mutual quantum connections create the **atomic vacuum**. In a molecule, internal quantum dipoles create atoms and mutual quantum connections between atoms create the **molecule vacuum**. Long quantum dipoles connecting celestial bodies create the **cosmic vacuum**. A considerable part of cosmic energy is concentrated in these vacuum connections (cosmic vacuum). It is the so-called "dark matter". The vacuum as well as any other form of matter consists of the same quantum dipoles, only their lengths define whether they are constituents of material objects (particles, atoms, molecules, celestial bodies) or the vacuum.

Particles and physical objects do not move "in" a free space-like vacuum, but thanks to their external direct connections, they move "towards" all other parts of the Universe. We do not need any **background** to allow particles to move. All particles and interactions, as well as the vacuum are created of elementary bipolar quantum connections. As everything is connected to everything else, so every part moves towards all others thanks to their mutual connections. The vacuum consists of elementary quantum connections between particles and physical objects. All interpretational problems of quantum physics follow from its attempt to describe the motions of point-like elementary particles "in" space represented by a coordinate system.

**Nothing exists in space as everything creates space! Nothing moves in space as every part moves towards all others thanks to their mutual quantum connections!**

Your distance to some object is given by the length of elementary quantum dipoles connecting your body to this object. These quantum dipoles create the vacuum as a mutual connection between material bodies. You do not move in space, you move only in relation to all other parts of the Universe thanks to your direct connections to them. You are connected to the whole Universe at the elementary quantum level. There is nothing inaccessible as everything is connected to you. Objects are separated through space only because they are interconnected mutually through their vacuum non-local quantum connections (+/-) creating space.

Particle is not a point-like entity and cannot move in free space represented by a mathematical coordinate system. Every elementary particle carries a certain quantum of space and moves only in relation to all other parts of the Universe. Any particle can be studied only in its relation to other objects, but not to a coordinate system. Heisenberg's uncertainty principle is a consequence of incorrect question - how to define a position of moving particle in space represented by a coordinate system. Actually, elementary particles consist of elementary quantum dipoles as holders and carriers of elementary quanta of space, whose energies are inversely proportional to their lengths. They do not move in space but in relation to all other elementary quantum dipoles thanks to their mutual quantum connections. There is no uncertainty regarding elementary particles, as they have the exact internal structure, motional state and relations to all other entities of the universe at every



moment. Heisenberg's uncertainty principle results from inability of physicists to ask Nature correctly, how it works. Nevertheless, this principle has very important consequences showing that reality is non-mechanical and non-local. The EPR paradox as well as quantum entanglement shows that two particles creating one quantum system are mutually interconnected and act instantaneously to each other at a distance. This "spooky" action at a distance indicates that except of local there are also non-local interactions that contradict with Einstein's locality principle. But, because of Einstein, physicists are afraid of non-locality, so they prefer to accept undetectable virtual bosons to carry the basic physical interactions by a limited speed of light instead of acceptance of non-local quantum connections. It is very strange schizophrenia following from attempts to put together two principally incompatible theories. We need no virtual undetectable realities, but real non-local interactions. It is impossible to include non-localities into Einstein's theories.

According to particle physics there are two types of elementary point-like particles:

- fermions as basic constituents of matter
- bosons as mediators of force interactions between fermions

ELEMENTARY PARTICLES – FERMIONS			
Family	LEPTONS		QUARKS
I.	$e$ <i>electron</i>	$\nu_e$ <i>electron neutrino</i>	$u$ <i>up</i> $d$ <i>down</i>
II.	$\mu$ <i>muon</i>	$\nu_\mu$ <i>muon neutrino</i>	$c$ <i>charm</i> $s$ <i>strange</i>
III.	$\tau$ <i>tauon</i>	$\nu_\tau$ <i>tau neutrino</i>	$t$ <i>top</i> $b$ <i>bottom</i>

BASIC INTERACTIONS	MEDIATORY PARTICLES – BOSONS
Electromagnetic	Photons
Strong	Gluons
Weak	Inter-medial bosons $W^\pm$ a $Z^0$
Gravitational	Gravitons

According to the Standard model elementary particles are dimensionless point-like entities without any internal structure. Such an understanding is very naive. Fermions dispose of many properties (charge, mass, spin, ability to interact with other particles, different energies). Thanks to them they

differ from one another and possess various qualities manifested outwards. The reason for this miscellaneous qualitative manifestation of these quasi-elementary particles is hidden in their different internal structure that cannot be detected by contemporary particle accelerators and colliders, but only by a deep logical insight. The essence of the vacuum is also unknown. Force fields are supposed to be continuous but on the other hand they are transmitted by point-like particles – virtual bosons. For example, electromagnetic field is transmitted by virtual photons. Real photons mediate neither electrostatic nor magnetic interactions, so mysterious and undetectable virtual photons are supposed to do it.

Fields in contemporary theories indicates something monotonous, unlimited and continuous, surrounding all bodies. The question is: do point-like particles-bosons create fields or do fields create particles? What is the mechanism through which a point-like boson is detached from a field? Theorists say that every boson is associated with its force field, but they cannot explain how. How are force fields related to physical space? Do these fields create space or are they only placed in space? Is space (vacuum) made of their different fields like electromagnetic, weak, strong, Higgs and gravitational? How are they interconnected mutually? According to theorists different fields arise as a consequence of spontaneous break of symmetry, but this explanation is very vague and unclear. A statement that a point-like boson is associated with its field says nothing neither about the essence of boson nor the field. If force fields are quantized in such a way that bosons represent quanta of these fields, it means these fields must be made of point-like bosons. But how point-like entities can create a field? Is this field only a set of points? How are they interconnected mutually in order to create a field? “Field-particle” or “wave-particle” complementary dualism is nothing more than sweeping the problem under the rug. The relation between continuity and discontinuity is unknown. Everything is mystical and hidden in a jungle of complicated mathematics.

The **greatest nonsense of particle physics** is the declaration that although **bosons ( $W^\pm$ , Z, Higgs) are point-like particles without any internal structure and zero volume**, they decay in other particles. In reality, if particles decay into some components, it only means that they must be composed of them as well as their mutual quantum connections. There are no elementary particles without internal structure and with zero volume. All they are made of elementary quantum dipoles (+/-) being carriers of elementary quanta of space.

The **quark model**, in which a principal impossibility to detect quarks and gluons is explained by their so-called mysterious “**asymptotic freedom**”, is an example of absurdity, where one nonsense produces another. Such a hideous model is accepted in order to explain the structure of some particles like proton, neutron and mesons, although it is well known that particles colliding with their antiparticles can annihilate into pure photons. It means they are made of photons and their mutual quantum connections. If physicists have disclosed the essence of a photon as an elementary structural unit (quantum dipole), they could see the structure of all particles as made of elementary quantum dipoles (photons).

### ***Dialectics of “ONE-MANY” Cosmic Expansion***

“One” is nothing without the other. “One” as a whole can create its relation to itself only if it divides itself into many ones. “One” creates its relation to itself through its relations to others. Through them it reflects itself into itself (self-reflection). “One” as a whole divides itself into many ones in such a way that they create the unity of the “One” in the sense that every “one” is connected

to all other “ones”. Through many ones the whole One is structured and quantized. Internal structuration means that the “One” repels from itself many ones by repulsion and, at the same time, holds them in a unity thanks to attraction. As the whole “One” represents a bipolar relation “something (+) – other (-)”, its internal differentiation means that it gradually repeals from itself both opposites, one after the other. One as a whole comes from its unity to its diversity by internal structuration and at the same time it again and again reflects itself into its unity and so performs its self-reflection. “Many” as negation of “One” is overcome by its return to its unity – negation of negation. Negation of negation is a self-reflection, meaning the One represents always the Unity which can exist only in its internal structuration, where everything is reflected in everything else, everything is connected to everything else and everything communicates with everything.

“One-Whole” represents the self-creating and self-reflecting Unity of the highest complexity where everything is reflected in everything else. **Self-reflection of self-closed system of high complexity means the Life and Consciousness**, therefore the Universe as a whole is a self-closed, self-creating and self-reflecting system of the highest complexity and so represents **Consciousness of personal God**. The essence of personal GOD as well as human soul is explained in more detail by analysis of dialectical relation “**subject-object**”.

Looking at the Universe from its external objective side we do not see its internal subjective united side, so we deny the existence of personal God. Not only the whole reality is “subject-object” relation, but all we represent “subject-object” dialectics. We cannot search for the truth limiting our attention to only one side of reality and neglecting the other one, as the external objective side of the whole reality cannot exist without its internal subjective one. Positivist scientific paradigm is limited and accepts only a certain part of objective reality mediated by local mechanical interactions, so it cannot lead to the true knowledge. It is high time to leave this wrong paradigm and open the door to new one that, except of external objective mechanical side of reality, takes into consideration also non-locality as well as its internal subjective side. A **new scientific paradigm** must be based on **dialectical logic of rational thinking** as well as deep **spiritual insight** into the unity (subjectivity) of existence. Of course, we can study only a physical objective side at its various levels of hierarchy and limit our attention to only separated aspects of reality. Even the Universe as a whole can be studied in cosmology as a physical system per se, but in that case we must be aware that except of its external objective side it possesses also its internal subjective one.

**Consciousness of personal God** represents the whole reality where the physical Universe is His external objective face.

The physical Universe as a whole divides and differentiates itself in such a way that every new positive pole “+” is expelled from all existing negative poles “-“ and every new “-“ from all existing “+“. It means that every positive pole “+” is connected to all negative ones “-“, and reciprocally, every “-“ is connected to all “+” of the Universe, so that **everything is connected to everything else, creating the Unity Principle of existence**. Internal differentiation of the Universe, its plurality generation and structuration, means its cosmic expansion. The Universe is an expanding network of quantum dipoles (connections). During cosmic expansion, the cosmic repulsive force is in its active stage, and the attractive force, as a counterbalance, is in its passive stage and manifests itself as a global cosmic gravity. Both these forces are equal but have mutually opposite orientation. When the repulsive force will exhaust itself in its active stage, the cosmic expansion ends, and the attractive force starts the cosmic contraction. Then the repulsive force passes to its passive stage, and as a reaction to attractive one (being now in its active stage), manifests itself as a global cosmic antigravity. During a cosmic contraction, the Universe gradually incorporates its quantum dipoles

into itself, until it becomes only a sole quantum dipole and starts again another stage of cosmic expansion.

As a sole quantum dipole (+/-), the Universe is in its initial quantum state. Cosmic transition to the second state is accompanied by expelling and creation of a new pair “+/-” in such a way, that every “+” is connected to all “-“. Thus, in the second state, we have four quantum connections (+/-).

1. The first quantum state of the Universe:  $\begin{array}{cc} + & - \\ \hline \end{array}$
2. The second quantum state of the Universe:  $\begin{array}{cc} + & - \\ \hline \square \\ - & + \end{array}$

Creation of a new pair (+/-) means the transition of the Universe from one quantum state to the following. In reality, the Universe expels firstly one pole and then the other opposite one, but in order to simplify our analysis we consider only quantum transitions between symmetrical quantum states, when two new poles are created (expelled). The Universe in its symmetric quantum state  $k$  consists of  $k$  positive and  $k$  negative poles with  $k^2$  connections – elementary quantum dipoles.

**Space is created of elementary quantum connections and their number defines the volume of space.**

Every elementary quantum dipole (connection) represents an elementary quantum of space with its basic quantitative characteristic - volume. As there is no reason for a difference, all elementary quantum dipoles have the same elementary volume. Elementary quantum connection (+/-) represents the basic elementary structural unit (building block) of space and its volume etalon. Separate quantum dipoles nevertheless differ quantitatively from one another. Energy, as a measure of intrinsic motion of their opposites, is a characteristic that allows their distinguishing. Their differentiation in this characteristic needs other characteristic that as a counterbalance returns this differentiation into the unity. This characteristic is the length  $d_i$  which multiplied by energy  $e_i$  gives the same value for every elementary quantum dipole  $i$ :

$$\delta_t = e_i d_i, \quad \text{where} \quad E = \sum_{i=1}^{k^2} e_i$$

The value  $e_i d_i$  represents the **universal law** which gives the energetic and length (geometric) characteristics of the Universe into the mutual relation. The whole energy  $E$  of the Universe is given by the sum of energies of its elementary quantum dipoles (+/-). The dialectical relation between energy and length of quantum dipoles allows their quantitative and qualitative differentiation as well as demonstration of their unity. On the contrary, the spatial volume of elementary quantum dipole has no counterbalance in other characteristic. So all quantum dipoles are indistinguishable in this quantitative characteristic and carry the same spatial volume, so that the volume of space is given by the number of elementary quantum dipoles.

The dynamic network of quantum connections (dipoles) represents the unitary field that Einstein was finding unsuccessfully in his theory of unified field. This network can be easily imaged by the matrix in which lines represent positive poles, and columns – negative ones. Points of intersections represent elementary quantum dipoles as connections of opposite poles. Cosmic quantum transition (jump) from one symmetric quantum state to the next during a cosmic expansion can be described by addition of a new line and column (k+1). New points of intersections represent new quantum dipoles created during an elementary quantum cosmic transition (jump):

**The table of increasing cosmic network of quantum dipoles during cosmic expansion**

Quantum state		1	2		k-1	k	k+1		n
	<b>Poles</b>	-	-	.....	-	-	-	.....	-
1	+						+/-		
2	+						+/-		
							+/-		
k-1	+						+/-		
k	+						+/-		
k+1	+	+/-	+/-	+/-	+/-	+/-	+/-		
n	+								

All newly created quantum dipoles (+/-) are weaker and longer than existing ones. They are under the direct control of divine creative activity. The internal structuration of the Universe resulting in its cosmic expansion can be easily described by the following basic quantum equation:

$$V_k = k^2$$

where:

$V_k$  volume of cosmic space given by the number of quantum dipoles,

$K$  number of positive (or negative) poles as well as the number of elementary quantum jumps of the Universe from the beginning of its expansion and representing the cosmic time

This basic quantum equation reflects the internal division and structuration of the Universe creating thus its own expanding space and flowing time. The Universe is quantized as its energy and space are localised in its elementary quantum connections and its time is given by its elementary quantum jumps from one quantum state to the following. Elementary quantum jump represents the elementary change of the Universe, its elementary quantum of motion (time) to which all other changes (motions, times) can be related. These **elementary quantum jumps define the universal cosmic time**. Time is not a mystery, but manifestation of motion of the Universe as a whole as well as motion of its parts. Time is a measure of motion, it is nothing without motion. Imaginary time in black hole theories has no real physical meaning, so it is pure nonsense as well as black holes.

Every local motion can be compared to the **universal cosmic motion**. As shown in my paper [8], contemporary one second corresponds to  $(3/4)/(\pi c^5/2kh\alpha)^{1/2} = 8,144.10^{43}$  elementary quantum

jumps of the Universe between two symmetrical quantum states, so we can allocate the time  $\Delta t = (4/3)(2 \hbar \alpha / \pi c^5)^{1/2} = 1,128.10^{-44} \text{ s}$  to one quantum jump. But it does not mean that the quantum jump has its duration. Time does not define the duration of elementary quantum jump, but just contrariwise, time is defined by the number of elementary quantum cosmic jumps. Every process (motion) and its duration can be compared to and expressed by universal time. If some process takes one second, it means that it corresponds to  $8,144.10^{43}$  elementary quantum jumps of the Universe. If the same process is dilated to two seconds (time dilation) because of high speed of object towards the vacuum or strong gravity (big gravitational potential), it corresponds to  $2 \times 8,144.10^{43}$  elementary quantum jumps of the Universe. This cosmic time so represents a universal base through which all processes (motions, times) can be expressed.

Time is quantized and can be numbered and expressed by integers. It is nonsense to say that something can be hidden under the Planck time. Nothing can be hidden under the Planck scale neither in the sense of time, nor volume, because the Universe is quantized in both its characteristics – space and time. Both they have clear physical meaning. The question, what had happened from the moment of the Big Bang until Planck's time, has no sense. There is no mystery as the Universe did not start its expansion from its undifferentiated singularity but just from its initial state as a sole quantum dipole (+/-). The Universe has the source of its motion (energy) in mutual attraction and repulsion of its opposites. Contemporary cosmological theories do not see the dialectical essence of existence, so they cannot explain the origin of cosmic expansion – Big Bang, and the way out of singularity. Singularity as undifferentiated totality is nothing. Anything cannot appear from nothing. Singularity does not have its own source for plurality generation. It is only "one" and nothing more. Quantum cosmological theories suggest the fluctuation of a previous vacuum as a source of cosmic expansion and mention some fluctuation of energy density. But the source of energy is unknown. The so-called false vacuum should contain a contradiction between the huge gravitational effect of its energy and repulsive effect of its pressure, but the intrinsic bipolarity as a reason is not detected. Neither the source of energy nor essence of cosmic expansion and gravity is explained. Therefore the reason for spontaneous super-symmetry breaking remains unknown. Such vague notions like accident, uncertainty, spontaneity and fluctuation cannot explain the real source of cosmic expansion.

If we allocate  $\Delta t$  sec to one quantum jump, then the time of cosmic expansion is:

$$t = k \cdot \Delta t$$

and the basic space-time equation of the Universe where the volume  $V$  is expressed by  $m^3$ , obtains the following form:

$$V = z \cdot t^2, \text{ where } z = (d^2V/dt^2)/2$$

**This is the basic equation of spatial dynamics of the Universe, expressed in real dimensional units, where the spatial volume of the Universe is directly proportional to the square of time of cosmic expansion.**

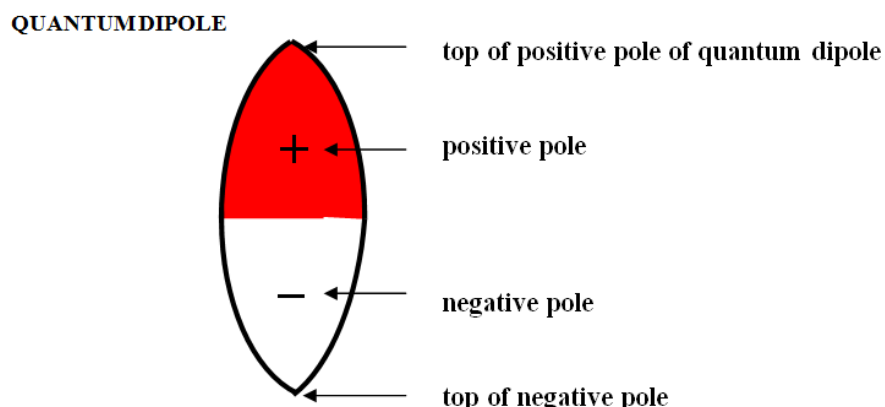
In that form space and time are continuous values, but we must remember, they are quantized in reality and can be truly expressed only by integers. Thus, if we want to study space and time from the viewpoint of cosmology, we can use them as continuous values, but it is inappropriate at the quantum level. The detail analysis of the basic quantum equation with its interesting and important

consequences for cosmology is made in my papers [7], [8] and partially in the Appendix of this paper.

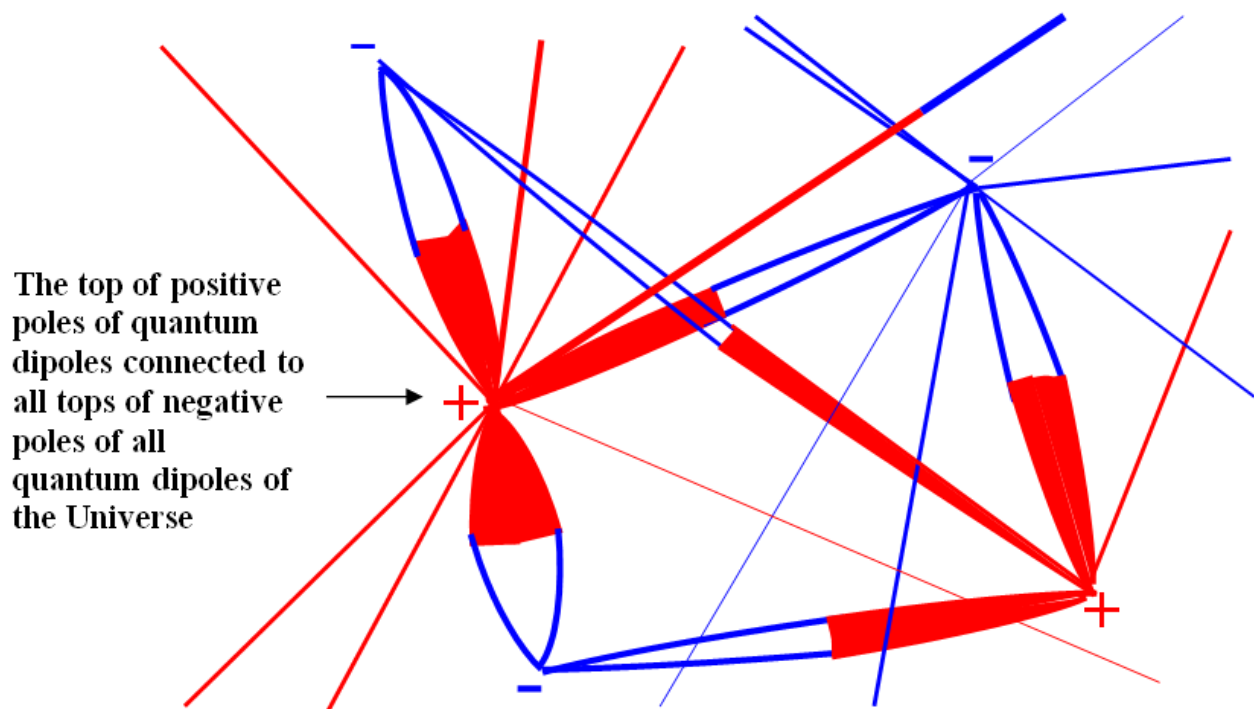
Above equation shows only how three-dimensional space of the physical Universe is evolving in time, but says nothing about how a divine Idea (Mind) is implemented into the physical structure of the Universe. The newest quantum dipoles, being longest end weakest at the same time, represent the threads through which God manipulates, managing the evolution of expanding Universe. As this action is now, in contemporary phase of cosmic expansion, very gentle, it seems it does not exist. The evolving physical Universe is managed according to divine Idea (Word) and subsequently reflected in a divine Mind. At every consecutive cosmic quantum jump the divine Idea (intention) determines where, meaning to what distance from every existing quantum pole, a new opposite pole is to be expelled. The enormous number of possibilities for conscious decisions at every stage creates unbelievably reach field for a free will. Every conscious subject has a free will to decide what reality he will reflect and create in his imaginations and how he will interact with the world.

