New Energy Technologies

Also in this issue:
* Multipolarity and inner structure of quarks
* Unknown Tesla
* Inductive conversion of environmental heat in electricity
* New vortex generator
* Free energy based on parametrical resonance

Ball lightning

inner structure,

generation and applications
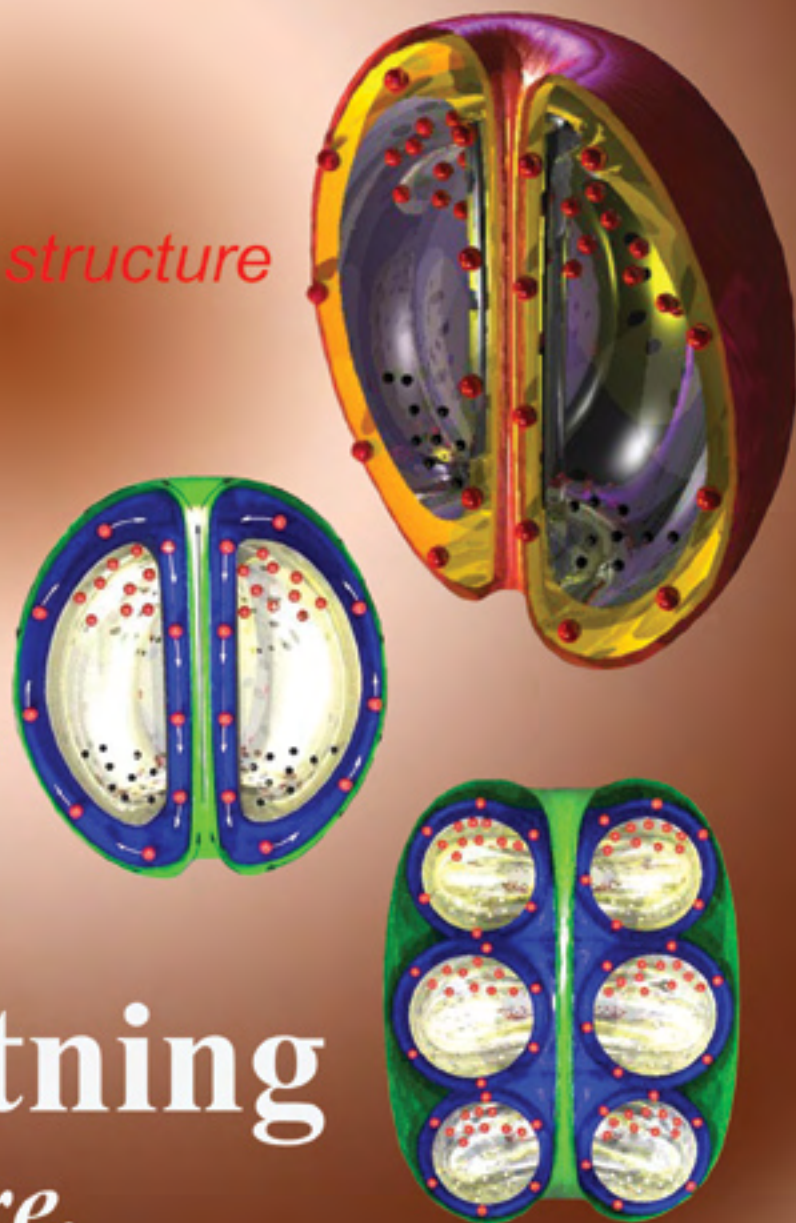
TESLA

New ideas in sensational article by
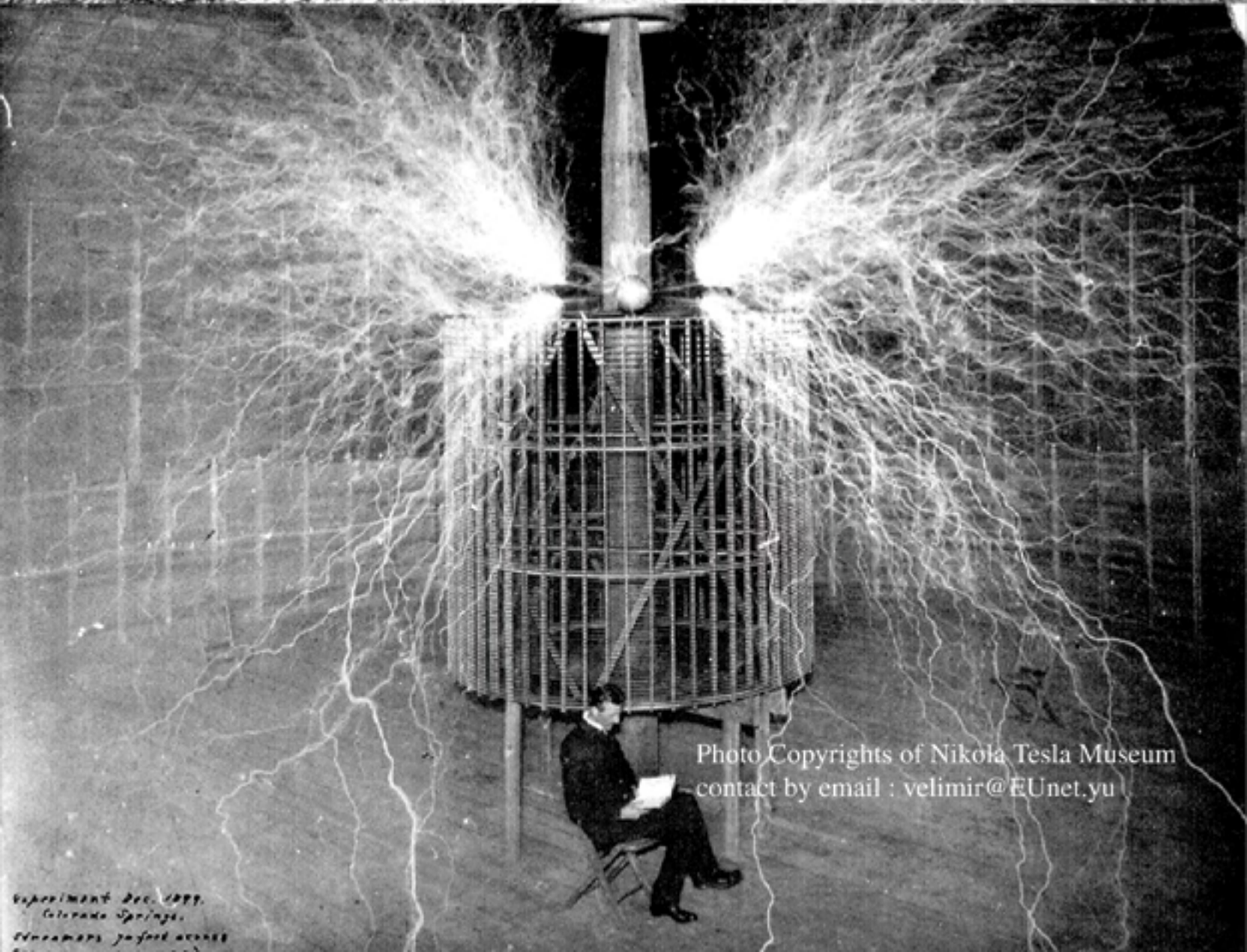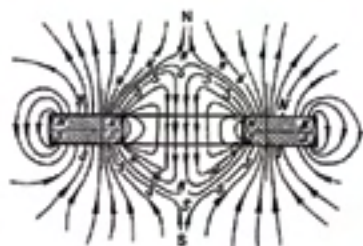Prof. Velimir Abramovic,
Time Institute, Rotterdam