### ***Localism versus non-localism***

Every elementary quantum dipole is a holder of elementary quantum of space, so the volume of space is given by the number of elementary quantum dipoles. We can imagine a quantum dipole as a balloon representing its space in which two charges of opposite poles are melted:



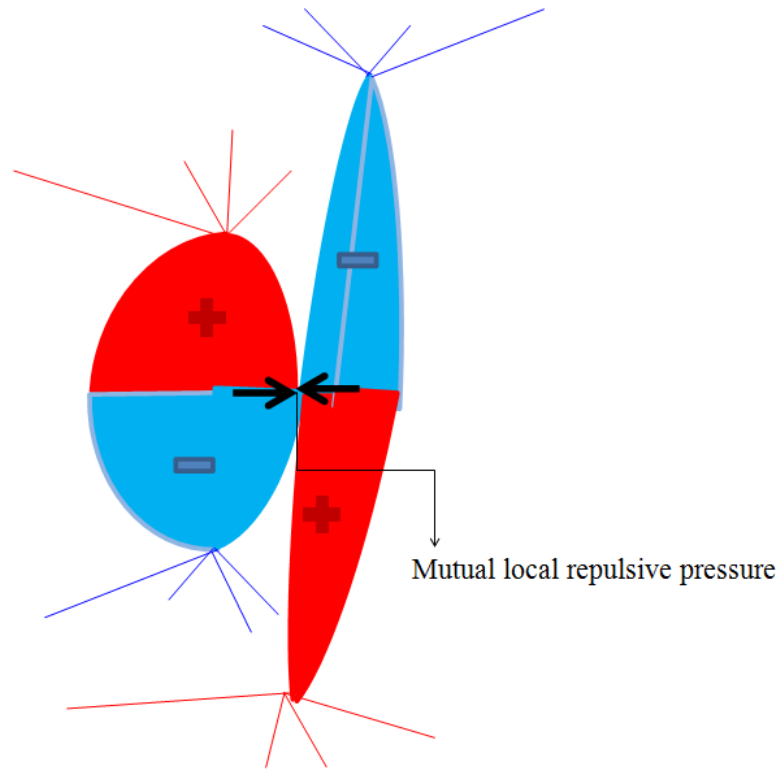
The illustration of a pole and its relations to all opposite poles of the Universe through quantum connections (dipoles):



**The Universe is a network of non-local connections** and “perceives” all its parts. On the other hand every elementary quantum “perceives” the whole Universe. These non-local connections are in radical contradiction with Einstein’s theory of relativity. They not only exist but represent the substance of the Universe. Thus, the principle of universal simultaneity is valid. What is simultaneous in one system is automatically simultaneous in all others.

Thanks to direct quantum connections, where everything is connected to everything else, the whole Universe represents the Unity, where every part reflects and “perceives” all the rest Universe as well as is reflected in it, so the Universe as a whole represents a self-reflecting (self-mirroring) and self-closed Unity of the highest complexity, it means personal God.





The above picture shows two quantum dipoles acting locally by their mutual pressures. They are holders of elementary quanta of space, but differ by their lengths. The left one is shorter, stronger having more energy and the right one is weaker, longer with less energy. The more energetic and shorter the dipoles are the higher is their mutual local pressure. The multiplication of energy  $\epsilon_i$  by the length  $d_i$  gives the same value  $\epsilon_i d_i$  for every elementary quantum dipole  $i$ . This value represents the universal law from which Coulomb's and Newton's laws follow directly as shown in Appendix to this paper. If elementary quantum dipole changes its energetic level it also changes its length. By losing a part of its energy it elongates, by its receiving it shortens. Quantum dipoles exchange their energies mutually as they are in a permanent mutual motion.

**Energy is a motion or potential for motion as a consequence of attraction and repulsion of quantum dipoles.**

There are only two basic interactions – **local** (mutual repulsive pressure of quantum dipoles through their spaces) and **non-local** (direct elementary quantum connections – dipoles (+/-)) and two forces – attraction and repulsion. All known forces like electromagnetic, strong, weak, nuclear and gravitational are their manifestations mediated by quantum connections. It is strange that contemporary theoretical physics is under the pressure of wrong dogma of localism and interprets mistakenly the basic interactions as an exchange of point-like bosons between point-like fermions. So the **Standard Model** of particle physics based on erroneous localism must be replaced by a true description of micro-world built of quantum dipoles [6]. The same situation is in **cosmology** where **gravity**, based on Einstein's theory, is explained as a local interaction propagated by gravitational waves moving by limited speed of light. But **true gravity acts instantaneously and is mediated by non-local vacuum quantum dipoles connecting all celestial bodies mutually and creating a cosmic vacuum** as explained in [7], [8], [9]. Cosmic gravity is a consequence of cosmic expansion.

Theorists do not see that all interactions are only different forms of attraction and repulsion. There are only two forces – attractive and repulsive being in a mutual dynamic equilibrium, although they can manifest by various ways. Why do theorists create their speculations on the idea of symmetry breaking, resulting into quite different fields and bosons with unknown nature although all known forces or interactions like electromagnetic, nuclear, weak, strong and gravitational differ only by intensity of attraction and repulsion. Of course, all these interactions exist at different energetic levels, but it does not mean the different fields. There is **only one field** made of elementary non-local quantum connections that can differ by their intensity or energy contents. The equilibrium of repulsive and attractive forces is a fundamental feature of reality. The **symmetry between attractive and repulsive forces** is the basic symmetry manifested everywhere, at all levels of reality. This **symmetry (equilibrium) cannot be broken** but can be manifested at various forms. At the basic quantum level this dynamic equilibrium is manifested by oscillation of quantum dipoles (e.g. photon or oscillation of dipoles creating the structure of proton and electron) or by compensation of mutual local repulsive pressures of dipole spaces with attractive forces between opposites of quantum dipoles (e.g. proton, cosmic vacuum). The detail analysis of all basic interactions is made in the **Appendix** to this paper in order not to abrupt now our basic line of thought.

Not only theoretical physics but all **positivistic science and philosophy**, including unsuccessful science of consciousness, are based on localism according to which we can deal only with what is achievable by our senses and testable in practise. As local touch interactions between flows coming from outside and our body (eye, ear, skin, tongue and nose) cause our sensual perceptions, we deny the existence of non-local direct connections (interactions). But this is a great mistake as just invisible non-local quantum connections (dipoles) inaccessible by our senses and instruments represent the true essence of everything and follow naturally and clearly from dialectical logic of thinking. Contemporary theoretical physics build its theories on **irrational** speculations while non-local quantum connections (dipoles) follow from **rational** dialectical logic as well as quantum mechanics known as **entanglement**. Only science based on understanding of direct non-local connections as well as the Unity Principle can be really true. It is high time to overreach limitations of atheistic positivistic science and build true fundamentals of science on dialectical **logic** and spiritual insight into the reality. This new science can give a true explanation of the essence of our Universe, God, life and our consciousness (spiritual soul). Positivistic and materialistic localism cannot do it. **Materialism and atheism are blind accepting only a limited physical reality manifested through mechanical local interactions.**

## ***The Unity Principle and Occam's Razor***

It is impossible to have a simpler relation than attraction and repulsion of opposites (+/-) creating the whole reality, where every "+" is connected to all "-" and reciprocally. This Unity Principle is the clearest manifestation of Occam's razor and results directly from dialectical logic of thinking reflecting the dialectics of existence. The highest complexity of the Universe is created of the highest simplicity of bipolar relations (+/-). Only direct non-local connections of everything to everything can allow the existence of life as a self-reflection (consciousness) of very complex self-closed structures - subjects. As everything is reflected in everything else, the whole Universe as a Unity represents a self-reflecting, self-mirroring and self-creating system of the highest complexity, it means the consciousness of personal God. God creates His multilevel Universe of basic bipolar relations – quantum dipoles (+/-). The quantum of light (photon) is a free quantum dipole (+/-), so we can say that God, being the Light (energy), creates everything of His own Light (energy). The complexity, diversity and universality of objective side of the Universe come from its Unity - individuality and subjectivity of personal GOD as a "subject-object" relation (dialectics). We do not need to create speculative theories like "**Theory of Everything**" or "**Theory of Unified Field**" but we need to understand deeply the exact and simple mechanism of the **Unity Principle**.

### ***We need to know the simple TRUTH!***

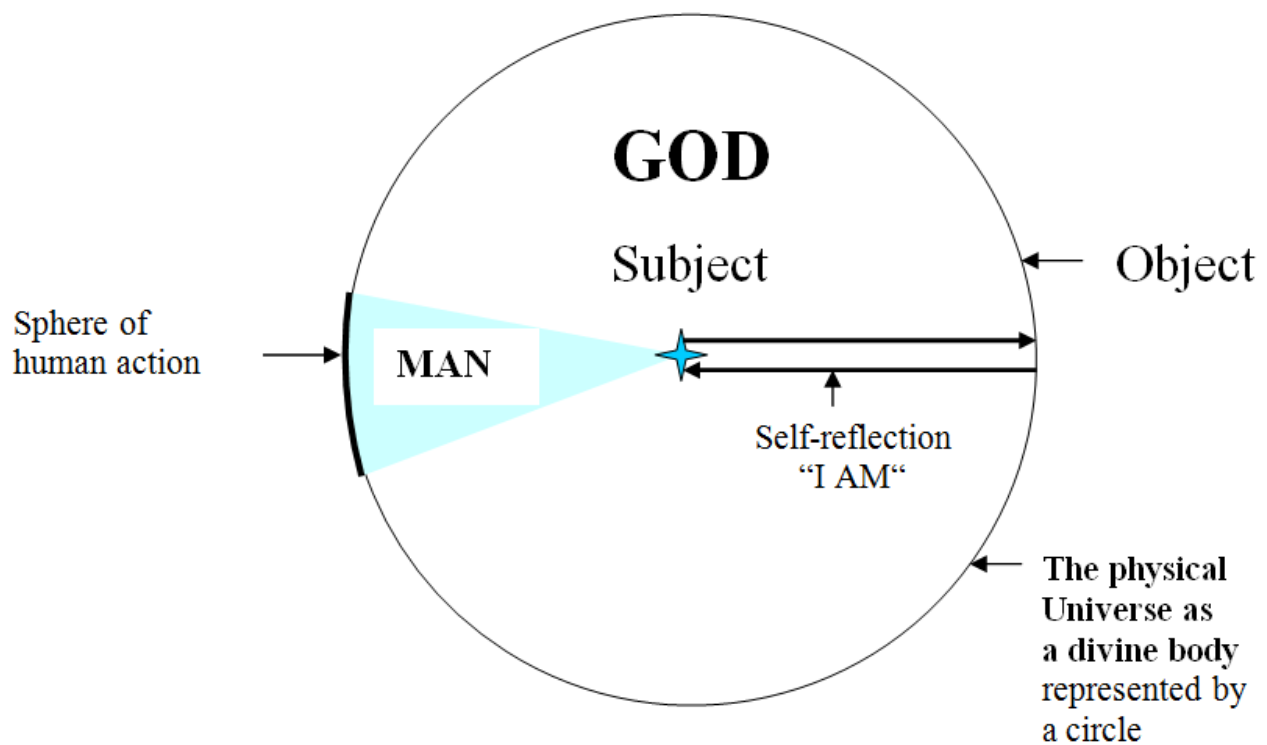
*"Someday we'll understand the whole thing as one single marvellous vision that will seem so overwhelmingly simple and beautiful that we may say to each other: 'Oh, how could we have been so stupid for so long? How could it have been otherwise!'"*

*J. A. Wheeler*

## ***God and His Universe (Subject-Object Relation)***

Although personal God is the centre of everything, He was removed from positivistic science as useless hypothesis. Without knowing the essence of God, the whole existence is unknowable. Denial of God by positivistic science and theoretical physics has fatal consequences for contemporary situation not only in science but also in society as a whole. The darkness of ignorance is a reply of God to our arrogance. We cannot look at the whole reality without looking at God, otherwise our view is false. God contains His whole created world in Himself as a subject-object relation, where subject represents the centre (unity) of the world through which God performs His self-reflexion. God revealed his name (essence) as "**I AM**" in his famous declaration "**I am who I am**" to the question of Moses what is the name of God who sends him to Israelites in Egypt. It means that God is not a pantheistic impersonal existence but He is just a conscious **PERSON**. He is the whole being which is self-aware. To be a Person means to be a Spirit (subject). We can talk about spirituality only in relation to the subject being self-aware or in the process of self-awareness.

Unlimited GOD as a subject has His limit (manifestation) in His world (object), which is again unlimited. The relation between God and His physical Universe can be imagined:



God is expressed as a four dimensional reality limited by His three-dimensional space, which is closed, having no limit. The above picture is only an illustration of God, where the four-dimensional reality of God represents His subjectivity (Spirit) manifested through His three-dimensional space of the physical Universe. It means that every elementary quantum dipole is not only a holder of elementary quantum of three-dimensional space but, at the same time, it is a four-dimensional quantum of divine Spirit (consciousness). What does it mean that the whole reality is four-dimensional? We know that the physical space has three dimensions, it means, we can move in three mutually perpendicular directions. But despite that, there is another basic motion coming from subjectivity (unity, internal side) to objectivity (diversity, external side) and back again. This motion represents a self-reflection as negation of negation.

***Jesus said: "I am the light that is over all things. I am all: from me all came forth, and to me all attained" (Thomas, 77)***

**The fourth (spiritual) dimension** is given by the motion from inside to outside, from the unity to diversity, from subjectivity to objectivity and back again – as a self-reflection. It is the motion of higher quality than other physical spatial motions, which are only aspects of this basic self-reflecting motion where everything is reflected in everything creating instantaneous non-local communication of everything with everything. We cannot study the essence of Consciousness not knowing the exact mechanism of the Unity Principle.

**Consciousness is a self-closed system of high complexity where everything communicates with everything non-locally creating thus the Unity of conscious subject.**

The Unity (subject) negates itself through its objectivity (internal structuration) through which it again reflects to its Unity. The self-reflecting Unity, where everything is reflected in everything else, means that the whole reality is a self-closed, self-creating and self-reflecting system of the highest complexity. The relation between God as a subject and Nature (Universe) as a divine object is, at the same time, the relation between inside and outside, one cannot exist without the other. The physical Universe has not its own centre, that is everywhere, in it is self-reflecting Unity (subjective side), where everything is just HERE and NOW. God is always here (everywhere) and now (in every time). Personal **God is a self-creating, self-reflecting and self-knowing Universe**. God acts through the whole Universe, which creates His body (soul), while Man acts through his limited multilevel physical body (soul). The subjectivity and spirituality (self-consciousness) of personal God is a source of our spirituality. Divine Holy Spirit = “I AM” is a source of human spirit = “I am”. The centre of the Universe is in our spirit (our Self), in our “I am”. I am in the centre of my world, my Universe. My consciousness creates my world according to my creative imagination and active will. I am in my consciousness which is in me. I am always in the world of my consciousness (subjectivity), I cannot get out. I am always here and now, in my consciousness, but I can manifest through my body-soul. Only the world of my consciousness is real with its imaginations, inspirations, feelings, emotions, knowledge, concepts, desires and goals. The outside objective world is my mirror through which I perform my self-reflection. It represents the other side of me and I can “see” it only through my consciousness (subjectivity).

Personal God represents the “subject-object” relation (dialectics), where His united internal subjective side is manifested through His external objective differentiated one.

**Personal GOD represents the highest Unity of the highest complexity of the self-closed and self-reflecting system - Universe - made of elementary quantum connections (+/-). Consciousness of personal God is the essence of existence creating His reality from His own energy (Light) consisting of elementary quanta (+/-).**

**The Universe in its self-reflecting simultaneous Unity represents the subjectivity of personal GOD creating its objective side by internal differentiation and structuration (space and time) through which He again reflects to His Unity (subjectivity).**

Without direct non-local quantum connections, where everything is reflected in everything else, the subjectivity of life (consciousness) and spirit (self-awareness) is impossible because every living subject with its consciousness represents a self-closed unity of high complexity. Through only local mechanistic interactions the essence of life and consciousness cannot be explained.

### ***Father – Son – Holy Spirit***

God as the Father is a starting point of everything. Everything is in Him and He is in everything. He is a self-reflecting Unity of His Universe, the self-knowing, self-conscious and self-creating Person. God as a whole differs Himself into the **Creator** (Son, Christ) and the **Creation**. The Christ (Son) is a quantum structure of highest spirituality of personal God, His top self-awareness creating His whole multilevel Universe from His own Light (energy). Through the Christ (Son) God relates to His Creation and “looks at it”. Holy Spirit is the highest divine level of self-consciousness “**I AM**” creating the spiritual essence of the Son and the Father as well as the relation of the Son to His

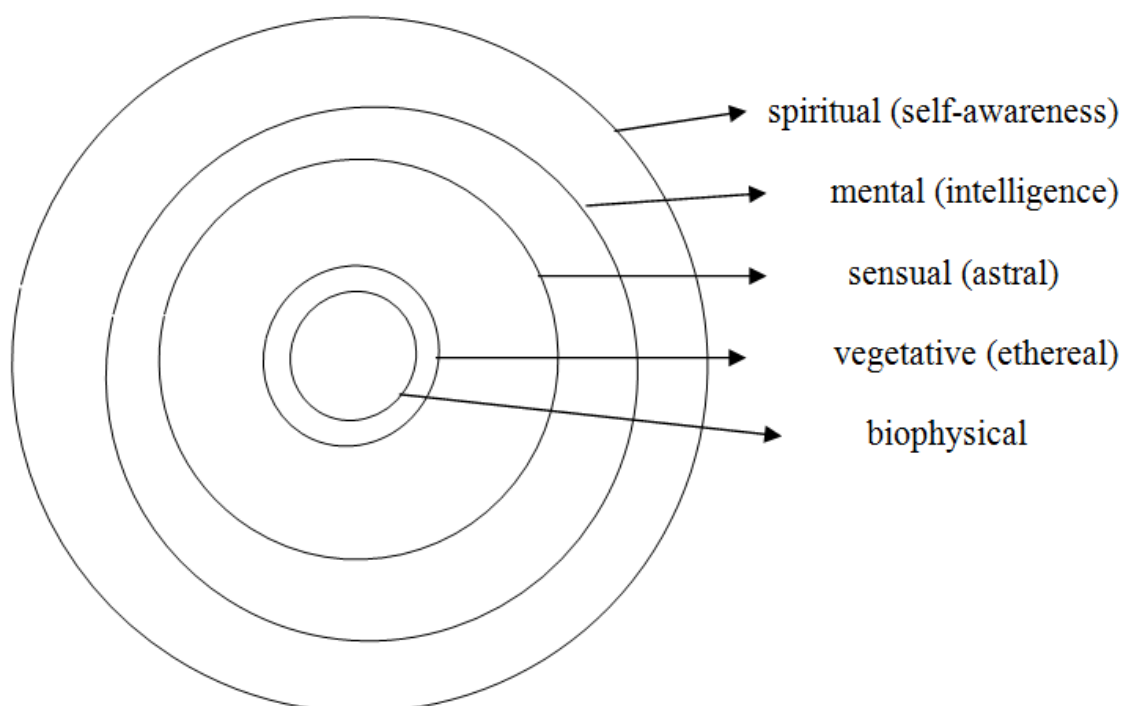
Creation. Through Holy Spirit the Father is in the Son who is in the Father. Everything is made of elementary quantum connections – quanta of energy (light) creating the quantum structure of the whole Universe (Father) as well as separated self-closed subtle quantum structure of the Son (Christ) together with His connections (Love) to all other parts of the Universe, especially individual spiritual subjects. Our souls are such self-closed individual quantum structures, through which our consciousness (“I am”) is manifested creating our spiritual individuality. There is only One personal God, but He can manifest as the Father (self-conscious Unity of everything), the Son (Creator in His relation to the whole Creation) and the Holy Spirit (I AM).

Through Jesus’s biophysical body the divine Son – Christ was manifested at our Earth. Jesus united the human soul with the divine Spirit enriching it by experience of human feelings, emotions and human pain. In Jesus the close quantum connections between His human soul and the Christ became the part of a new quantum structure of divine Spirit. By Jesus the gap between God and Man was bridged so that the divine Son Christ became Jesus Christ - the true way to God and His Kingdom.

### **Multilevel Hierarchy of Existence**

God operates through the whole physical Universe at its various levels made of different energetic and information structures. Our body (soul), as well as the whole Universe, consists of the following hierarchical levels made of quantum dipoles of different intensity

- biophysical and vegetative
- sensual (astral)
- mental (intelligence)
- spiritual (self-consciousness – emotion, mind and free will)



All these levels, including mental and spiritual souls, are self-closed and self-reflecting physical (energetic) structures mutually interconnected and made of elementary quantum dipoles – photons (+/-). They define the sphere of physical reality through which we operate just directly. The physical Universe is hierarchic as well as our bodies-souls. The Heaven is also physical, but located at higher levels of cosmic hierarchy created of much weaker and subtle quantum connections inaccessible now by our corporal senses and measuring devices. Human consciousness operates through all these levels, but now it looks like it acts only through biophysical reality achievable by our five corporal senses. Corporal death means only that human consciousness finishes its acting through five biophysical corporal senses and starts to operate through astral as well as mental and spiritual levels. The multilevel body-soul, through which the consciousness operates, differs by the range, richness and depth. Plants act only through the biophysical and vegetative level, while animals include also sensual level and some aspects of mental one. Only human consciousness acts through all levels of hierarchy and only through spiritual soul (Mind and Emotion) as the highest level of hierarchy we can manifest our self-awareness. Animal souls do not possess the spiritual level (self-conscious “I am”) which is outside and leads them through their instincts as their external agent. Animal souls are not self-aware, they are only self-feeling and sensual, possessing some mental aspects. The biophysical layer of human consciousness is represented by neuron networks of brain and nervous system, while vegetative and sensual bodies represent the networks of subtle quantum connections (dipoles). These layers are also present in animal souls, but only a human soul possesses a spiritual level, so it is immortal in its unity with the Spirit. Through the human biophysical body the Spirit can experience a big range of feelings and emotions otherwise inaccessible. These feelings and emotions create the human psychic that allows the soul to experience various states of consciousness from the highest beatitude to despair, from love to hate, from clear mind to confusion, from enthusiasm to apathy, etc. The spiritual and mental soul is connected to a biophysical body through the astral (sensual) and ethereal (vegetative) souls. All levels of human body-soul represent relatively separate complex structures made of elementary quantum dipoles of different intensity, but all they are mutually interconnected, as everything is connected to everything, and create the unity of a human being.

Biophysical body together with its vegetative sphere is developing according to information coded in DNA, while astral body-soul is already finished immediately after conception, because DNA contains the full information for evolution of biophysical body creating its astral image (astral body) according to which a biophysical body is evolving. At the moment of conception the complex quantum structure of spiritual soul is created possessing a spiritual spark for spiritual development during the life. The whole human individuality with all its hierarchical levels, including spiritual soul, is created at the moment of its conception waiting for its future development, so a pseudo-humanistic advocacy of abortion cannot deny that it is just a killing of a human being having obtained no chance for its spiritual evolution on Earth.

We cannot say that our spiritual souls are placed in our biophysical bodies as they are only in a close mutual connection. OBE (out-of-body experience) is the evidence that the spiritual and mental soul together with its astral body can free its close connections to a biophysical and vegetative body [24]. Very interesting are experiments carried out at Ljubljana, Slovenia, presented by Amrit S. Sorli in the paper [15] showing that after the death of living organisms their weight decreases. It means that higher quantum structures (vegetative and astral bodies-souls) are released from their biophysical bodies carrying away a certain mass (vital energy). Our self-closed and self-reflecting spiritual souls highly overreach our limited physical bodies and can penetrate the whole Universe thanks to mutual quantum connections. Our close connections to the highest spiritual soul of Jesus

Christ are the source of our spiritual inspirations and high human qualities (love, wisdom and creativity) leading us to the Kingdom of Heaven.

**Jesus said: If they say to you, 'Where have you come from?' say to them, 'We have come from the light, from the place where the light came into being by itself, established itself, and appeared in their image.' <sup>2</sup>If they say to you, 'Is it you?' say, 'We are its children, and we are the chosen of the living Father.'** (Thomas, 50)

“The light comes into being by itself” – it means that the Light (Universe) divides itself by creation of new and new quantum dipoles (photons) from already existing ones during cosmic expansion. The quantum structure of human spiritual soul is formed just from these new created quantum dipoles, which are very subtle and weak. So we need lower levels including biophysical body to take energy from them and so strengthen and form our spiritual souls during our spiritual development on Earth. In contemporary stage of cosmic expansion this is the only way how to create new spiritual beings unlike early stages of cosmic expansion when the new quantum structures of angelic spiritual souls were enough energetic to be fully self-aware at the moment of their creation.

The greatest mistake of idealistic and theological philosophy is an assumption that spiritual means immaterial or unphysical as well as materialistic declaration that our consciousness is only a function of our biophysical brain and its activity. The knowledge of the Unity Principle shows that everything must be physical including personal God and our spiritual souls. As everything is made of elementary quantum dipoles +/- including our spiritual souls, there is no “mind-body” dualism, but only “subject-object” dialectics. Our spiritual souls are physical as they represent the self-closed quantum structures of high complexity made of subtle elementary quantum dipoles (connections).

**Spiritual does not mean unphysical. It only means a conscious self-aware subject with its Mind, Emotion and Will.**

God is spiritual because He is universal self-aware “I AM” and “I WILL”, but He is at the same time physical, performing His self-reflection through His physical soul - the physical multilevel Universe. God is not outside His physical Universe, He is in it, which is in Him. God represents a self-creating, self-reflecting and self-aware and self-knowing Unity of His physical Universe.

The physical Universe (object) is united in God – subject. The whole unbelievably rich complexity of the Universe is present in God. Only through energy God can manifest His creative Will by creation of His own world. Energy of the Universe is energy of divine Consciousness. Its quantity as a basic quantitative characteristic of God and His Universe is constant. To say that God creates energy is nonsense. Energy is an eternal attribute of GOD so it cannot be created. **God is the Light of the World.** God is just the Light (energy) that everything is made of. The Heaven as a part of the whole multilevel physical Universe is also physical and made of subtle quantum dipoles (structures) inaccessible by our temporal biophysical senses. Thinking as a spiritual activity is at the same time a physical activity. Divine thinking is a creative activity, through which God creates the reality at all levels of His hierarchy. At the level of biophysical reality it is manifested through the creative evolution of life on Earth. The whole physical Universe represents the physical body of God although it seems that it has its own independent existence. It is because now, in contemporary phase of cosmic expansion, God acts markedly through His very long and weak (subtle) quantum connections (dipoles). New quantum dipoles arising during cosmic expansion are just threads through which God perpetually manages the cosmic evolution according to His own creative



Intelligence (Word) which is gradually included into the evolving information structure of the physical Universe. So the informational structure of the Universe represents the imprinted and encoded creative power of divine Intelligence which is the source for creative evolution at all levels of the physical reality including our Earth.

Divine Consciousness is a starting point of everything playing the primary role in relation to its physical manifestations. It is not impersonal cosmic consciousness but divine Consciousness of personal God as a subjective (self-reflecting) Unity of everything, who creates His own physical word (Universe) by internal structuration and differentiation (evolution). So Consciousness as a self-creating and self-reflecting Unity represents the essence of existence with its basic elementary constituents – bipolar relations of opposites (quantum dipoles).

Human body consists of all above mentioned hierarchical levels (biophysical and vegetative, sensual, mental and spiritual). Through them human mind can operate although now it seems that it operates only through biophysical level. After the death of our biophysical and vegetative body, the level of physical sphere, through which our mind (spirit) operates, will change to the level of astral, mental and spiritual reality and we will interact with it mainly by direct non-local quantum connections in contrast with contemporary local touch sensual interactions. Even now on Earth some people are able of **direct conscious (mental) action** at objects (**psycho-kinesis**) or other people (**telepathy**) through non-local quantum connections. There are also other paranormal phenomena confirming the instantaneous action of consciousness at the physical reality.

Materialists accept mind as only a function of brain activity producing my subjectivity, my “I am” as its function. Yet, I accept my brain and biophysical body only as my instrument and temporary ownership that I use to play my own game in my life on Earth developing my own spirituality. The brain is an instrument for my acting at the level of biophysical reality. It can only limit me in my effort to evolve and manifest my own intelligence, my mind. But it is remarkable that it has been developed to the level of nearly no resistance for evolution of my intelligence and creativity. How much idle reserves it hides inside, they are only waiting for their usage. What a foresight is hidden in its evolution! This foresight is the evidence that evolution is not blind but creative. The spiritual soul (human consciousness) forms holistic imaginations. Creative thinking activates electrochemical processes in a brain and its nervous system accompanied by the flow of holistic spiritual imaginations. Only through brain activity spiritual ideas, plans and aims can be converted to the physical activity of my body, and reciprocally, the external energetic influences are transmitted and transformed to the flow of holistic spiritual imaginations (pictures, sounds, tastes, emotions, thoughts, etc.). A biophysical aspect of memory is needed mainly for fixation and coding the kinetic habits that can be manifested later almost automatically. We cannot manifest physically a number of our imaginations without needed physical skills. I cannot transfer imagined music to singing or playing if I have not trained the required habits, I cannot paint a beautiful picture existing in my mind without consequent skill. The imaginative, intellectual and emotional world as a product of spiritual soul is the greatest miracle of human existence. What a complex physical organism with its brain had to be evolved to manifest the spiritual world at the level of Earth!

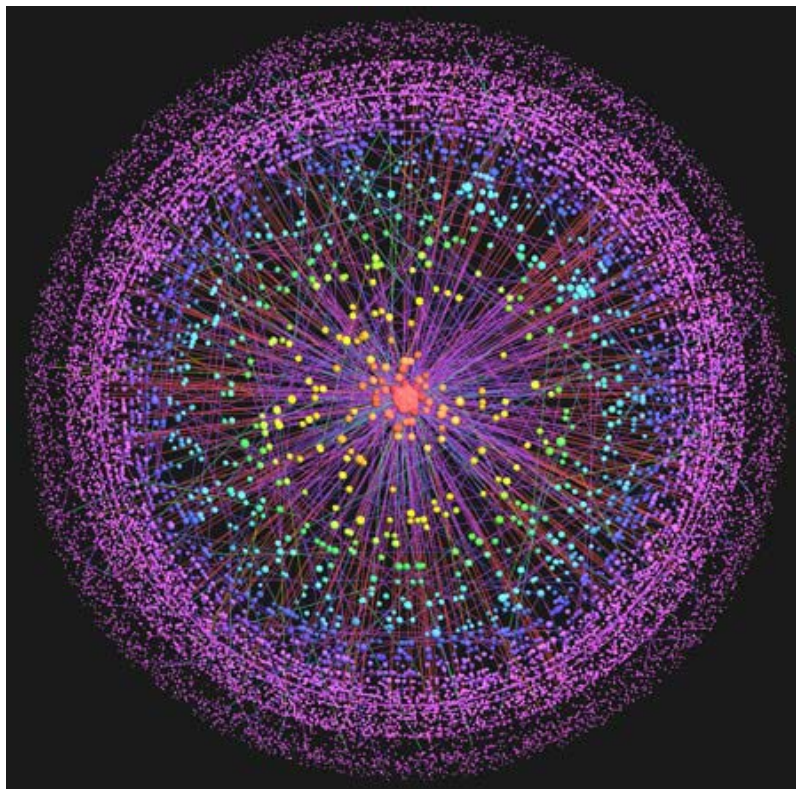
Mind, emotions, will and conscience are the exclusive abilities of spirit and its soul. Through mind (rationality) the spirit is oriented to the objective world in order to know and accept it. Through emotions (spiritual heart) the soul is oriented to its spiritual subjectivity.

Rationality and emotionality are two opposite orientations of spirit and its soul:

- through local touch interactions perceived by five corporal senses, that create the sensual level of consciousness, the objective world is mediated to our consciousness from “outside” and is knowable by our rational thinking,
- the subjective spiritual world of consciousness, manifested by our emotionality, intuition and spiritual insight, operates through non-local quantum connections penetrating the whole reality

Two brain hemispheres correspond to this differentiation. The left hemisphere is oriented to abstract analytical thinking and objective world, while the right one – to emotions and intuition. Man is wise if both his rational and emotional intelligences are highly developed. Man combines sensual and spiritual consciousness. The higher is his spiritual consciousness with its free will, the more free and developed he is. Consciousness creates the world quite different from physical one. Matter as such represents only energy vibrations while the spiritual world of consciousness is full of feelings, thoughts, emotions, pictures, melodies, colours, tastes, scents, concepts, ideas, inspirations and imaginations. Human consciousness has a great imaginative ability with its consequent creativity. If imaginations follow from spiritual inspirations, man can create fascinating artistic and spiritual products bearing a stamp of spiritual spark and originality, sometimes even genius. For everybody only his subjective world is really true. Real are states of his soul – pleasure, sorrow, pain, enthusiasm, despair, love, fear, hate, peace, anger, feelings, imaginations, etc. Spiritual “*I am*” represents the highest reality and the truth. The objective world is only an outside mirror for self-reflection.

**Consciousness is a unity of self-closed and self-reflecting system of high ordered complexity made of elementary quantum connections – dipoles (+/-).**



As contemporary theoretical physics cannot explain the essence of reality, other spheres of human cognition try to find their own insight into the problems they meet. Activity of the **WISE World Institute for Scientific Exploration** is worth a special attention. Its mission is to help solve the major problems faced by people and explain many unanswered questions and mysterious phenomena and events of all kinds that have been observed and reported in various fields, and to provide a global platform whereby such research can be published and made freely available to the world. Its 1<sup>st</sup> **International Conference “Life, Energy and Resonance”** <http://www.lifeenergyscience.it/viterbo2013/program.htm> has started a **new scientific paradigm** and was dedicated mainly to the **theory of syntropy** that tries to find the essence of life energy and explain the evolution as a creative syntropic synergetic process in contrast with Darwinian dogma that evolution is a blind random process, although actually it manifests a divine creative intelligence. Many contributions were dealing with the practical usage of the phenomena of **non-local instantaneous communication** like “Controlled Remote Viewing” [20] and others [21], [22], [23], [24].

The knowledge of the Unity Principle gives the exact explanation of the nature of non-local instantaneous communication as well as new insights into the law of syntropy. From the viewpoint of the whole Universe, entropy and syntropy are in a mutual dialectical relation. Expansion of the Universe is a consequence of its internal division and structuration accompanied by the decrease of its average energy density that physicists interpret as the increase of entropy of expanding Universe. But, on the other hand, it means the increase of its ordered complexity and information richness united in a divine Consciousness and so the increase of cosmic syntropy. The increase of entropy of energy, represented by the decrease of its average density, means at the same time the increase of internal structuration and differentiation, so the increase of syntropy and information richness of the whole Universe. Entropy and syntropy are two faces of the coin in that case. But if we want to study the relations between entropy and syntropy at various systems and levels of reality, we have to notice the principal difference between two basic physical interactions:

- **local mechanical (touch repulsive pressures)**
- **quantum non-local interactions**

While local mechanical interactions (repulsive pressures of quantum dipoles) are manifested by the law of entropy (dissipation, disintegration, disorder and destruction) non-local quantum connections are responsible for the dominant role of the **law of syntropy (differentiation, structuration, growth of complexity, life, consciousness and creation)**.

The law of entropy (second law of thermodynamics) is manifested only through mechanical processes in thermodynamic systems where pressure, density and temperature tend to become uniform over time as they result from local mechanical collisions and mutual pressures of its particles (local interactions). A formal mechanistic approach, refusing the existence of non-local interactions, leads to the false impression about the determining role of entropy in the behaviour of the whole Universe. But local touch interactions between objects represent only a subsidiary aspect of reality, which is made of direct non-local quantum connections. High binding energy of structures like protons cannot freely flow to energetically weaker structures like electrons or even the vacuum. Even gravity contradicts the law of entropy as it causes matter (energy) to flow from places with its low density to those with its high concentration. The Universe is not mechanical (entropic) but dialectical (syntropic) built according to its Unity Principle where the law of syntropy plays the dominate role as a manifestation of divine creativity.

Entropic mechanical processes lead to disintegrations of systems, while syntropic ones - to their evolution and reinforcement. Our biophysical body with its vegetative level represents a dynamic equilibrium between entropic and syntropic processes. A biophysical body functions mainly through mechanical processes – e.g. flows of blood or electric signals in a nervous system, while the vegetative level represents its quantum superstructure of non-local quantum connections managing automatically the vegetative processes in a human body. Both these levels (biophysical and vegetative) create an inseparable unity, so that the death of biophysical body leads consequently to the gradual decay of its quantum vegetative superstructure. The death of biophysical and vegetative body is a consequence of superiority of entropic destructive processes over syntropic ones. Quantum superstructure of vegetative level is not enough strong to prevent the destruction of biophysical body. Quite different is the situation regarding our spiritual and mental soul together with its astral (sensual) body. Our soul represents a self-closed quantum structure of high complexity made of very subtle quantum dipoles mutually interconnected into the indestructible unity (our subjectivity and individuality), because the mutual local repulsive pressures (entropy) are so weak that cannot destroy our spiritual soul. At this quantum level the syntropy plays the dominant role guaranteeing our immortality. The soul frees its close quantum connections to the biophysical body after its death and starts to act at higher and more subtle levels of physical reality. Our biophysical body is a product of creative evolution of life on Earth, but not our spiritual and mental soul, which is created at the moment of our conception defining our human personality and developing during our life on Earth. Our subjectivity (unity) comes just directly from the subjectivity (unity) of personal God and, being fully syntropic, cannot be destroyed by entropic processes in our biophysical body.

Only mechanistic approaches to the study of evolution can lead to the false conclusion that evolution is a blind process following from the postulates of Darwinian or Neo-Darwinian theories. **Evolution** of the Universe at all its hierarchical levels is a **syntropic creative process** because the Universe is a living body of personal God, so the evolution is oriented to the highest levels of Consciousness (I AM), spiritual creative power and freedom, representing the final goals. Quite interesting in that sense is a definition [24] of **Consciousness** as *“an increasingly intelligent, evolving, complexifying, organizing, ordering principle that manifests through matter-energy as a syntropic, living entity that drives biological evolution, and gives rise and meaning to reality, which is a reflection of it.”*

Information plays a crucial role in syntropic creative processes. **Information is a reflection of something in something else, it means communication.** The elementary quantum dipole (+/-), thanks to its bipolarity, represents an elementary quantum (bit) of information. The Universe is a living divine energy-information organism of the highest complexity. From the viewpoint of information, the Unity Principle can be expressed by the following sentence: **“Everything communicates with everything else”**. Physics deals only with physical (energy, matter, space and time) aspects of reality and knows nothing about its information essence which is much more important. Physics cannot see this **informational aspect as a manifestation of divine Mind (Imagination)**. The increasing cosmic network is at the same time the increasing information structure to which the creative divine Mind imprints its Idea – Word – Intelligence. Creative consciousness of God creates unceasingly its own world, reflects it consequently and interprets by His Imagination. This eternal communication of God with Himself is the information process at the highest levels of divine game, which of course, is manifested at all hierarchical levels of reality with many active conscious players. The Universe as a whole looks like a **dynamic cybernetic evolving living system** where every consequent elementary quantum step (jump) is under the direct control of a divine Idea (intention-goal-imagination) defining what choices are to be performed among

enormous number of possibilities. Intensions and decisions, through which God manages the evolution of the Universe, manifest His creative free WILL which is limited by the actual state of the Universe and possibilities existing at every step of cosmic evolution. There is huge number of possibilities for a free choice at every step of cosmic expansion. The evolving Universe looks like a big computer (hardware) constantly computing its future states from its current state according to its own computing program (software – divine Mind) reflecting the divine goals to which the cybernetic process is directed. Information is a holder of **creative power** of consciousness. Creative divine Mind is incarnated into **the information structure** of the whole Universe, from which the needed information is gradually scanned and transformed to the evolving coding system of DNA. Creative evolution on Earth is managed through genetic mutations which variations result in an enormous diversity of living organisms. The process of mutations and selections is not blind but organised according to already existing and gradually evolving information coded in the quantum information structure of the whole Universe. Living forms evolving on Earth have their ideal forms (quantum structures - **attractors**) situated at higher subtle levels of the Universe – in divine Mind. The richness of life with almost infinite number of beautiful living forms on Earth is just a clear manifestation of unbelievably high creative Intelligence of Nature as a direct consequence of the highest Intelligence of personal God who represents the **final attractor** towards which the whole syntropic process of human spiritual and social evolution is oriented. The closer we evolve towards God, the more conscious, happy and free we become. Jesus Christ expressed this by the words: **“I am the way and the truth and the life. No one comes to the Father except through me” (John 14:6)**

Evolution of human consciousness is impossible without evolution of society as only a social life can create conditions for rich and complex manifestation of spiritual nature of Man. Man as individual as well as social human being evolves his spirit (self-consciousness) through his social activity, volitional efforts, individual abilities and social conditions. People differ according to the level and contents of their souls, so they can stay at different levels of individual spiritual evolution. The main goal for everyone ought to be the highest level of spirituality coming from God (Jesus Christ) in order to achieve the Kingdom of Heaven (spiritual freedom) not only in our individual souls but also in a social organism. Human desire for heaven heights of spirit cannot be destroyed as it is a basic motive power of individual as well as social development. The higher is the level of society the more complex are material and spiritual needs and relations of their members. The more differentiated they are the more mutually linked is the social organism. Mankind must realize that its future progress does not need destructive fights between separate parts but a mutual cooperation and coordination in order to achieve the high level of richness and freedom. Not only separate geographic regions but all spheres of human activity like economics, politics, science and technology, informatics, culture and faith are becoming more interconnected. Social evolution accelerates thanks to the grandiose increase of information processes playing the crucial role in the law of syntropy. It is impossible for the Spirit to be a loser. Its final victory is inevitable. God brings a true sense to our life being the Way, the Truth and the Life. Mankind is awakening from the dark long-time materialistic sleep and the darkness of the 20-th century is to be replaced by the spiritual Light of the 21-st century.

The knowledge of the law of syntropy should increase a human dignity accepting a Man as an immortal spiritual being whose spirituality follows directly from the spirituality of personal God. Contemporary science based on materialistic positivistic and atheistic paradigm and ideology degrades Man to the position of mortal, self-aware and egoistic animal subordinated to Neo-Darwinian postulates, according to which we are only by-products of activities of selfish genes and our lives are nonsensical doomed to their total destruction. Such false “scientific” theories and

ideologies, degrading our human dignity coming from God, represent a great danger for mankind. The earlier they will collapse the better for our destiny. Our mission is to help by presentation of the true knowledge. 20-th century is a great warning for humankind, because it was the darkest period of the whole human history with two world wars and many military conflicts. The lying propaganda based on “scientific” materialistic mechanistic dogmatism and blind atheistic social Darwinism together with aggressive imperialistic militarism represent a great danger that can result in the third world war as shown in the book of Dr. Ulisse Di Corpo and Dr. Antonella Vannini: ***“Change of Paradigm or Third World War?”*** . Only new scientific paradigm can ***“guide individuals and institutions out from this period of “evil”***. **Significantly new scientific paradigm** based on the knowledge of truth is very urgent in order to save our civilisation and make people free and happier.

### ***The Way Out of Crisis***

**Theoretical physics has not fulfilled its basic mission - to find the exact physical mechanism of the Unity Principle** as a true base and working instrument for other branches of science, mainly for science of Consciousness.

In 1954, one year before death, Albert Einstein made his famous prognosis: *“I consider it entirely possible that physics cannot be based upon the field concept that is on continuous structures. Then nothing will remain of my whole castle in the air, including the theory of gravitation, but also nothing of the rest of contemporary physics.”*

Einstein’s attempts to find a unitary field could not be successful, as he was not familiar with dialectical logic and did not know the dialectics of “whole-part”, “one-many” and “continuity-discreteness” as well as the essence of EPR non-locality. Einstein’s pessimistic forecast has been fulfilled. Theoretical physics is in a deep crisis. As a result physics departments at major universities with grand histories are closing down for lack of interest. A dramatic decline in the number of pupils studying theoretical physics is noticeable. Too much mathematics is produced and too many theorists are dealing with what is pure fiction and too great human recourses are involved bringing no practical and cognitional results. Theoretical physicists have already exhausted almost all possibilities to attract public attention by their mysteries and people are already tired as they want to know true answers to basic ontological questions regarding the essence of physical reality and our life. Theoretical physicists want to play a leading role in human knowledge therefore they ask all other spheres of human cognition, including philosophy, to accept their ideas, not seeing that they are evidently wrong and false even from the viewpoint of ordinary rational thinking, not to mention philosophical critical dialectical reasoning. They are fruitless from the viewpoint of what they can offer to other spheres of human knowledge in the process of spiritual evolution of society. Mainstream theoretical physics offers only a very complicated and hard way that leads our minds to the darkness. It will lose quickly its attractiveness to young people. As the interest of young people in theoretical physics falls dramatically we must be prepared to present the true knowledge for future generations of scientists with open minds. I am sure a **fresh wind of truth will attract young people**. If the truth is disclosed once it cannot be silenced. Its final victory is guaranteed. It cannot be a loser, but the fight will be hard and long-time.

Every civilisation started its period of great development in its cultural, cognitional, social and political spheres by new ideals and spiritual motive powers, which culminated in a period of bloom, maturity and fertility, but consequently finished in its own decay and fall, where all negative irrational and destructive aggressive forces were manifested. Long-time decay of contemporary

west capitalism and imperialism is marked now by a deep economic, financial, social and moral crisis. It seems that our history is led by uncontrollable blind forces and we have no chance to influence it. Sometimes people ask how can God, if exists, allow injustice, human tragedy and misery. Western countries are now unable to awake from their spiritual and moral decadence and materialistic sleep. Blind atheistic materialism, scientific positivism, postmodern irrationalism and aggressive expansive social Darwinism must be stopped, if we want to save our civilisation. Post-capitalistic and post-imperialistic society cannot be materialistic and atheistic, but spiritual. There is no other way. The desire for greater spiritual power and freedom must be and will be a motive power, otherwise our civilisation is lost. Radical ideas that change the world always come from deep thinkers. Like Nature wakes up with coming spring from its winter dream to a new abundant life with new fresh forces, a human mind is awakening from its blind materialistic dream into its new shining days of spirit.

Now western people feel lost in contemporary complicated and incomprehensible world, Jesus Christ is refused and their souls are hungry and unsatisfied so they hope that this emptiness can be supplied by meditative practise of **yoga, mystics, esotericism, shamanism, occultism, New Age and Scientology practice**. But this way represents a great danger for human psychics (soul) as it requires active self-awareness to be shut off in order to open the door for very different influences and forces coming from astral sphere to subconscious. It is a fatal mistake to think that this is the way to the Heaven, as it is just a direct way to the Hell and spiritual slavery. Mass-media represent a great power in the hands of power oligarchy which medial politics is oriented to obfuscate and enslave people to become only a passive non-resistant crowd. Show must go on! Irrationalism as well as massive decline of human thought and culture does not elevate our souls to higher levels of spirituality (rationality, individuality, emotions and creative will) but only to the darkness and destruction. This great attack against progressive achievements of human spiritual evolution is very danger and represents a direct way to the abyss. It is a tragedy that contemporary western civilisation is managed by blind forces. Fortunately the strong dictatorship and control over western science and theoretical physics cannot be transferred over the world. A human desire for the truth cannot be silenced.

Atheists declare that Christians exploit God to explain the gaps in our “scientific knowledge”. It is so-called **god of gaps**. It is really very funny as contemporary state of “science” represents not only a gap but a big abyss of blindness. Unbelievable variety of intelligent living forms follows directly from the highest intelligence and creative power of personal God. Our Universe can manifest Life and human subjective spirituality only because it is an objective manifestation of subjectivity of personal God. Atheistic scientists will never accept that our subjectivity and spirituality comes directly from personal God and cannot be derived from blind matter. Evolution of Nature and Humankind is a creative and intelligent process.

The way to higher level of spiritual evolution and freedom is not a passive waiting for the Heaven, but very hard, active, creative, rational, emotional and volitional effort of our consciousness. Heaven inspirations are impossible without volitional and creative efforts of our minds and souls. The road to higher level of self-awareness needs to combine and unify all achievements of rational abilities of human Mind with high spiritual qualities of human Soul. It is the way to the highest levels of individual and social freedom. Some outstanding personalities, like Nicola Tesla, can evolve their rationality, scientific knowledge and creativity without losing their contacts with the highest spiritual levels as sources of heaven inspirations. Nicola Tesla said: *“The gift of mental power comes from God, Divine Being, and if we concentrate our minds on that truth, we become in tune with this great power”*. We can find creative solutions not only through acceptance of



technical and mathematical principles but also through our ability to feel and see by our hearts and spiritual senses. We cannot wait passively for the Heaven that is inaccessible by lazy souls. History has shown that only people, evolving a maximum effort for their spiritual evolution, represented a leading progressive power in the given period of history. Human desire for heaven heights of spirit cannot be destroyed as it is a basic motive power of individual as well as social development. It is impossible for Spirit to be a loser thereby its final victory is inevitable. God gives a true sense for our life as He is the Way, the Truth and the Life. Nobody can destroy, subdue or enslave our souls and spiritual freedom if we trust and know Him. Victory is ours thanks to our common endeavour.

## **Conclusion**

The question of truth is very acute. The knowledge of the Unity Principle and its manifestations is a base for new science including theoretical physics, biology, sociology, science of consciousness as well as philosophy. It will start a great revolution in human knowledge giving true answers to all basic questions of our existence. The earlier Mankind will know the truth the better for its destiny.



## APPENDIX

### BASIC FORCES AND INTERACTIONS

#### Force and Energy

There are only two basic forces – attraction and repulsion and two basic interactions – local and non-local. All known interactions: mechanical, electromagnetic, strong, weak, nuclear and gravitational, are only their manifestations. Two basic forces – attraction and repulsion are always in a mutual dynamic equilibrium at all levels of hierarchy. At the level of elementary quantum dipole, attractive force of two opposites equals the repulsive force of quantum dipole, which can be manifested in two ways:

- repulsive force of opposites (non-local connection)
- local touch repulsive pressure of space of a quantum dipole on neighbour quantum dipoles.

In case of a photon (+/-), the dynamic equilibrium between two opposite forces is manifested as oscillation. In case of particles like proton, the high local repulsive force (pressure) between spaces of six elementary quantum dipoles, creating its structure (3+/2-), is compensated by strong attraction between opposites of quantum dipoles so that the whole structure of a proton is very stable.

The whole force of attraction and repulsion  $\mathbf{f}_i$  of a quantum dipole is:

$$\mathbf{f}_i = \mathbf{f}_{ia} + \mathbf{f}_{ir}, \quad \mathbf{f}_{ia} = \mathbf{f}_{ir},$$

where:  $\mathbf{f}_{ia}$  - attractive force between opposites of quantum dipole  $\mathbf{i}$ ,  
 $\mathbf{f}_{ir}$  - repulsive force of quantum dipole  $\mathbf{i}$ .

Energy  $\mathbf{e}_i$  of a quantum dipole is a consequence of its attraction and repulsion. Force of attraction and repulsion  $\mathbf{f}_i$  acting between opposites through the entire length  $\mathbf{d}_i$  of a quantum dipole creates, by multiplication with its length, the whole energy  $\mathbf{e}_i$  of a quantum dipole:

$$\mathbf{e}_i = \mathbf{f}_i \cdot \mathbf{d}_i$$

If a quantum dipole changes its energetic level, it also changes its length. By losing a part of its energy it elongates, by its receiving it shortens. Quantum dipoles exchange mutually their energies as they are in permanent mutual motion. The whole internal energy of a quantum dipole  $\mathbf{e}_i$  consists of its two parts: attractive  $\mathbf{e}_{ia}$  and repulsive  $\mathbf{e}_{ir}$  which are always in a mutual equilibrium. While attractive part is manifested by attraction of opposite poles, the repulsive one by their repulsion or by the local pressure of a quantum dipole on the neighbours. In photons, the relation between attractive and repulsive parts is manifested by oscillation. Quantum dipoles, bound in a composite structures, cannot oscillate freely and so presses on neighbours, so its repulsive part of energy is manifested by its local pressure, which is at equilibrium with its attractive part between its opposite poles. In that case this attractive part of energy of a quantum dipole has a form of potential energy as it cannot cause the motion of quantum dipole because of local repulsive pressures of neighbour

dipoles. As attraction is at equilibrium with repulsion, so the attractive part of energy of quantum dipole is equal to its repulsive one. The following relations are valid:

$$\begin{aligned} e_{ia} &= e_{ir} \\ e_i &= e_{ia} + e_{ir} = 2e_{ia} = 2e_{ir} \end{aligned}$$

Any form of energy, e.g. kinetic or potential, is always energy of elementary quantum connections represented by the equilibrium of their two parts, attractive and repulsive, because attraction and repulsion are two sides of the same coin, representing the dialectics of a quantum dipole as well as the whole Universe.

From the **basic cosmic relation between energy and length of elementary quantum dipole**

$$\delta_t = e_i d_i = 2e_{ia} d_i$$

we can derive the following relation:

$$e_{ia} = \delta_t / 2d_i$$

It is a classical Coulomb's relation between potential energy of a dipole with elementary charges and its length:

$$e_{ia} = (q^2 / 4\pi\epsilon) d_i, \text{ where: } \delta_t = q^2 / 2\pi\epsilon$$

$q$  – elementary electric charge,  
 $\epsilon$  – dielectric capacitance

From the relation for a fine structure constant  $\alpha = q^2 / (2\epsilon hc)$  and Coulomb's relation we get:

$$e_{ia} = \alpha hc / (2\pi d_i),$$

where:  $\alpha$  - fine structure constant,  $h$  – Planck constant,  $c$  - speed of light

Then:  $e_i d_i = \alpha hc / \pi$ .

Coulomb's relation  $e_{ia} = \alpha hc / (2\pi d_i)$  manifests a universal cosmic law:

$$\delta_t = e_i d_i = \alpha hc / \pi$$

as a dialectical relation between energy and length of elementary quantum dipoles.

From this relation we obtain:

$$f_i = \alpha_t / d_i^2 = \alpha hc / (\pi d_i^2)$$

Attractive force  $f_{ia}$  of a quantum dipole which corresponds to its potential energy  $e_{ia} = e_i / 2$  can be expressed as follows:

$$f_{ia} = \alpha hc / (2\pi d_i^2)$$

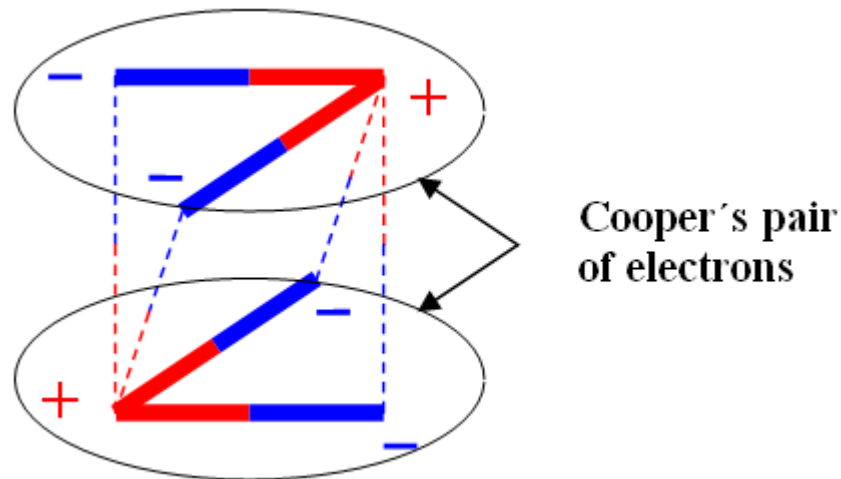
It is a classical Coulomb's law expressing the dependence of attractive force acting between elementary electric charges, on their distance. It is at the same time the expression for the attractive force acting through the elementary quantum dipole with a length  $\mathbf{d}_i$ . This force is indirectly proportional to the square of its length.

## Electrostatic Force

Particles or any physical objects with prevalence of positive poles are positively charged. Particles with prevalence of negative poles are negatively charged. **Elementary charge** is the minimal possible quantity of prevalence. Electron (+/2-) is the most well-known particle with a **negative charge**, proton (3+/2-) – with a **positive** one. Particles with a balance of positive and negative poles are neutral. Long quantum dipoles, as connections of material objects, are affected by attractive forces of their opposite poles. The sum of attractive forces of all quantum dipoles connecting two massive objects creates the whole attractive force between them. Let  $\mathbf{d}$  is an average distance between two neutral objects. The first object contains  $\mathbf{k}_1$  positive and  $\mathbf{k}_1$  negative poles and the second one -  $\mathbf{k}_2$  positive and  $\mathbf{k}_2$  negative ones. The whole number of elementary quantum connections between two objects is  $2\mathbf{k}_1\mathbf{k}_2$ . So the whole attractive force  $\mathbf{f}_a$  between both objects is a sum of attractive forces of all mutual quantum connections. If  $\mathbf{d}$  is an average length of quantum dipoles, the next relation is valid:

$$\mathbf{f}_a = (\alpha\hbar c/2\pi).2\mathbf{k}_1.\mathbf{k}_2/\mathbf{d}^2 = (\alpha\hbar c/\pi).\mathbf{k}_1.\mathbf{k}_2/\mathbf{d}^2$$

This relation expresses the electrostatic attractive force between two electrically neutral objects and is directly proportional to the number of quantum dipoles connecting them. But, as we know, there is no attractive electrostatic force between electrically neutral objects. This force can be identified only if these objects are electrically charged and it is proportional to the multiplication of their charges. Indeed, this force affects all quantum dipoles connecting two material objects, but **is fully compensated by repulsive spatial pressures of quantum dipoles coming out of these objects**, so it looks like if there is no attractive force between them. If two objects are oppositely charged with charges  $\mathbf{q}_1$  and  $\mathbf{q}_2$ , the attractive forces affecting their direct quantum connections are not fully compensated by pressures of outgoing external quantum dipoles, and so their uncompensated mutual attractive force is directly proportional to **multiplication of their charges**. If two objects have like charges, the missing mutual connections between them cause that the repulsive pressures of their external quantum dipoles prevail over the attractive forces of quantum dipoles connecting these objects, what is manifested as an electrostatic repulsive force directly proportional to multiplication of their like charges. Although Coulomb's law is the same for expression of attractive and repulsive electrostatic forces, their reasons are different. The attractive electrostatic force is a consequence of non-local mutual attraction between opposite poles of quantum dipoles, while repulsive electrostatic force is caused by prevalence of local repulsive pressures of quantum dipoles over attractive forces as a consequence of deficiency of mutual non-local quantum connections. The indirect evidence for this statement is a mutual attraction between like charged particles, e.g. electrons, which can be manifested by certain conditions, e.g. by very low temperatures. Electrons are not point-like particles, but structures consisting of two quantum dipoles with positive and negative poles. By low temperature, when kinetic motions are very slow, electrons can create the bound compositions known as **Cooper's pairs**. Their ability for mutual attraction allows the existence of superconductivity. Electrons in their basic (not excited) states represent structures with one positive and two negative poles (+/2-) . The bound state of two electrons creating a Cooper's pair can be pictured:



**Casimir's phenomenon** is another evidence for existence of attractive electrostatic force between neutral objects. This force acts between two neutral conducting plates. If approach them closely, the mutual attraction, known as Casimir's attractive force, starts to act. This effect means that attractive forces between quantum dipoles, connecting both closely approached plates, are greater than repulsive spatial pressures of quantum connections coming out of them.

There is no principal difference between electromagnetic force and others like strong and weak nuclear. They differ only by their intensity. In stable particles, the strong and weak forces are mediated by very short and energetic elementary quantum connections which can effectively compensate the great repulsive pressures of their spaces. Electromagnetic interactions can be converted into the strong ones only, if the barrier of huge repulsive pressures is overreached by a close approach, where long connections are dramatically shortened and attractive forces increased. Analogical is the opposite process, where strong interactions inside protons and antiprotons can be changed, after their annihilation, into elementary quantum dipoles – photons - carriers of electromagnetic energy.

If two particles are mutually approached to the certain distance and exceed the barrier of electrostatic forces, all mutual external quantum connections of both particles become internal and create a new particle. The mutual attraction increases to the level able to balance repulsive pressures of spaces of their quantum dipoles. If a stable equilibrium of these forces is achieved, the new microstructure (particle, atom) does not decay. But if this equilibrium is temporary installed by huge external energies, the repulsion of internal pressures of particle corrupts this equilibrium and particle decays immediately after its creation. Such a microstructure cannot keep its internal equilibrium of forces without great external energies and so it decays. The unstable short-living structures (resonances) supposedly occur thanks to great energies in particle accelerators-colliders.

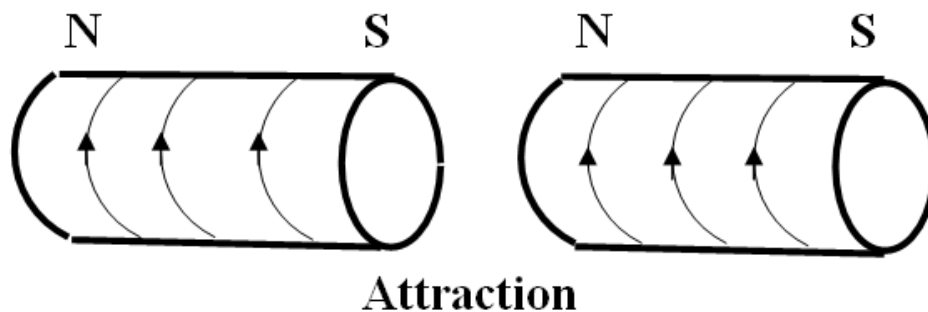
## Magnetic Force

Magnetic force is a consequence of mutually coordinated internal motions (oscillations) of quantum dipoles in atoms of magnetic materials (mostly metals) that can act to other materials with magnetic properties through their mutual external quantum connections.

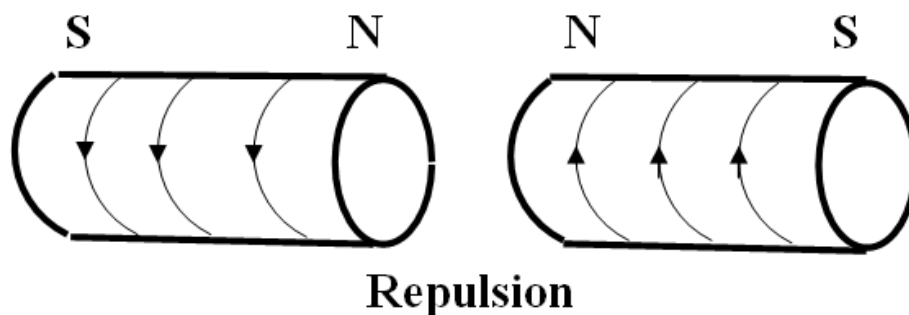
Magnetic are materials where it is possible to create mutually coordinated synchronized motions (oscillation) of quantum dipoles in their atoms (atomic dipoles) in the sense of their like orientations.

Magnetic field of a magnet is created of its external quantum dipoles connecting the magnet with the whole Universe. Its external quantum connections reflect the internal coordinated motions of its inner dipoles in such a way that they can cause the mutual attraction between opposite magnetic poles, the repulsion between like poles and magnetisation of magnetic materials.

Mutual attraction of opposite magnetic poles is a consequence of synchronized coordinated oscillations (rotations) of quantum dipoles inside magnets as shown by the following picture:



At the above picture we see two permanent magnets where the arrows show the same direction of synchronized oscillations (rotations) of atomic dipoles inside magnets. The external quantum connections coming out of both permanent magnets reflect these synchronized motions in the way that their motions become also synchronized (the same orientation) resulting in the decrease of their mutual local repulsive pressures so that the attractive force between opposite magnetic poles of both magnets prevails - magnets attract each other. From the above picture we see why the North Pole (N) is always at left side, while the South Pole (S) at right one independently of how many parts is the magnet divided into. Thus, we have disclosed why magnets have always two magnetic poles and why one pole cannot exist without the other as both magnetic poles result from the synchronic coordinated motions of their inner atomic dipoles. Mutual synchronized oscillations of atomic dipoles inside magnet are impossible without their mutual non-local quantum connections as just only through them atomic dipoles can synchronise their motions. Virtual photons as supposed mediators of magnetic interactions cannot explain this phenomenon in any case. This phenomenon is just a manifestation of quantum entanglement (non-local connections) through which the spins or magnetic moments of particles are coordinated.



On the other hand (above picture), if like magnetic poles are situated face-to-face, their internal atomic dipoles oscillate in mutually opposite directions what causes opposite orientation of motions of their external quantum connections coming out of both magnets resulting in the increase of their mutual local repulsive pressures which consequently prevail over their mutual non-local attractive forces so that like magnetic poles of permanent magnets repeal each other.

Magnetic force or field is mediated by non-local external quantum connections and so it is quantized in that sense.

Coordinated synchronized oscillations of atomic quantum dipoles of magnet can influence, through mutual external quantum connections, internal motions of quantum dipoles in other magnetic materials in such a way that they start to manifest their magnetic properties in the sense of coordinated oscillations of their internal atomic quantum dipoles.

Magnetic as well as electrostatic forces are mediated instantaneously through non-local mutual quantum connections, but not through virtual photons moving with a limited speed.

Certainly, physicists do not know the essence of magnetic force or magnetic field as they do not know the essence of any force or field. They can describe their manifestations, but cannot interpret correctly the nature of these phenomena.

**All forces or fields are nothing more than mutual interactions between objects, e.g. particles, mediated by their mutual non-local quantum connections.**

Magnetic field (force) can be also produced by electric current as well as changing magnetic field can produce electric currents if applied to a conductor, but we are not going to analyse these electromagnetic phenomena now as they require a special individual approach. Theory of electromagnetism is well developed from the viewpoint of its phenomenology, but suffers from insufficient or wrong interpretation in the sense of ontology. Some aspects we have just explained, others are also accessible from the viewpoint of knowledge of the Unity Principle.

It is declared that the **photon is a quantum of electromagnetic field**. Really, photon manifests its electrostatic properties because it is an **elementary quantum dipole** that unifies two opposite charges as well as magnetic properties through its internal motion – oscillation. **Electromagnetic forces are mediated by elementary quantum dipoles**, not in the sense of virtual photons moving with a limited speed of light, but of mutual non-local quantum connections.

**Electromagnetic interaction is a direct instantaneous non-local interaction.**

### ***Gravitational Force***

Internal structuration of the Universe caused by its repulsive force is manifested by cosmic expansion. The certain part of the whole cosmic repulsive forces used for cosmic expansion is given by the relation derived in [8] :

$$F_c = c^4/(16k) = 7,566.10^{42} \text{ N}$$

Thus, we know the exact value of the force of cosmic expansion. As attraction and repulsion are two opposite forces in a mutual dynamic equilibrium, so the force of cosmic expansion has its own counterbalance in a cosmic gravitational force  $\mathbf{G}$ , where:

$$\mathbf{G} = \mathbf{F}_e = 7,566.10^{42} \text{ N}$$

Gravity is therefore a direct consequence and evidence of cosmic expansion. Many critics of Einstein theories and the standard cosmological model deny the cosmic expansion claiming that the cosmic redshift and microwave cosmic background can be explained by different ways. We can accept their arguments, but gravity as a counterbalance of cosmic expansion is just its direct evidence. Attraction and repulsion are always in a mutual dynamic equilibrium at the level of every elementary quantum dipole as well as the whole Universe. Cosmic gravity affects all objects and all elementary quanta of space. It means that gravity, as a reaction to cosmic expansion, has a global as well as quantum character.

By derivation of Coulomb's relation for the attractive force acting between two neutral massive objects  $\mathbf{f}_a = (\alpha hc/2\pi)2\mathbf{k}_1.\mathbf{k}_2/d^2$  we have mentioned, that this force is compensated by the repulsive force of pressures of quantum dipoles coming out of both objects. However, this compensation is valid only relatively, a certain part  $\mathbf{f}_g$  of attractive force  $\mathbf{f}_a$  is not compensated  $\mathbf{f}_g = \beta\mathbf{f}_a$  and represents the **attractive gravitational force  $\mathbf{f}_g$  of bodies**.

$$\mathbf{f}_g = \beta\mathbf{f}_a = \beta(\alpha hc/2\pi)2\mathbf{k}_1.\mathbf{k}_2/d^2$$

Uncompensated part of attractive forces by repulsive pressures of quantum dipoles is a consequence of deficiency of repulsive forces of the Universe caused by the fact, that a certain part of these forces  $\mathbf{F}_e = 7,566.10^{42} \text{ N}$  is used for cosmic expansion. The total measure of this deficiency of repulsive forces and prevalence of attractive ones is manifested as gravity acting between bodies through their long mutual vacuum quantum connections.

Gravitational force between celestial bodies is mediated by their mutual vacuum quantum connections, so it is non-local instantaneous interaction in contrast with Einstein's local theory, where gravity is a consequence of space-time curvature which local changes are propagated by gravitational waves with a limited speed of light.

**Newton's theory of gravity is correct, because it is a relational theory**, where gravity is a consequence of mutual instantaneous non-local interactions (relations) between physical objects, while **Einstein's theory of gravity is fatally wrong, as it is a local non-relational theory** not accepting that gravity is a non-local instantaneous interaction between celestial bodies. Newton's theory needs only one small supplement: that the density of the vacuum, proportional the gravitational potential, causes the deceleration of processes in objects (time dilation), what is correctly accepted in Einstein's theory. But Einstein's gravity cannot explain naturally why rotations of galaxies are faster than they ought to be according to calculations of masses of the stars in them, so the existence of mysterious invisible dark matter is postulated. This phenomenon can be simply explained by Newton's theory if we accept that galaxies, except of celestial bodies, contain also mutual non-local vacuum quantum dipoles connecting every object to all others in the galaxy, so that the galaxy is kept together despite its fast rotation. Of course, the mass of Galaxy is much bigger than the total mass of its celestial bodies, as a huge amount of energy (mass) is carried by mutual non-local vacuum quantum connections.

For the basic space-time equation of the Universe, derived from the mechanism of its internal structuration, the next relations are valid:

$$V = z \cdot t^2, \text{ where: } z = (d^2V/dt^2)/2$$

$$dV/dt = (d^2V/dt^2) \cdot t, \\ (dV/dt)^2 = 2 \cdot V \cdot d^2V/dt^2$$

The quantity  $d^2V/dt^2$  is a fixed constant during the whole evolution of the Universe.

All these equations express the space-time unity of the Universe. The speed of expansion of spatial volume  $dV/dt$  is directly proportional to the time of expansion. It accelerates unceasingly and this acceleration  $d^2V/dt^2$  is constant.

Three-dimensional space is self-closed therefore it can be imagined as an ideal three-dimensional surface of a four-dimensional sphere, for which the following formula is valid:

$$V = 2\pi^2 r^3, \text{ where } r \text{ is a radius of spatial curvature.}$$

From the relation for the circumference of the Universe  $o = 2\pi r$  and previous relations we obtain:

$$(do/dt)^2 = -2o \cdot d^2o/dt^2$$

The relations between spatial circumference  $o$  and time  $t$  are:

$$o = u \cdot t^{2/3} \\ do/dt = (2/3)u \cdot t^{-1/3} \\ d^1o^2/dt^1 = -(2/9)u \cdot t^{-4/3},$$

$$\text{where: } u = (2\pi d^2V/dt^2)^{1/3}$$

These equations show that the spatial circumference  $o$  increases in time but its speed  $do/dt$  decreases. So, acceleration is negative. It means that the speed of cosmic expansion decelerates. The length of the longest quantum dipoles, representing the highest possible distances and connecting two opposite sides of the Universe, equals the half of circumference of the Universe  $o/2$  and the speed of its increase, thanks to cosmic expansion, represents the highest possible speed of light  $c$ :

$$c = (do/dt) / 2 = o/3t \\ o/2 = \pi r = (3/2) ct$$

Speed of light represents the speed of cosmic expansion therefore it is the escaping speed for the whole Universe. As the speed of cosmic expansion decreases, so the speed of light decreases, too. But now theoretical physics accepts erroneously cosmic expansion to be accelerating and even Nobel Prize 2011 was awarded for this “discovery”, although in reality acceleration of cosmic expansion is only a seeming phenomenon based on wrong dogma that the speed of light must be always the same in relation to the observer. This mistake has fatal consequences for contemporary cosmological theories as they postulate and search for mysterious dark energy as a source of accelerated cosmic expansion. This acceleration was deduced from observations showing that very distant supernovas look fainter and therefore, more distant than they should be by constant or



decelerating cosmic expansion. But this interpretation is wrong and based on the misleading dogma that the light always moves towards us by a constant speed  $c$ .

The real situation is quite different, because the larger the distance from which the light travels, the slower is its speed towards us, as its actual speed  $c$  must be reduced by the speed  $v$  of extension of this distance thanks to cosmic expansion. If the light approaches us from the point of distance  $d$ , then this point moves away with the speed  $v$  thanks to cosmic expansion:

$$v = H \cdot d ,$$

where:

$H$  – Hubble's constant,

$d$  – actual distance of the light ray from us (observer),

then the light from the distance  $d$  approaches us by the speed  $(c-v) = (c-Hd)$ .

We need no dark energy to accelerate cosmic expansion as this acceleration is nonsense based on the wrong dogma. Time and trajectory, through which the light travels to us, are much greater than they would be by the constant light speed  $c$  approaching us. The larger the distance between us and the light, the slower is its speed towards us. So the cosmic objects (supernovae) seem to be much more distant and fainter than they are expected by a constant  $c$ .

Another reason why accelerating cosmic expansion is only an illusion is the deceleration of light speed during cosmic expansion. The speed of light expresses the speed of cosmic expansion, so the deceleration of cosmic expansion means at the same time the deceleration of the speed of light.

The “discovery” of accelerating cosmic expansion as a consequence of erroneous understanding of the speed of light leads to postulation of non-existent dark energy as a source of acceleration. Supporters of dark energy as accelerator of cosmic expansion try to find its source in the vacuum. Of course, huge energy is contained in a vacuum consisting of an enormous number of elementary quantum dipoles, connecting mutually all visible material objects. The higher the number of material objects taken into the system, the more the number of mutual elementary quantum connections between them and the higher the whole energy of the system. So a system with many objects has, thanks to their mutual vacuum connections, much more energy than is contained in visible matter. But it is not dark energy causing fictional acceleration of cosmic expansion. Even, dark energy together with dark matter is declared to carry about 96 % of the whole energy (mass) of the Universe. Except of mysteries like virtual bosons, quarks, strings, hidden dimensions, multiverse, black holes, warm holes, imaginary time, false vacuum, etc., other great mysteries of dark matter and dark energy are included in “science”.

As we know celestial bodies rotate and their rotations also influence motions of other objects through non-local external quantum connections. Rotational motions of celestial bodies in cosmology result from oscillations (rotations) of elementary quantum dipoles. These rotational motions are sources of magnetic fields of rotating bodies.

The impact of rotational motions of torsion generators on other objects is studied deeply in theories of **torsion fields** of **Russian physicists A.E. Akimov and G.I. Shipov** and confirmed by many experiments including that by which the structure of molten metals is changed significantly by

torsion (rotational) fields generated by electro-torsion generators. Certainly, their theories are strongly criticised by mainstream establishment, although declared as developed on the base of Einstein-Cartan field theory. But, in reality, their torsion fields can be correctly interpreted only saying that they are mediated through direct non-local external quantum connections of rotating generators. Torsion fields are other significant evidence that non-locality and non-local instantaneous interactions represent a fundamental feature of reality removed from contemporary physical theories.

### ***Three Forms of Mass***

It seems that every material object manifests itself only through one mass. But it is not true. The reason is evident. While the **internal mass  $m_e$**  of a body is defined by energy of all its quantum dipoles, its **gravitational mass  $m_g$**  is defined by the number of its positive and negative poles, from which all external quantum dipoles come out and connect it with all other objects of the Universe. Every material object is dead defined by the number of positive and negative poles, whose elementary quantum connections create its inner structure. If two objects have the same number of positive and negative poles, they have the same gravitational mass. Let us have two neutral objects (structures). The first has  $k_1$  positive and  $k_1$  negative poles, the second –  $k_2$  positive (or negative) ones. The first object has  $k_1^2$  quantum dipoles, the second  $k_2^2$ . The system consisted of both objects have  $(k_1+k_2)^2$  quantum dipoles, so it contains  $2k_1k_2$  quantum dipoles in addition, that mutually connect both objects. Its external gravitational mass is proportional to the sum of positive and negative poles  $(k_1+k_2)$ . The internal mass and energy is the sum of energies of all quantum dipoles. If two objects are connected into one object, their external mutual  $2k_1k_2$  connections transform to the internal connections of the new object. These connections become much shorter and energetic. Increase of their energy must be compensated by energy weakening of others internal quantum dipoles, so that the total internal mass of a new object is equal to the sum of masses of both previously separated objects and so the **balance between the internal mass  $m_e$  and external gravitational mass  $m_g$  is maintained**. This balance is a consequence of equilibrium between attraction and repulsion of matter created by stable material structures of atoms and molecules.

The increase of repulsive pressures of quantum dipoles connecting two previously separate structures must be compensated by the decrease of energy of quantum dipoles in previous structures. The mutual equilibrium of attraction and repulsion as a condition for existence of stable material structures is possible only if internal energy (mass) is proportional to the number of its positive and negative poles. Then the **internal mass  $m_e$  of a body is the same as its external gravitational mass  $m_g$** . By the synthesis of atomic nuclei, a part of energy is released even in a form of particles flying away and carrying the energy of quantum connections being before parts of components entering to the synthesis. This is the way how to make stable the new material structure. Released energy is known as binding energy.

If body moves, it manifests itself through its **inertial mass  $m_i$** , expressing its motional relation towards the surrounding. This body manifests its resistance against acceleration or deceleration. If the massive body is at rest, all three masses – **internal, gravitational and inertial** – are in a mutual equilibrium and have the same value. If the body does not change its internal structure and the number of positive and negative poles is the same, then its gravitational mass  $m_g$  remains unchanged. But its internal energy (mass), as well as inertial mass, changes during its motion. If body accelerates, its resistance against next acceleration increases what causes the increase of its inertial mass  $m_i$ . But its internal mass (energy)  $m_e$  decreases whereby the resistance of the

environment (vacuum) is compensated. The decrease of internal energy of moving body means the deceleration of all its internal processes what is manifested as time dilation. This is the reason of real relativity. **Time dilation** means the deceleration of all internal processes inside a moving body and consequently the **decrease of its internal energy and mass  $m_e$** .

The relation between gravitational  $m_g$ , internal  $m_e$  and inertial  $m_i$  masses of massive body can be expressed by the following relation:

$$m_g^2 = m_e \cdot m_i$$

If a body is at rest towards the nearest vacuum, all these masses equal each other:

$$m_g = m_e = m_i$$

If body increases its speed towards the vacuum, its gravitational mass  $m_g$  remains unchanged, but its inertial mass  $m_i$  increases according to Lorentz relation, and its internal mass (energy)  $m_e$  decreases (deceleration of internal processes = time dilation)

Historically the mass of bodies was firstly defined by their resistance towards acceleration (**inertial mass**) and by mutual gravitational attraction between Earth and material objects (**gravitational mass**). The Newtonian gravitational law established the relation between gravitational masses of bodies and their mutual gravitational attractive forces. From the discovery that bodies with different inertial masses fall towards Earth with the same gravitational acceleration followed: the greater the inertial mass, the higher the gravitational one. So the principle of equivalence between inertial and gravitational masses was postulated. But the validity of this principle is limited and vanishes by speeds close to the speed of light. Later it was discovered that mass bodies contain enormous internal energy proportional to their internal mass  $m_e$  multiplied by the square of speed of light. It is a famous law  $E = m_e c^2$  of equivalence between energy and mass, which unifies the internal mass with internal energy.

Einstein built his theory of gravity by assumption of equivalence between inertial and gravitational masses. This equivalence is valid only by slow motions. It loses its validity by great speeds and also by elementary particles, mainly by particles with zero rest mass (photons, neutrinos) but with their gravitational mass given by the number of their positive and negative poles. They act gravitationally with other objects.

The equilibrium between internal and gravitational masses is valid only if material body is at rest towards near surroundings or move with relatively small speed. Moreover, at the level of elementary particles both masses can be quite different. For example, photons as simple quantum dipoles consist of two opposite poles. They can have various internal masses (energies), but their gravitational mass is always the same, as it is proportional to the number of opposite poles. It means the gravitational force between mass body and the photon is always the same independently of photon's internal mass (energy). **Gravitational mass corresponding to one pole creates its gravitational charge.**

In bodies the equilibrium between internal and gravitational mass is maintained thanks to compensation of increasing binding energies by the release of internal energies of initial structures. The other is the situation, if we take into account a system of celestial bodies. The sum of opposite poles is the same whether we analyse the system as a whole or as a sum of its parts. But if we study

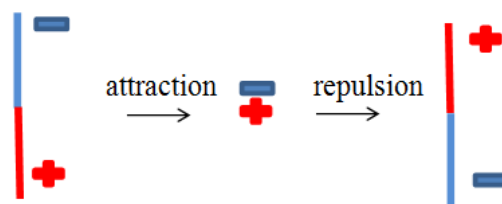
the internal or inertial mass of the system, we must take into account, except of internal and inertial masses of all bodies, also masses of their mutual quantum connections. If the number of celestial bodies in a given system is small, energy and internal mass of the whole system only slightly differs from the sum of internal masses of separate bodies. It is because energy of mutual quantum connections is negligible thanks to their great lengths. But if the number of celestial bodies in the system is huge, for example, galaxies or the whole Universe, the number of mutual quantum connections creating the cosmic vacuum is enormous and important with respect to the whole mass. Their energy (mass) creates energy of cosmic vacuum inside the galaxy or the whole Universe. Increase of three forms of masses (internal, inertial and gravitational) of the whole system is considerable if the number of celestial bodies inside is huge. But the number of opposite poles is always the same independently of whether we consider the sum of separate celestial bodies or the whole system. Increase of gravitational mass of the whole system comparing to the sum of masses of its bodies means, that the gravitational charge of one pole is much lesser if we analyse the gravity between two bodies than if we analyse the whole system.

Contemporary theories suppose gravitational attraction to be caused only by objects with non-zero rest inertial mass and do not accept gravitational attraction of particles with zero rest mass. If we take into account all photons and neutrinos of the observed system as well as mass of mutual quantum connections between objects of a system (galaxy), we can see that no mass is missing in the observed system, e.g. galaxy. No dark matter and dark energy is needed to understand the gravitational behaviour of cosmic structures, e.g. galaxies. The problem of dark matter is only the consequence of misunderstanding of the real essence of matter and the vacuum and erroneous understanding of the equivalence principle between inertial and gravitational masses.

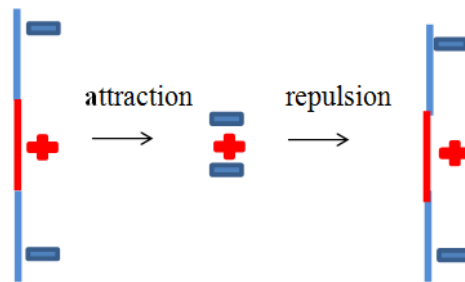
### Strong Interaction

Before analysis of the strong interaction we will imagine the structures of all stable particles that oscillate in one main axis (line) with common centre of oscillation, where all tops of opposite poles come together during the phase of mutual attraction (contraction).

**Photon  $\gamma$  (+/-)** is created by one oscillating quantum dipole:

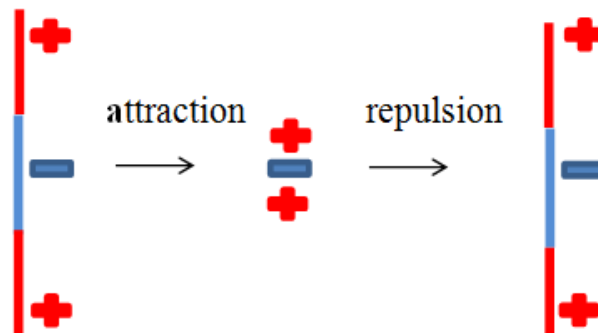


**Electron  $e^-$  (+/2-)** is created by two quantum dipoles:

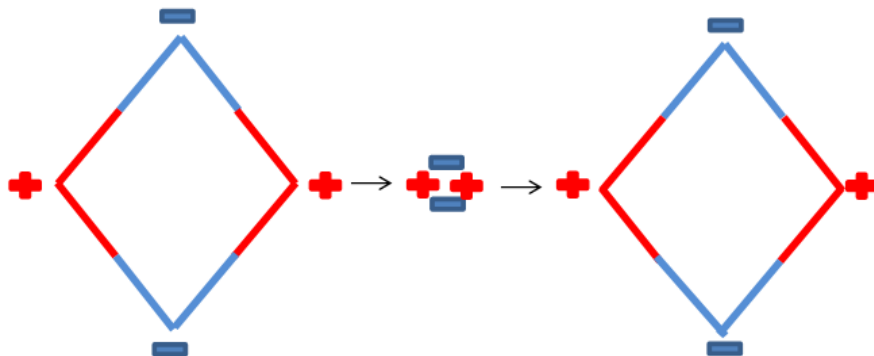


**Muon** and **Tau** have the same structure as an electron, only they are much more energetic and so shorter. They are unstable and change into electrons by transferring their energies into surroundings.

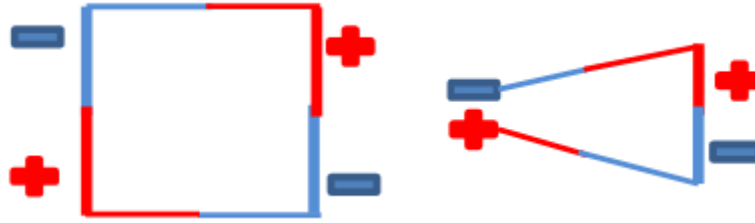
**Positron  $e^+$  (2+/-)** made of two quantum dipoles:



**Neutrino  $\nu_e$  (2+/2-)** made of four quantum dipoles:



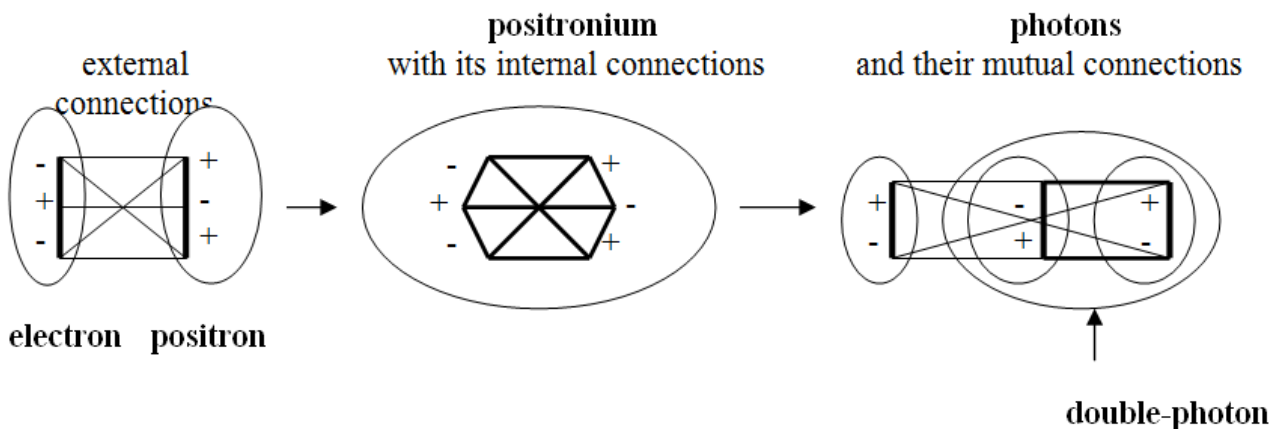
If neutrino really exists, it represents a double-photon structure with specific internal motion. The neutrino is its own antiparticle, so neutrino and anti-neutrino represent the same particle with above structure and motion. As the neutrino oscillates in one plane as well as a photon, it does not resist its dragging by cosmic expansion and so it has no rest mass and its speed is  $c$ . The same structure of quantum dipoles as a neutrino also other structures can have, e.g. double photon, mesons, neutral pions, but their internal motion is not so simple, so they do not represent the stable structures. For example:



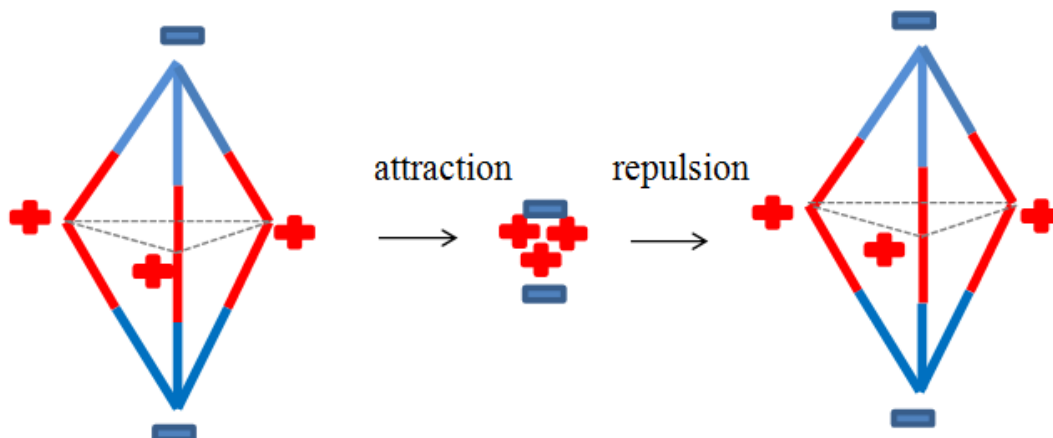
This structure of a double photon has two different centres of oscillation with different phases.

A photon can associate with any particles without disturbing their internal structure and so bring them into excited states. It can also associate with itself without creating a new particle. Its spin  $j=1$  means that the intermediate state known as a positronium, created after electron-positron collision, can decay either into two or three photons. A photon in relation to a magnetic field can deflect to the north or south magnetic poles or stay without any deflection. This means that the dipole is right-handed or left-handed, or performs both these motions simultaneously, meaning that it exists as a double-dipole, where one dipole is right-handed and the other left-handed with a neutral manifestation towards a magnetic field.

The annihilation of electron ( $+/-$ ) and positron ( $2+/-$ ) after their collision and consequent decay of intermediate positronium into two or three photons, can be illustrated by the following scheme:



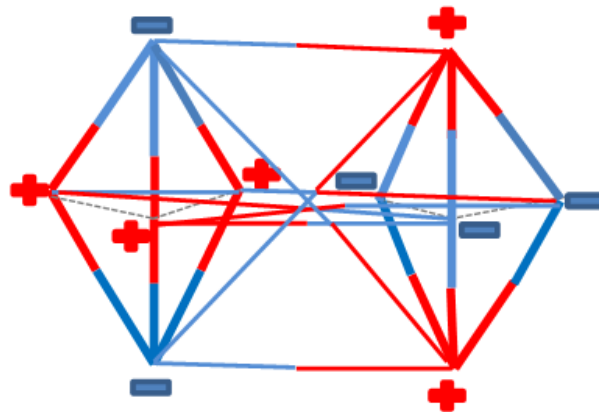
**Proton  $p^+$  ( $3+/2-$ )** made of six elementary quantum dipoles:



All stable structures (**particles**) oscillate in one line (axis of oscillation) to the one common centre (during attraction). All dipoles of a proton are very energetic (short and strong) so their forces of mutual attraction and repulsion are so strong that can compensate the mutual local repulsive pressures of spaces of quantum dipoles in such a way that the proton is the most stable composite structure. If structures are more complicated and composite, the mutual local pressures of dipole spaces destroy their compositions in the moment of their creation (so-called resonances). From the structure of a proton with three tops of positive poles is evident why the experiments in electron-proton scattering found that electrons scattered off three points inside the proton. It is not because of a quark structure but the bipolar essence of a proton.

The proton can be destroyed only by its annihilation with an antiproton.

### Proton – Antiproton Annihilation ( $p^+p^-$ ) – protonium:



Proton and antiproton represent the mutual mirror images so they attract each other very strongly creating the temporary high energetic composite structure of protonium ( $5+/5-$ ), which, thanks to huge local repulsive pressures of dipole spaces, completely destroys the original structures of proton and antiproton with a definite release of 5 free photons  $\gamma$  at least. Of course, more photons are possible, because of excitation of initial particles before annihilation.

In the structure of “protonium” ( $5+/5-$ ) or ( $6+/6-$ ), if excited by one photon, we can see some other substructures, which correspond to some mesons, so we can interpret the annihilation as follows:

As unstable neutral pions  $\pi^0$ , as well as eta mesons  $\eta$ , represent the bound states of two photons, both they decay into two photons  $2\gamma$ :

$$\pi^0 \rightarrow \gamma + \gamma$$

$$\eta \rightarrow \gamma + \gamma$$

Omega meson  $\omega$  decays by the next way:  $\omega \rightarrow \pi^0 + \gamma$

**The annihilations by low energy collisions of proton and antiproton can be:**

1.  $p^+ + p^- \rightarrow \omega + \pi^0 \rightarrow \pi^0 + \gamma + \pi^0 \rightarrow \gamma + \gamma + \gamma + \gamma + \gamma$
2.  $p^+ + p^- \rightarrow \pi^0 + \pi^0 + \pi^0 \rightarrow \gamma + \gamma + \gamma + \gamma + \gamma + \gamma$
3.  $p^+ + p^- \rightarrow \pi^0 + \pi^0 + \eta \rightarrow \gamma + \gamma + \gamma + \gamma + \gamma + \gamma$

Contemporary theoretical physics supposes protons, neutrons and unstable baryons to consist of three quarks, while mesons of quark-antiquark pairs interacting by gluons. The quark model was invented to simplify the situation with a huge number of hadrons (baryons and mesons). Although it can help a little with classifications of these particles, it is totally wrong by explanation of the real essence of micro-world. The greatest problems of quark model are quite clear. Quarks cannot exist as individual entities, cannot be detected directly, they have unbelievable so-called “asymptotic freedom” and nobody can explain what is the reason for their different colours, flavours and other very strange qualities.

Let us look at how the quark model explains the decay of a neutral pion  $\pi^0$ :

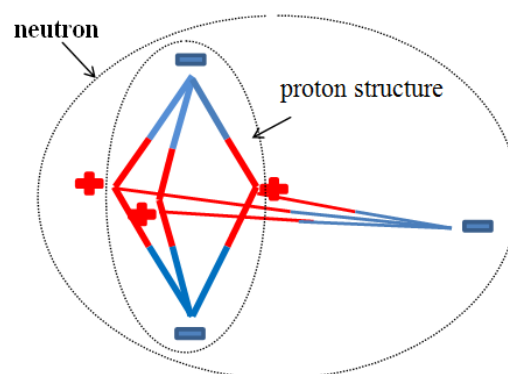
“The  $\pi^0$  (neutral pion) is a quark – antiquark meson. The quark and antiquark can annihilate; from the annihilation come two photons.”

This just shows how the quark model complicates the very simple situation: We know that the pion decays into two photons. Why do we need the quark-antiquark annihilation in addition? Why do we not accept the pion as a bound state of two photons? Why photons, as elementary quanta of free energy, are not considered to be the basic constituents of all physical structures (particles and interactions)? Why do we not try to understand and detect the real nature of a photon but create so absurd constituents - quarks? Why do we complicate the situation so much if the truth is very simple?

Now we know definitely that the neutral pion  $\pi^0$  ( $2+/2-$ ) represents a bound state of two photons and so its internal structure consists of four mutually interconnected quantum dipoles. We do not need any mystical undetectable quarks as we have real photons. Nothing is hidden and there are no mysteries in the physical Universe. Everything is clear and simple.

### Weak Nuclear Interaction - Neutron Beta Decay

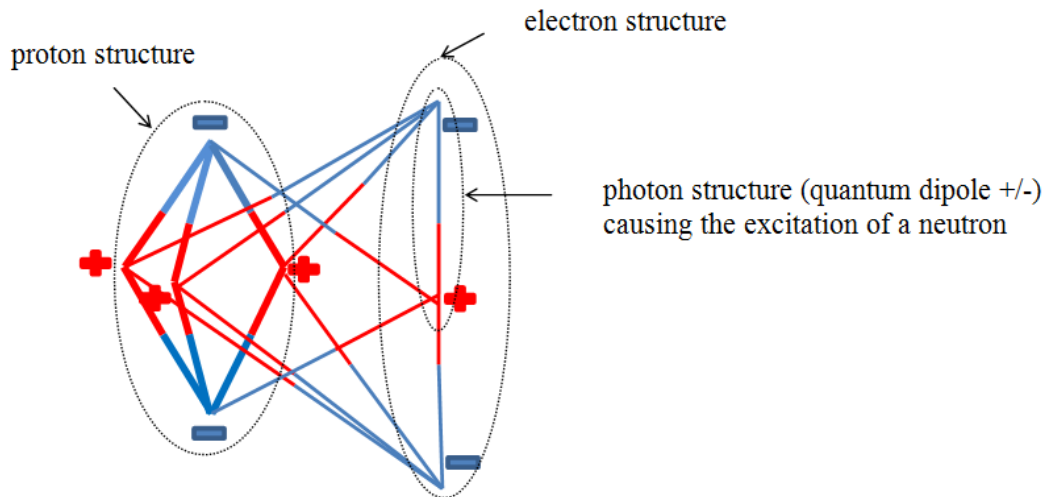
**Neutron n ( $3+/3-$ )** in its basic state (not excited) is created by nine quantum dipoles:



Inside a neutron we see the structure of a proton with very short end strong quantum dipoles. One negative pole is connected to three positive opposites by much weaker and longer connections, so it can be released from this structure during beta decay.

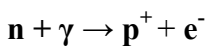


**Neutron n (4+/4-)** in its excited state created by sixteen quantum dipoles:



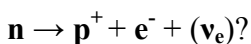
We can see that the neutron (4+/4-) in its excited state with sixteen elementary quantum dipoles represents a bound state of a proton (3+/2) with six elementary quantum dipoles and an electron (+/2-) with two quantum dipoles. Eight quantum dipoles represent mutual quantum connections between the proton and electron structures. They are, at the same time, the constituents of the internal neutron structure. Neutron consists of a proton and an electron as well as their eight mutual quantum connections (dipoles) which are included into the neutron structure. If the proton and electron represent separate particles (e.g. in the structure of hydrogen atom), their mutual connections (being much longer and weaker) are external and represent their mutual vacuum or their electromagnetic field. So the atomic vacuum is created by mutual connections between nucleons and electrons in the structure of atom. In 1920 Rutherford quite correctly supposed the existence of a neutral particle being a strong bound state of a proton and an electron, but this nice and clear idea was refused and the monstrous electroweak theory was postulated.

The neutron cannot be as stable as a proton as its structure and internal motion are more complicated and the neutron has more than one centre of oscillation. So the neutron (after its excitation by one photon) decays into a proton and an electron. Their mutual connections being before the constituents of neutron are now the external connections between a proton and an electron. This decay is known as beta decay ( $\beta^-$  decay), because flying electrons represent beta ( $\beta^-$ ) radiation and can be expressed as follows:



“ $n + \gamma$ ” represents the excited state of a neutron

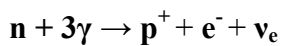
Contemporary theoretical physics represents this decay, considering it to be a manifestation of the so-called weak interaction, by the following scheme:



In addition to a proton and an electron the neutrino (antineutrino)  $\nu_e$  is included. In our structural scheme the neutrino is missing. We do not deny the possible existence of a neutrino. The expression “ $(\nu_e)?$ ” only means that we cannot accept it to be a product of  $\beta^-$  decay in the presented form. It could be a product only if a neutron is bound in a heavy nuclei where nuclear forces and mutual repulsive pressures are enough strong to form a neutrino consisting of four strong, short and energetic quantum dipoles.

Although a neutrino is not detectable during  $\beta^-$  decay its hypothetical existence was predicted as it seemed that some energy was missing and conservation of momentum, as well as angular momentum, was violated. Emitted electrons have a continuous kinetic energy spectrum, ranging from 0 to the maximal available energy of a few tens of MeV. A typical value is around 1 MeV. This continuous spectrum looks strange from the view-point of quantum theory. But continuous spectra of kinetic energy of electrons can be simply explained if accept that neutrons, before their decay, are excited by photons with any value of energy of continuous spectra, so the resulted electrons can also have kinetic energy of continuous spectra.

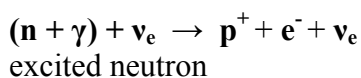
We do not deny the possible presence of electron antineutrino (for us there is no difference between neutrino and antineutrino) in beta decay. We can only accept the excitation of a neutron, bound in a heavy nucleus, by three photons which, after catching a negative pole “-“ from the neutron and changing it into a proton, consequently form one electron and one neutrino according to the following scheme:



Our doubt about a neutrino as a product of beta decay without previous excitation of a neutron by photons follows also from the following consideration:

As emitted electrons have a continuous kinetic energy spectrum, if we want to receive the discontinuous energy spectrum, we must accept that energy carrying by a neutrino has also a continuous spectrum. But as the neutrino has no rest mass, we must accept the existence of neutrinos with internal energies of any value of continuous spectra, what means that their essence is analogical to that of photons, what can be possible as neutrinos represent bound states of two photons. Continuous spectra of photons exciting the structure of neutrons cause their decay by emitting electrons with energies of continuous spectra. The rule of the Standard Model that the lepton number must be conserved is wrong and artificial as we can see that the electron can be a substructure of an excited neutron. Only the charge number must be conserved as well as the number of nucleons (protons and neutrons), because proton is very stable and cannot be destroyed (except of annihilation). It can only be excited by an electron to the neutron, which can again decay into a proton and an electron.

It is supposed that the whole universe baths in a sea of neutrinos. In that case it looks much more likely that the decay of a neutron is caused by its previous excitation by a free neutrino, so the decay is as follows:



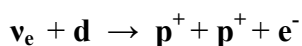
Neutrinos before and after decay have different energy and momentum. The above mentioned scheme of  $\beta^-$  decay shows that neutrinos can easy interact with matter by a weak force. This looks much more likely than supposed very rare interaction of neutrinos with rest matter. In this case neutrinos behave like photons exiting the initial neutrons before they decay. So we suppose that  $\beta^-$  decay of a neutron can exist in two forms. If a neutron is excited only by one photon then the neutrino cannot be a product of decay. Only if a neutron is excited by three photons (or one photon and one neutrino) then the neutrino can occur as a product of beta decay. This could be the reason why the production of solar neutrinos is three times lower than predicted by the Standard Model.

According to our understanding it looks very likely that only one of about three  $\beta^-$  decays produces a neutrino (in our understanding the double photon). So no neutrino oscillation is needed.

According to the Standard Model three types of neutrino (electron, muon and tau) can exist with quite different energies (flavours) and they can mutually change into one another, so oscillate. We do not deny that neutrinos can exist in different energetic states like photons can, but only an electron neutrino represents the stable state (like electron), other states are unstable and change into an electron neutrino. If we want to accept the Standard Model interpretation that the **muon**  $\mu^-$  and **tau**  $\tau^-$  decay into an electron, neutrino and antineutrino, it means they must consist of these structural constituents before decay. In that case neutrinos have the same property as photons to excite other particles. But much more real is that **muon**  $\mu^-$  and **tau**  $\tau^-$  are only more energetic versions of an **electron**  $e^-$ , they are unstable and after a very short time they convert into electrons by transferring their internal energies into their external vacuum quantum connections. Of course, electron as well as muon and tau can be excited by photons.

Pions represent more complicated structures, so they decay. Pion  $\pi^0$  (2+/2-) decays into two photons  $2\gamma$ . Pion  $\pi^-$  (3+/4-) consequently can decay in one muon  $\mu^-$  (+/2-) and neutrino  $\nu$  (2+/2-). Muon  $\mu^-$  consequently changes into an electron  $e^-$ . Pion  $\pi^+$  (4+/3-) can decay into one muon  $\mu^+$  (2+/-) and a neutrino  $\nu$  (2+/2-). Muon  $\mu^+$  then changes into a positron  $e^+$  which annihilates with the nearest electron. Pions have structures analogical to those of excited protons ( $p^+ + \gamma$ ) (antiprotons), but while protons are very stable, pions decay. The difference between positive pions and protons is in different mutual motions of their internal quantum dipoles and their different energy (mass). Positive pions are less energetic than protons (about seven times lesser) so their quantum dipoles are not enough strong to save the structure from its immediate decay. But the indirect evidence for the similarity between proton and positive pion structures is their similar momenta. The structures of a proton (3+/2) while excited (4+/3-) is analogical to the structure of a positive pion  $\pi^+$  (4+/3-). While proton is very stable, pion decays immediately into a muon  $\mu^+$  and a neutrino  $\nu$ .

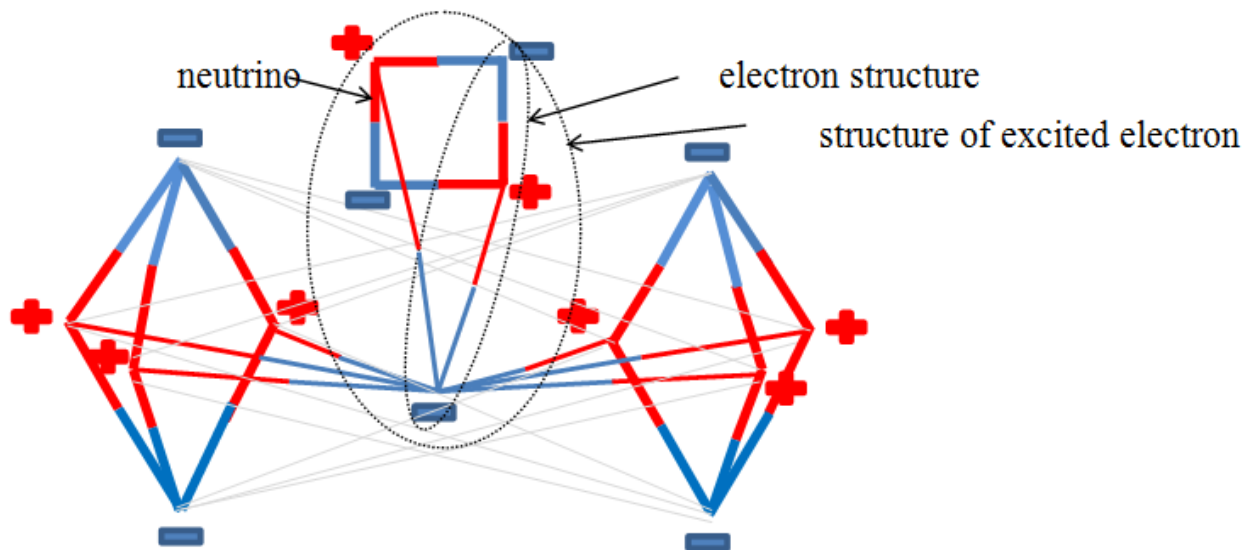
It is supposed that the universe bathes in a sea of neutrinos  $\nu$  (2+/2-). If they can easily penetrate through matter they must consist of short and energetic quantum dipoles having no rest mass. They are searched in various detectors based on their indirect detection in the so called inverse processes. One of them is the Sudbury Neutrino Observatory (SNO) consisting of a 1000 metric ton bottle of heavy water suspended in a larger tank of light water. The apparatus is located in Sudbury, Ontario, Canada at a depth of about 2 km down in a nickel mine. 18 m diameter geodesic array of 9,500 photomultiplier tubes surrounds the heavy water to detect Cherenkov radiation from the neutrino interaction which dissociates deuterium **d**:



*High speed electron produces Cherenkov radiation*

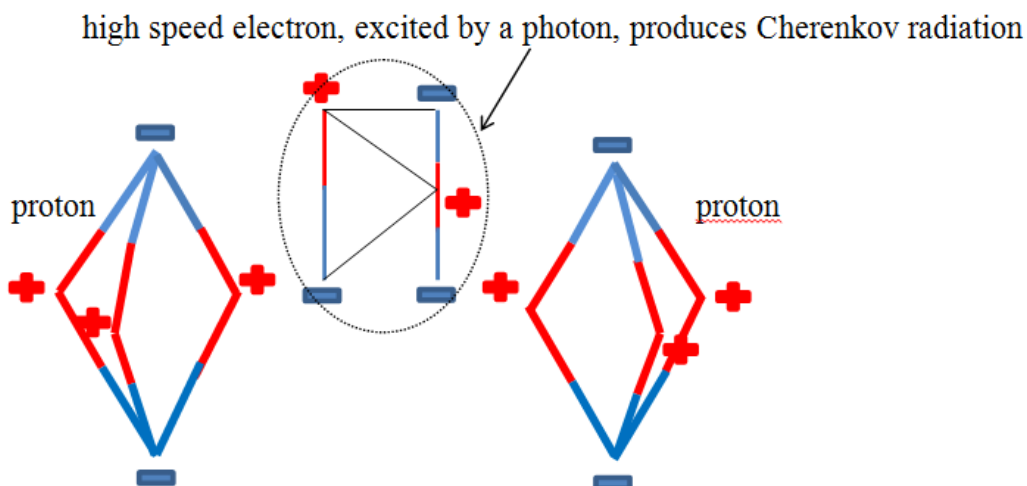
This interaction can be imagined:

**Deuteron (6+/5-) – a nucleus of deuterium before dissociation:**



According to this scheme the neutrino, by its interaction with a deuteron, catches one negative pole “-” from its structure destroying it into two protons and then flying away in a form of excited electron by a high speed causing Cherenkov radiation.

This result can be imagined:

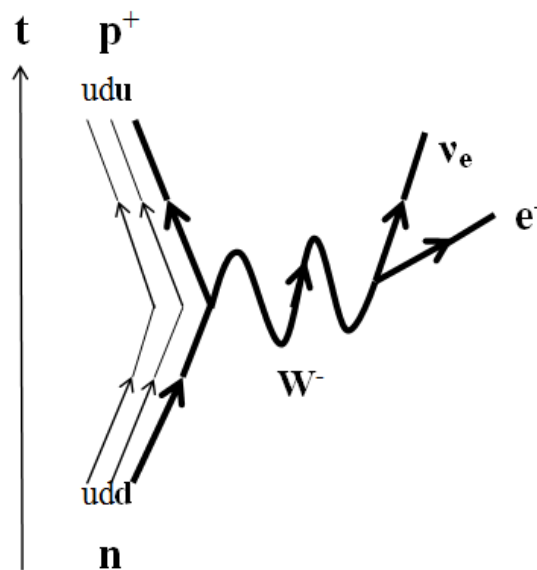


Internal quantum dipoles of a deuteron are transformed into mutual external quantum connections between two protons and one electron.

As neutrinos can be detected only indirectly, their role in beta decays is still opened and unclear. In any case, if we interpret all constituents of beta decay as structures of elementary quantum dipoles, the picture is becoming very clear and simple. But the so-called theory of electroweak interaction only complicates this situation very much.

Let us look how the theory of electroweak interaction (TEWI) complicates the simple picture of neutron decay. As QED supposes virtual photon to be a mediator of electromagnetic interaction, so TEWI supposes that the weak interaction must also have a point-like mediator named  $W^-$  boson, which is very massive, but virtual at the same time. As it is almost 100 times as massive as the initial neutron - heavier than entire atoms of iron, it is supposed that  $W^-$  boson, for only a very short undetectable time, borrows high energy from the vacuum (this miracle is supposedly allowed by Heisenberg's uncertainty principle) and then, after making all needed miracles, returns it back to the vacuum. Another great miracle that  $W^-$  boson makes is the conversion of one down quark (charge of  $-1/3$ ) of a neutron into the up quark (charge of  $+2/3$ ) it means that a neutron consequently converts into the proton. This reversal of quarks is called "flavour change". After making this "important" conversion and returning borrowed energy to the vacuum,  $W^-$  boson subsequently decays.

Feynman's diagram of  $\beta^-$  decay of a neutron according to the electroweak theory:



Although  $W^-$  boson is virtual during  $\beta^-$  decay and so undetectable, its real existence is also supposed. From the structure of electron ( $+2/-$ ) and neutrino ( $2+/2-$ ), the compound structure ( $3+/4-$ ) of  $W^-$  with 12 elementary quantum dipoles can be created by high energy collisions as a short living structure (resonance). The same is valid also for compound structure of positron ( $2+/-$ ) and neutrino ( $2+/2-$ ), it means the structure ( $4+/3-$ ) of  $W^+$ . But both these compound structures  $W^-$ ,  $W^+$  are not point-like bosons and appear only in very rare cases, in the high energy collisions. Electrons and unobserved electron neutrinos with enormous energy of about 40 GeV are supposed to be produced by decay of undetectable  $W^-$  bosons. It means that the neutrino with internal energy of only some MeV and zero rest mass must highly increase its internal energy to the value of 40 GeV. Introduction of monstrous undetectable W and Z bosons into the schemes of beta decays and their consequent search in high energy collisions, where they are directly undetectable, represents the absurd madness of contemporary theoretical physics with its chase for pure chimeras. But this madness costs too much money and requires enormous resources. Using of monstrous 80 GeV bosons to mediate low energy beta decays looks like killing the flies by atom bombs. But in contemporary theoretical physics all miracles and mysteries are possible in order to confirm accepted dogmas like that all interactions must be mediated by point-like virtual bosons

Insertion of virtual  $W^-$ ,  $W^+$  bosons into a simple picture of beta decay in order to create the electroweak theory is quite artificial and only complicates the simple situation. No virtual boson is needed, only real particles – neutron, proton, electron and maybe neutrino. No virtual processes are needed. It is a great arrogance to claim that real detectable processes and particles manifested during decays, high energy collisions and annihilations prove the existence of principally undetectable entities like quarks, gluons, virtual bosons and others. **TEWI is one of many contemporary physical theories which are extremely speculative and only complicate the simple situation.**

Theory of electroweak interaction tries to give together the electromagnetic interaction mediated by a virtual photon without rest mass with a weak interaction mediated by supposed very massive  $W^-$ ,  $W^+$  and Z bosons, so the so-called Higgs mechanism is required for breaking the electroweak symmetry and giving particles their rest mass. This hypothetical Higgs mechanism asks for the existence of very heavy Higgs boson which is declared to be found at LHC by energy of 125 GeV. If looking at the Higgs boson through one of its declared possible decay modes  $W^-$ ,  $W^+$ , then it represents the basic structure (7+/7-), which at same time represents the compound structure of electron, positron and two neutrinos. Only electron and positron are really detectable. Fictitious undetectable Higgs boson as a point-like particle is nonsense as well as mysterious Higgs field. Except for networks of elementary quantum connections (+/-) there are no other fields. Everything is made up of these connections. Photons as free elementary quantum dipoles (+/-) are the simplest particles having no rest mass as they vibrate in a plane of their dragging by expanding Universe. All other particles represent compound structures of two or more quantum dipoles with more complicated motions, so they local touch interactions with the vacuum (vacuum quantum connections) cause that they cannot be dragged by cosmic expansion and therefore they have rest mass as a measure of their resistance towards acceleration.

Another great nonsense concerning fictitious Higgs boson is the conclusion that its “small” mass, although 126 times the mass of the proton, causes that the universe we live in is inherently unstable, it means that this mass is not enough to prevent the cosmic catastrophe. Theorists so have another toy to speculate about false unstable vacuum and portend consecutive cosmic cataclysm during transfer to the stable vacuum billions of years from now. Unbelievable and appalling! Theorists know nothing about the essence of the vacuum, but they speak about false vacuum, stable vacuum, vacuum fluctuations, cosmic cataclysms, loan of huge energy from the vacuum for the miracles of particle physics and other nonsenses. If the Higgs mechanism breaks the symmetry between weak and electromagnetic interactions, what mechanisms does break symmetries between strong and weak interactions and at what level of energy are all interactions united including gravity?

If we are talking about symmetries the answer is very simple. The basic symmetry of all particles, interactions and fields means that all they are made of the same constituents – elementary quantum dipoles. We do not need huge accelerators and colliders in order to create such a big energy level, where all interactions ought to be unified, as the basic interaction is already known. Only real particles are detectable before and after high energy collisions, neither bosons nor quarks. Including them into the simple scheme of interactions is quite artificial and speculative. As all particles are made of elementary quantum dipoles, the picture of their mutual interactions is simple and clear without the necessity to include virtual undetectable realities there.

### ***Quantitative Characteristics of Basic Particles and Interactions***

According to my monograph “God and the Universe” [1] the volume of elementary quantum dipole is:

$$v = V/k^2 = 4,99.10^{78}/1,29.10^{123} = 3,87.10^{-45} \text{ m}^3$$

where:  $V$  – contemporary volume of cosmic space

$k^2$  - contemporary number of elementary quantum dipoles in the Universe

Then the volume  $Vp^+$  of a proton  $p^+$  (3+/2-) consisting of six elementary quantum dipoles is:

$$Vp^+ = 6 \cdot 3,87.10^{-45} \text{ m}^3 = 23.10^{-45} \text{ m}^3$$

The radius of a proton, if imagined by an ideal sphere, is:  $r = (3V/(4\pi))^{1/3} = 1,76.10^{-15} \text{ m}$

The accuracy of this result is depends on accuracy of Hubble's constant used in expressions for calculation of the volume and the number of quantum dipoles of the Universe. This result is close to the value of proton's charge radius  $0,88.10^{-15} \text{ m}$  presented in contemporary literature. Mass of a proton is  $m = 1,67.10^{-27} \text{ kg}$ . From the relation  $e=mc^2$  internal energy of a proton is  $e_p = 1,67.10^{-27} \cdot 9.10^{16} = 1,5.10^{-10} \text{ J}$ . As proton consists of six equal quantum dipoles, energy of one quantum dipole of a proton is  $e_{ip} = e/6 = 2,5.10^{-11} \text{ J}$ . From the basic relation between energy and length of quantum dipole  $e_id_i = \alpha hc/\pi$  we can receive its length:

$$d_{ip} = \alpha hc/(\pi e_{ip}) = 0,007297.6,626.10^{-34} \cdot 3.10^8/(3,14.2,5.10^{-11}) = 0,0185.10^{-15} \text{ m}$$

where:  $\alpha$ - fine structure constant,

$h$  – Planck constant,

$c$  - speed of light

The strong force  $f_{ip}$  of one proton's quantum dipole is:

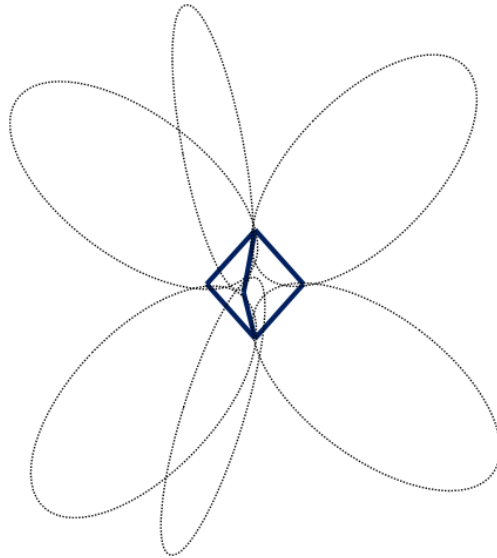
$$f_{ip} = e_{ip}/d_{ip} = 1,35.10^6 \text{ N}$$

So the total strong force creating the structure of a proton consisting of six equal quantum dipoles is  $8,1.10^6 \text{ N}$ .

If space of elementary quantum dipole of a volume  $v = 3,87.10^{-45} \text{ m}^3$  is imagined by an ideal sphere, than its diameter is:

$$d = (6v/\pi)^{1/3} = 1,73.10^{-15} \text{ m}$$

We can see that the length of proton's quantum dipole is almost 100 times lower than the diameter of ideal sphere of elementary quantum dipole. As volume of elementary quantum dipole is  $v = 3,87.10^{-45} \text{ m}^3$  then the quantum dipoles of a proton are very close each to other so that their spaces are pushed out as imagined in the following scheme:

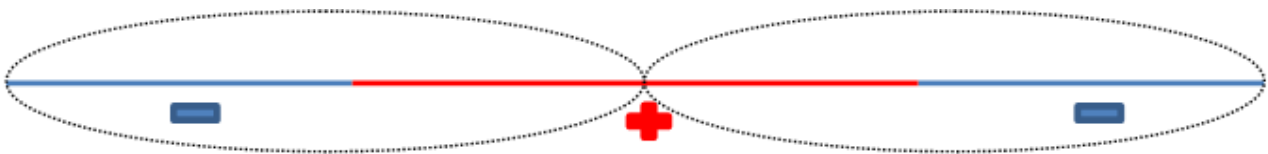


These six spaces of proton's quantum dipoles, being pushed out, do not enable anything to come close to the core of a proton and so limit the distance to which other particles can come close and eventually interact with a proton by mutual nuclear or electromagnetic connections (forces). This is the reason why nuclear connections (nuclear interactions between nucleons) are much weaker than very strong connections (quantum dipoles) creating the structure of a proton. The above image shows why the structure of a proton looks like composed of partons or quarks, although it is made of six quantum dipoles.

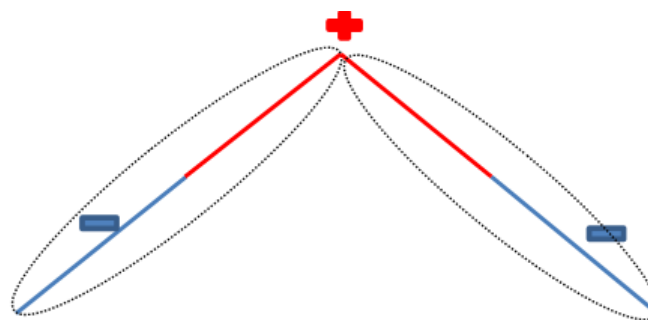
The proton mass (internal energy) is 1836 higher than the electron. As the proton consists of six quantum dipoles, while electron of two, energy of electron quantum dipole is 612 times lower than of proton one, so the length of an electron quantum dipole  $d_{ie}$  is 612 times the length of a proton quantum dipole  $d_{ip}$ :

$$d_{ie} = 612 d_{ip} = 11,3 \cdot 10^{-15} \text{ m}$$

This length is 6,5 times the length of an ideal dipole sphere, so the spaces of electron looks like this:



or like this:

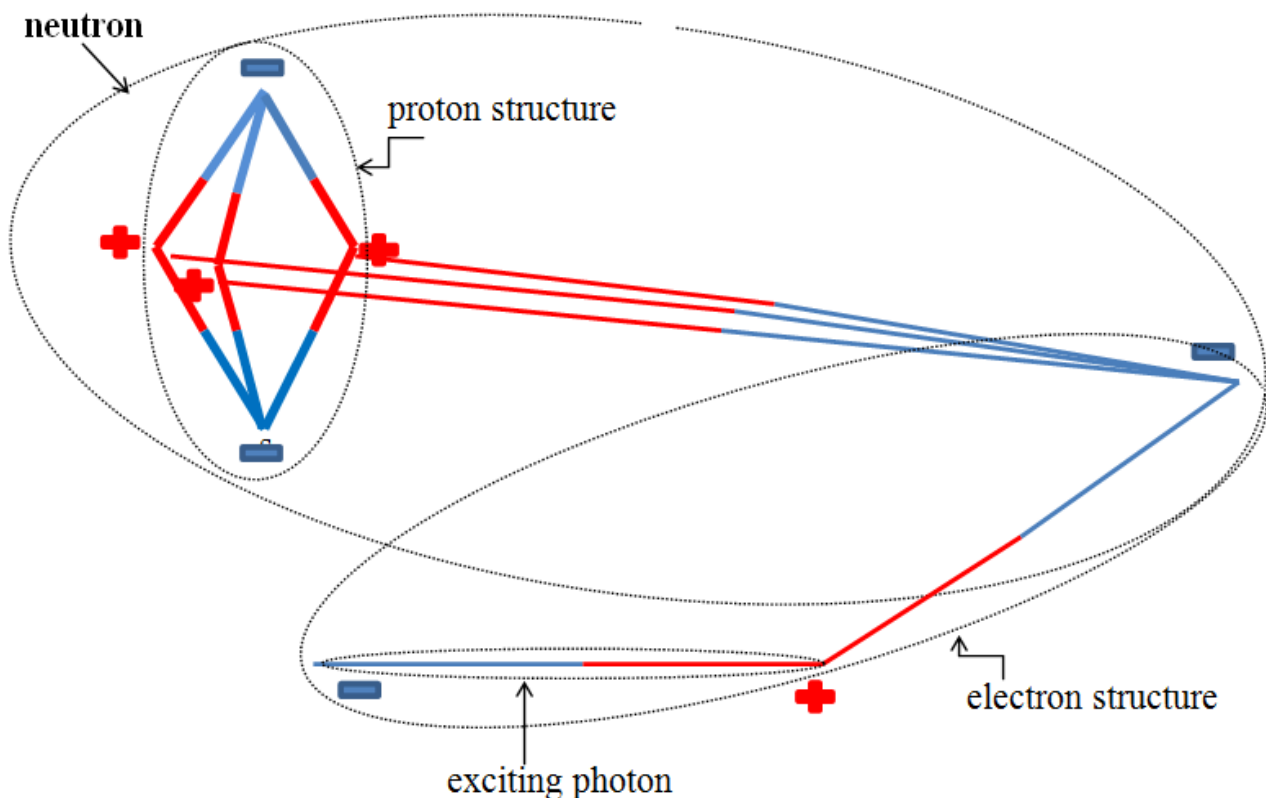




The neutron is created of a proton by addition of one distant “-“ pole that is connected to three positive poles of a proton creating three new long quantum dipoles (+/-). Inner energy (mass) of these three quantum dipoles (mass of neutron – mass of proton = 939.566 MeV - 938.272 MeV = 1.293 MeV) is  $938.272/1.293 = 725,66$  times lower than energy of six quantum dipoles creating the structure of a proton, what means that energy of one long quantum dipole is 362,83 times lower than energy of one proton quantum dipole, so the length of long quantum dipoles is 362,83 times the length of quantum dipoles creating a proton. The weak force  $f_{iw}$  of one of three long quantum dipoles connecting the distant “-“ pole to three “+“ poles of a proton structure is:

$$f_{iw} = e_{iw}/d_{iw} = 1,35 \cdot 10^6 / 362,83^2 = 1,35 \cdot 10^6 / 131646 = 10,25 \text{ N}$$

Thus the strong force, creating the structure of a proton, is more than  $10^5$  times stronger than the weak nuclear force, by which the “-“ pole is connected to the structure of a proton and so creating the structure of a neutron from which it is released during  $\beta^-$  decay.



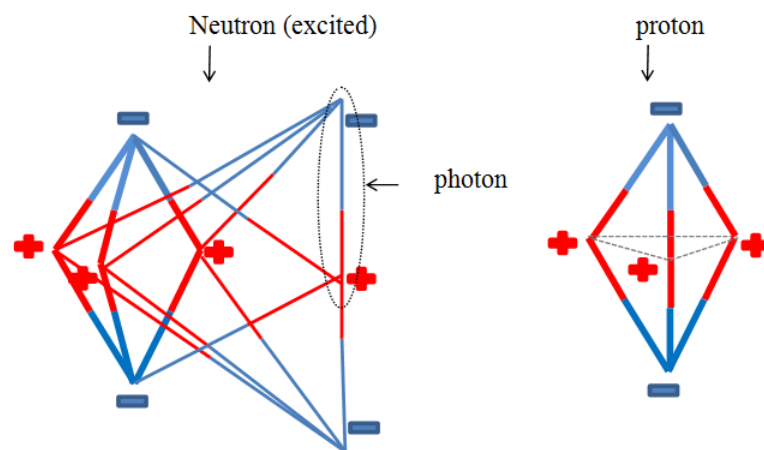
Now we can see real reason why the neutron is unstable. The distant new pole “-“, added to the structure of a proton, creates three new quantum dipoles which are 363 times weaker and longer than quantum dipoles creating the structure of a proton. So if the structure of a neutron is excited by one photon, this can easily catch the distant “-“ pole from the structure of a neutron and consequently create the structure of an electron by changing a neutron into a proton. It is absurd to include virtual  $W^-$  bosons in that simple scheme of  $\beta^-$  decay of a neutron and suppose its energy to be very high because of very short diameter of a weak force, about 100 times shorter than the diameter of a strong interaction! But according to our analysis, on the contrary, the diameter of a weak nuclear interaction (force) is 363 times lower than that of a strong interaction inside a proton. So  $\beta^-$  decay belongs to category of nuclear interactions. Really, it is fanny to say that a “weak”

interaction is mediated by a monstrous  $W^-$  boson which energy (mass) is almost 100 times the energy (mass) of a proton (or neutron) created of strong forces! Why does theoretical physics produce such nonsenses? Because according to accepted dogmas undetectable point-like virtual bosons, appearing and disappearing in the vacuum, mediate all interactions. Theoretical physics knows nothing about the nature of the vacuum, but uses it to perform all its miracles.

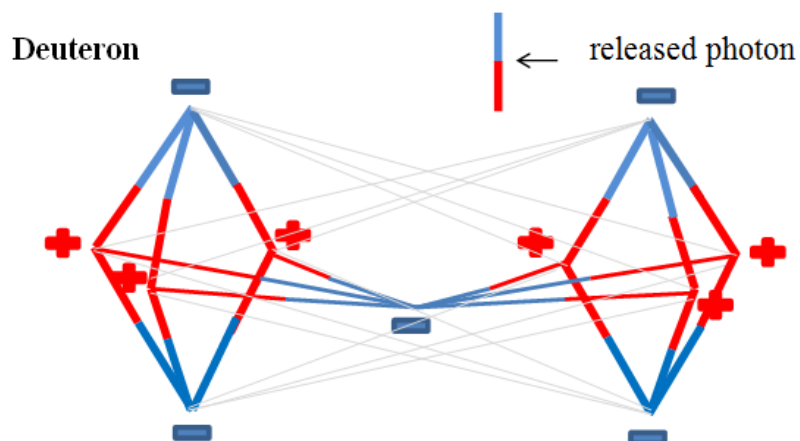
### ***Nuclear Force***

The **nuclear force** is an attractive one between two or more nucleons (neutrons and protons) binding them into atomic nuclei. Masses of light nuclei are less than the total mass of protons and neutrons which form them. According to contemporary quark model the nuclear force is a residual effect of much more powerful strong force (interaction) binding quarks by gluons. At the time before the quark model was created, the nuclear force was conceived to be transmitted by a neutral pion  $\pi^0$ .

The most appropriate system for studying the nuclear force is a bound state of one proton and one neutron named deuteron being the nucleus of the deuterium atom named heavy hydrogen.

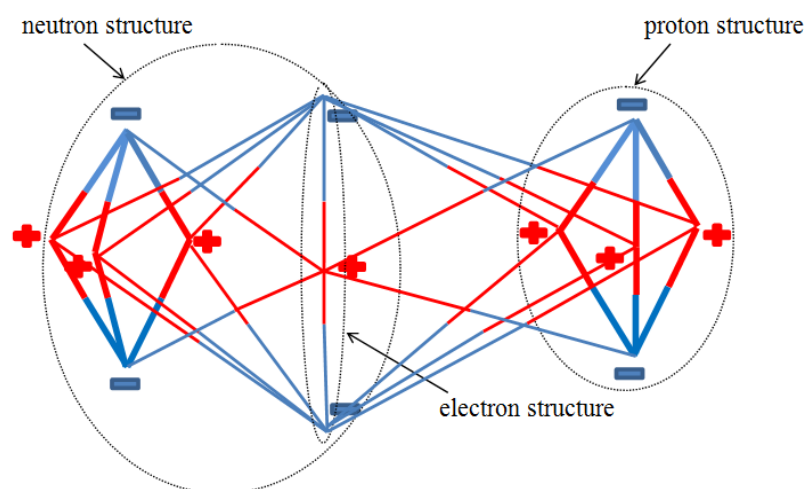


After synthesis of proton and neutron the photon is released taking out so-called binding energy:



In a bound state of nucleus it is not clear which of components is a neutron and which a proton as the negative pole is common for both nucleons. The compound state of one proton and one neutron in a deuteron ( $6+/5-$ ) consists of 30 elementary quantum connections. If the photon is not released,

the excited deuteron ( $7+/6-$ ) consists of 42 elementary quantum dipoles. This structure represents factually the bound state of two protons and one electron:



In this structure we can see the substructures of neutron, proton, electron, but the deuteron is created not only of these structures but also of their mutual quantum connections being internal constituents of a deuteron. It is a clear manifestation of the holistic principle according to which the deuteron is not a simple sum of its structural components (protons and electron) but represents a higher quality defined also by their mutual quantum connections. The deuteron compositions ( $7+/6-$ ) exist in heavier atoms with higher atomic numbers being sources of  $\gamma$  - rays during a radioactive decay.

The evidence is the fact that the fusion of two nuclei with lower masses than iron generally **releases** energy, while the fusion of nuclei heavier than iron **absorbs** energy. So not only no photon is released but new free photons are absorbed in the structure of heavier nuclei.

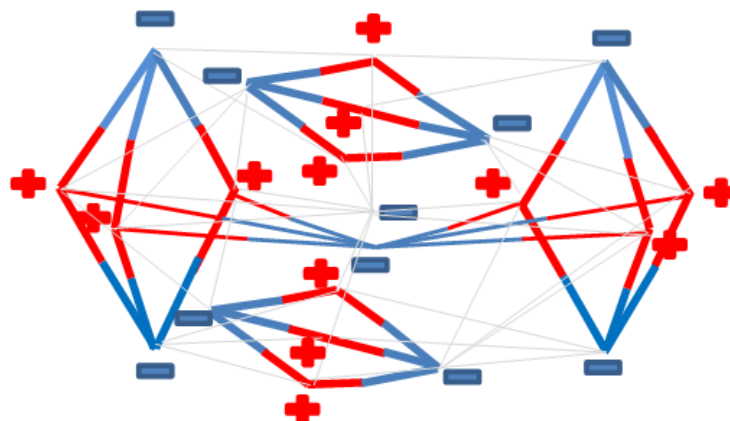
The opposite is true for the reverse process, nuclear fission. This means that fusion generally occurs for lighter elements only, and likewise, that fission normally occurs only for heavier elements. So, only the extreme astrophysical events can lead to short periods of fusion with heavier nuclei. This is the process that gives rise to nucleosynthesis, the creation of heavy elements during events like supernovas. Synthesis of heavier nuclei is possible only by extreme energies which allow to compress nuclei very close, so that the mutual quantum connections become very short and strong able to overcome their mutual repulsive pressures. The claim that binding energy of nucleons in nucleus is given by energy needed to be released during their synthesis is limited only for lighter nuclei and so cannot be a dogma, because real binding energy of nucleons in nuclei is energy of their mutual quantum connections (dipoles). Creation of the required conditions for fusion on Earth is very difficult.

Dipoles creating the internal structures of both nucleons (protons and neutrons) are very short, strong and energetic so they represent the strong forces, while quantum dipoles between both or more nucleons are weaker and represent the nuclear force connecting nucleons into a nucleus. Although the nuclear force is much weaker than the strong one, it is enough strong and short (the shorter – the stronger) to overcome the mutual local repulsive pressures between quantum dipoles. Now we see that the nuclear force is not a residual effect of a strong force binding quarks by gluons, but it is created, as well as a strong force, of elementary quantum dipoles, although much longer and weaker.

The nucleus of a helium atom  ${}^4_2\text{He}$ , named  $\alpha$  – particle, represents a bound state of 2 protons and 2 neutrons ( $12+/10-$ ) consisting of 120 elementary quantum dipoles. The internal dipoles of nuclei are

very short and strong (strong interaction) but their mutual connections are much weaker and can have different lengths and energies (nuclear interaction).

$\alpha$  – particle (nucleus of a helium atom  ${}^4_2\text{He}$ ):



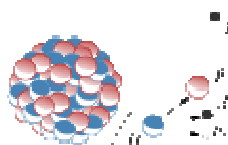
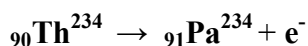
Not all 120 mutual quantum dipoles (+/-) are imagined in the above picture, but we can see the difference between quantum dipoles creating the internal structure of 4 nucleons (strong interactions) and their mutual nuclear interactions.

The more nucleons are in nuclei, the heavier and less stable are the atoms as the number of mutual quantum connections dramatically increases with a consequent increase of their repulsive pressures. Atoms with a huge number of nucleons (protons and neutrons) in a nucleus are unstable and can decay. This so-called radioactive decay is a stochastic (random) process. The internal motion of quantum dipoles and their mutual pressures as well as impulses from outside can disrupt the equilibrium of attractive and repulsive forces and cause the atom spontaneously decays, where the huge amount of nuclear forces is released by emitting particles ( $\alpha$  – particles,  $\beta$  – particles,  $\gamma$  – rays and others) which carry out high energies. The radioactive decay transforms the initial nucleus into another nucleus, or into a lower energy state. A chain of decays takes place until a stable nucleus is reached. An example of  $\alpha$  – decay involves uranium:



The process of transforming one element (e.g. uranium) into another (thorium) is known as transmutation.

The electron or positron represents the beta particle in beta decay. If an electron is involved, the number of neutrons in the nucleus decreases by one and the number of protons increases by one. An example of such a process is:



$\beta^-$  decay generally occurs in neutron rich nuclei.

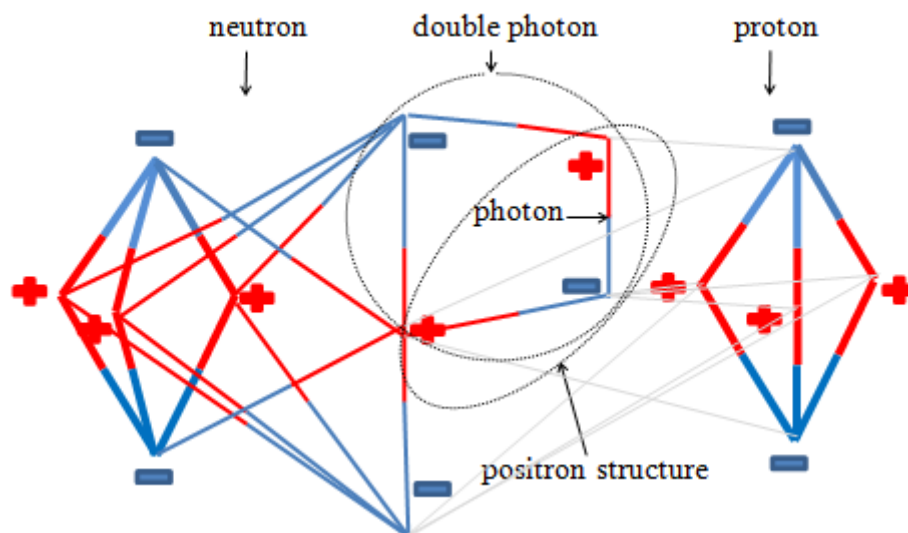
We also suppose that beta decay with a neutrino is possible only in heavier nuclei, in which the pressures are enough to create energetic neutrinos with stronger and shorter quantum dipoles than those in electrons. The decays of free neutrons run without neutrino production.

If a positron  $e^+$  is involved ( $\beta^+$  decay), the number of neutrons in the nucleus increases by one and the number of protons decreases by one.

**energy ( $\gamma$ -photons) +  $p^+ \rightarrow n + e^+ + (\nu_e)$ ?**

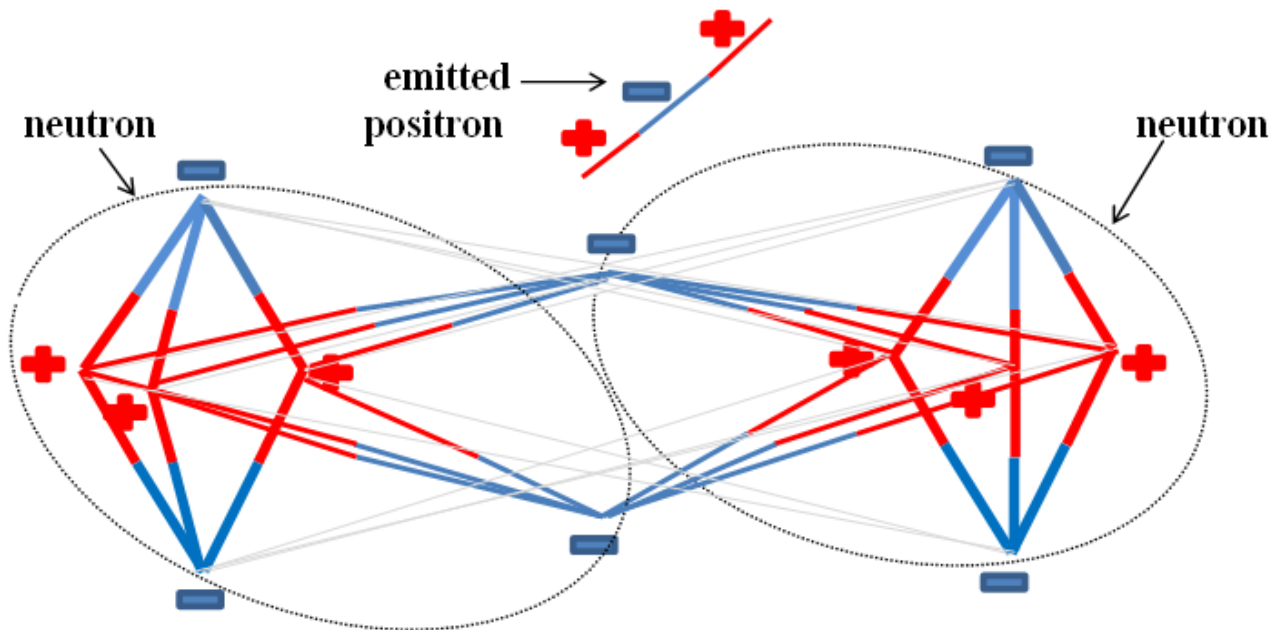
Energy is used to convert a proton  $p^+$  into a neutron  $n$ , while emitting a positron  $e^+$  and a hypothetical electron neutrino  $\nu_e$ . So, unlike  $\beta^-$ ,  $\beta^+$  decay cannot occur in isolation, because it requires energy, the mass of the neutron being greater than the mass of the proton.

**The bound state of a neutron and a proton excited by one double-photon in a heavier nucleus before  $\beta^+$  decay:**



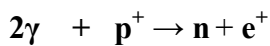
This bound state ( $8+/7-$ ) consists of 56 quantum dipoles (only some are imagined).

The result after emission of a positron  $e^+$  in  $\beta^+$  decay:



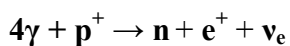
The resulting bound state of two neutrons (6+/6-) in a nucleus consists of 36 quantum dipoles

The positron quickly finds an electron annihilating each other. The above  $\beta^+$  decay is basic, having the following form:

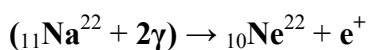


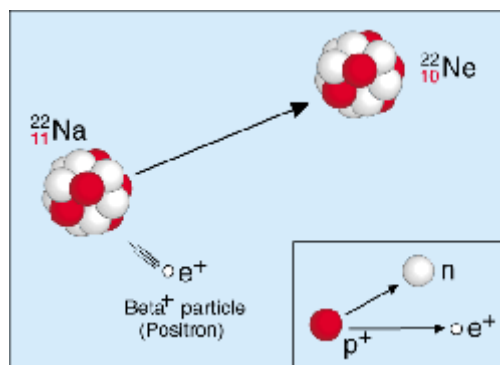
double photon

Supposed, but very unlike, neutrino production in  $\beta^+$  decay is possible only if the initial bound state of a proton and a neutron is excited by 2 energetic double-photons (or neutrinos?), then:

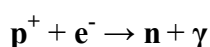


Of course,  $\beta^+$  decay is possible only if the initial bound state of a neutron and a proton is a part of a heavier nucleus.  $\beta^+$  decay usually occurs during artificial radioactivity among radioactive isotopes. For example, the excited unstable radioactive sodium **Na-22** decays into a stable neon **Ne** and a positron  $e^+$ :

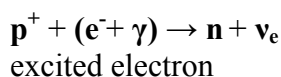




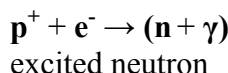
A process, in which a proton-rich nuclide absorbs an inner atomic electron, changing a nuclear proton into a neutron and simultaneously emitting a photon or neutrino, is known as **electron capture**:



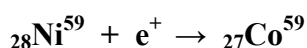
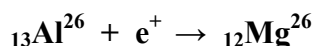
or (if a proton or an electron are excited by one photon):



Electron capture can run also without emitting any particle, so the resulting neutron is excited:

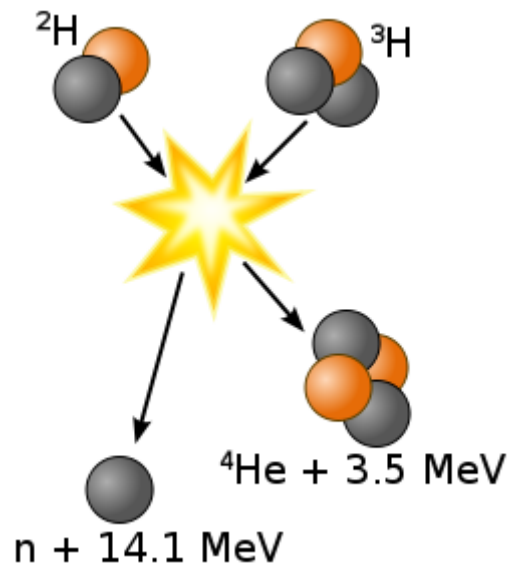


By changing the number of protons, electron capture transforms the nuclide into a new element, e.g.:



We have seen how simple is  $\beta^+$  decay emitting one positron  $e^+$  and changing one proton into a neutron and how extremely complicated it is according to the theory of electroweak interaction.

In the nucleus with a big number of nucleons the local repulsive pressures of enormous number of mutual nuclear quantum dipoles between nucleons (protons and neutrons) is so high that the equilibrium between attractive nuclear forces of quantum dipoles and their repulsive pressures is very fragile and a small impulse is enough to cause the imbalance so that a radioactive decay can occur. This small impulse could be caused by excitation of the nucleus by a photon (or neutrino?), so that the number of mutual quantum connections in a whole structure of nucleus increases with a consequent increase of local repulsive pressures causing the radioactive decay. If the impulse is high, caused by interaction with energetic neutrons, the internal structure of radioactive nucleus of uranium increases the number and amount of repulsive pressures of quantum dipoles so dramatically that the nucleus is split in two nuclei with release of high energy particles like  $\alpha$ ,  $\beta$ ,  $\gamma$  and neutrons, which can again cause the nuclear fission of other uranium nuclei and so generate the so-called chain reaction. On this principle the atom bombs are designed as well as nuclear reactors in nuclear power stations where the chain reaction is controlled.



High energy can be released not only by nuclear fission of heavy nuclei, but also by synthesis (fusion) of light nuclei in thermonuclear reactions. At the picture taken from Wikipedia we can see the fusion of deuterium with tritium creating helium, freeing a neutron and releasing 17.59 MeV of energy. It takes considerable energy to force nuclei to fuse. Accelerated to high speeds (that is, heated to thermonuclear temperatures), they can overcome their local mutual repulsive pressures and get close enough for the attractive force to be sufficiently strong to achieve fusion. The fusion of lighter nuclei, which creates a heavier nucleus and often a free neutron or proton, generally releases more energy than it takes to force the nuclei together. Even when the final energy state is lower, there is a large barrier of mutual repulsive pressures that must be firstly overcome. It is called the Coulomb barrier.

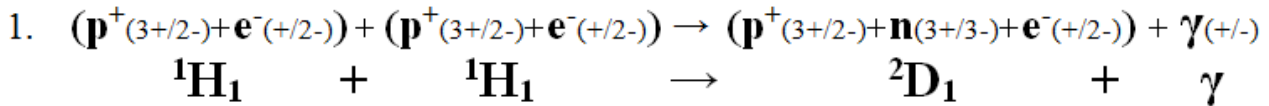
To achieve extreme conditions necessary for fusion, the initially cold fuel must be explosively compressed. Inertial confinement is used in the hydrogen bomb where the driver is x-rays created by a fission bomb. Long lasted research into developing controlled thermonuclear fusion is still unsuccessful.



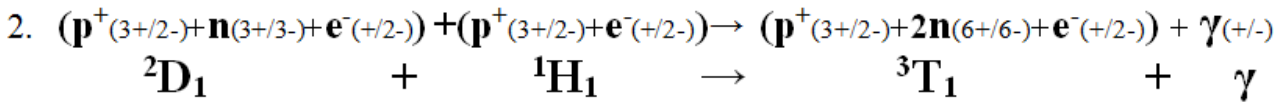
### *Thermonuclear Fusions in the Core of the Sun*

The fusion of light atoms of hydrogen  ${}^1\text{H}_1$  into heavier atoms or nuclei until atoms or nuclei of helium  ${}^4\text{He}_2$  are produced is supposed to be generated in the core of the Sun producing at the same time high energetic photons and neutrinos.

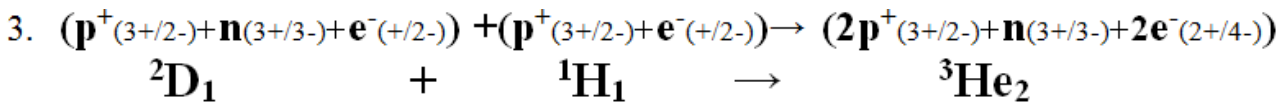
In the process of fusion not only protons  $\text{p}^+$  of hydrogen atom  ${}^1\text{H}_1$  but also their electrons  $\text{e}^-$  are involved. So if present the atom of hydrogen as  ${}^1\text{H}_1 = (\text{p}^+ + \text{e}^-)$  and the atom of deuterium as  ${}^2\text{D}_1 = (\text{p}^+ + \text{n} + \text{e}^-)$ , then the processes of nuclear fusion are as follows:



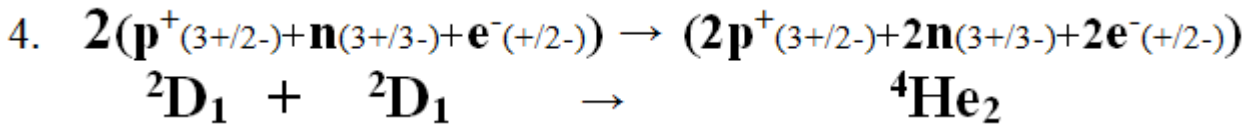
In the above fusion only atoms of deuterium and photons are produced.



Fusion of a deuterium with a hydrogen results in the atom of tritium and a free photon.



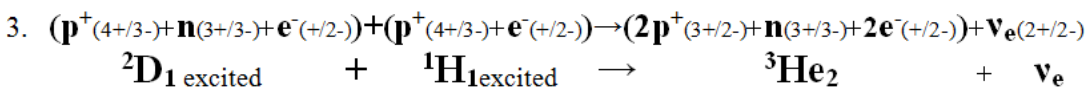
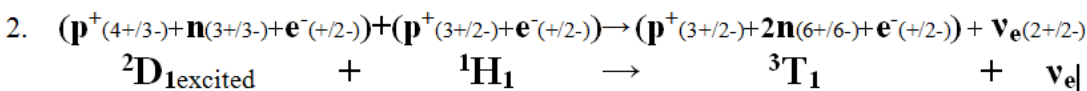
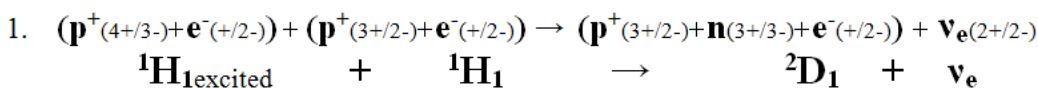
Fusion of a deuterium with hydrogen can give also the helium isotope  ${}^3\text{He}_2$



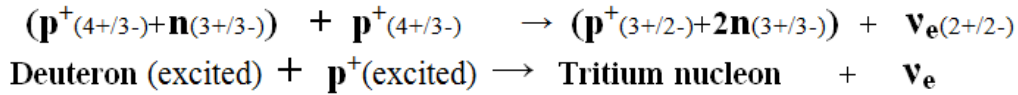
Fusion of two atoms of a deuterium gives the helium atom  ${}^4\text{He}_2$

Also other variations of fusion can run until the atom of helium is produced, e.g. tritium plus deuterium, hydrogen plus tritium, hydrogen plus proton, etc.

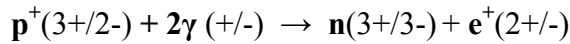
In the above mentioned fusions no neutrinos appear in the core of the Sun. They can appear only if some of initial components (atoms) are excited by photons, e.g.:



Analogical are situations where not the whole atoms are involved in a fusion, but only free particles like protons, neutrons, electrons or nuclei (plasma state), where the neutrino production is possible only if initial constituents of fusion are excited by photons, e.g.:

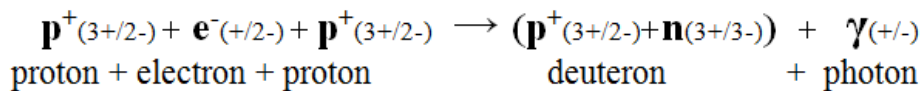


Production of positrons is possible by the following scheme:



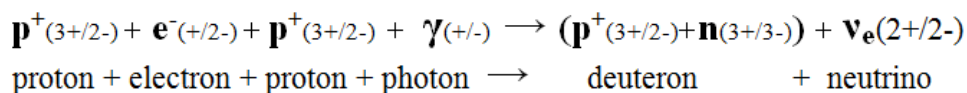
where the positron consequently annihilates with the nearest free electron into three elementary photons and neutron, which, excited by one photon, decays again into one proton and one electron, so we have the same state as before the fusion. As production of positrons is followed by reversible process so it does not influence the fusions in the Sun very much.

Much more important is the process of creating deuterons from protons and electrons, where  $\gamma$  rays (photons) are released:



Two protons catch one negative pole from the electron creating the deuteron and converting electron into a photon. From this basic scheme we can see that the number of nucleons (protons and neutrons) is conserved, but the number of leptons cannot be conserved as the electron is converted into a photon in this fusion. So the rule of contemporary particle physics, that the number of leptons is conserved during weak interactions, is false and artificial having no serious justification. Certainly, during the electromagnetic interactions the number of electrons does not change, but during nuclear interactions electrons can be destroyed as their two dipoles are much weaker and longer than dipoles creating the protons. Thus, the rules of QED cannot be devolved automatically upon particle physics dealing with strong and nuclear interactions.

The production of hypothetical neutrinos is possible only if free photons, produced in basic fusions, are involved in the process of nuclear fusion by excitation of initial components. Now we can see the clear reason for missing solar neutrinos. No oscillation theories are needed. For production of neutrinos, no  $\beta$  decays are sufficient, only great forces compressing two elementary quantum dipoles (+/-) into a short, strong and energetic structure of a neutrino  $\mathbf{v}_e(2+/2-)$ , e.g. by the following scheme:



The electroweak theory is a fictional scientific illusion that only complicates the situation leading to the wrong conclusions. Neutrinos cannot be produced in the so called weak interactions because their production requires strong pressures of nuclear forces. Only electrons interact weakly inside the structure of a neutron, so they are released from the excited neutron during  $\beta^-$  decay.

In more massive stars than the Sun not only atoms and nuclei of helium but also heavier atoms are produced because of much higher pressures and temperatures. The production of new elements via nuclear fusions is called nucleosynthesis. A star's mass determines what other type of nucleosynthesis occurs in its core (or during explosive changes in its life cycle).

Massive stars greater than five times the mass of the Sun, when their hydrogen becomes depleted, convert helium atoms into the carbon and oxygen, followed by the fusion of carbon and oxygen into neon, sodium, magnesium, sulfur and silicon. Later reactions transform these elements into calcium, iron, nickel, chromium, copper and others. When these old, large stars with depleted cores supernova, they create heavy elements (all the natural elements heavier than iron) and spew them into space, forming the basic constituents for life on Earth.

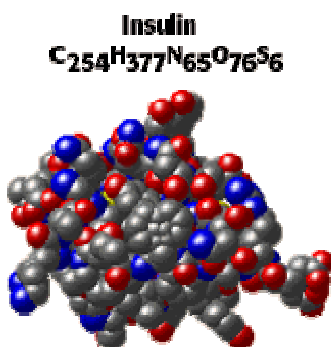
### **Weak Attractive Forces between Atoms and Molecules (Chemical Bonds)**

A molecule is two or more atoms linked by a so called chemical bond. Molecules can contain different types of bonds. If atoms are sharing electrons, then the bond between them is covalent. If an atom gives up an electron to another atom, then they have an ionic bond.

Ions are produced when atoms can obtain a stable number of electrons by giving up or gaining electrons. For example Na (sodium) can donate an electron to Cl (chlorine) generating Na<sup>+</sup> and Cl<sup>-</sup>. The ion pair is held together by strong electrostatic attractions.

Except of electrostatic attractions between atoms in a molecule also other weak forces are found like Van der Waals bonds which are short range attractive forces between chemical groups in contact or hydrophobic attractions causing non-polar groups such as hydrocarbon chains to associate with each other in an aqueous environment, etc.

As everything interacts with everything else, there is enormous number of mutual weak quantum connections (dipoles +/-) between atoms of molecule. As attractive forces overcome a little repulsive pressures of quantum dipoles, so atoms are attracted to each other creating very complicated and composed molecules like insulin:



Insulin is a complicated molecule called a protein. Proteins are molecules necessary for life.

The intermolecular attraction between like-molecules is known as cohesion.

All forces are nothing more than attraction and repulsion of quantum dipoles. Very short quantum dipoles create the strong attractive forces inside hadrons and leptons, nuclear forces are created by short and strong quantum dipoles between nucleons, electrostatic forces are formed by weaker and longer quantum dipoles, other forces between atoms and molecules are weaker than electrostatic ones, and the weakest are attractive forces of gravity between massive objects created by long mutual quantum dipoles representing a cosmic vacuum. Attraction and repulsion are always in a mutual equilibrium. Shortening and increasing of mutual quantum dipoles between nuclei during their fusions are at the same time accompanied by increasing of their mutual repulsive pressures, which overcoming is necessary for the successful fusion. The dynamic equilibrium of both opposite forces (attraction and repulsion) inside atoms and particles is manifested by internal motions (oscillations, vibrations, etc.).

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