read in this issue

Experiment Dec. 1899.
Colorado Springs.
Streamers 30 feet across

Vortex energetics

Heat exchanger

Hot flow (HF)

Vortex tube

Cold flow

Bypass

HF

HF

HF

Motor

Centrifugal pump

Vortex camera

FIG.1

Central electrode

To centrifugal pump

Dielectric

Vortex tube (metal)

ELECTRICAL INVERTER

−

+

Power to centrifugal pump

Bypass (dielectric)
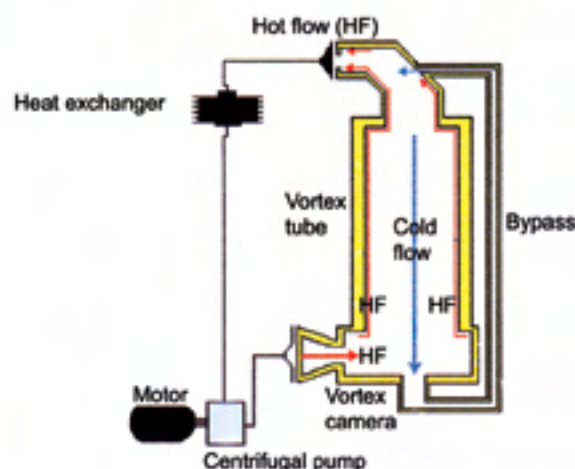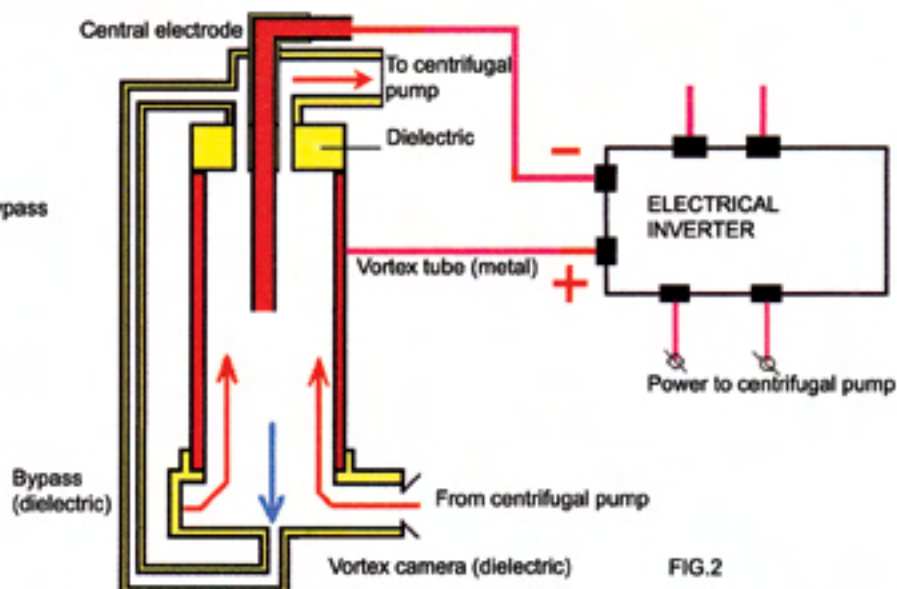
From centrifugal pump

Vortex camera (dielectric)

FIG.2

Read in this issue new report from Acad. Oleg V. Gritskevitch

Pulkovsky radio-telescope receives the signals
from the Center of the Universe
(read in this issue new article from
Dr. Alexander Mishin, St.-Petersburg, Russia)

Fig.2 A

Fig.2 B

NEW ENERGY TECHNOLOGIES #4

1. On possibilities of vortex energetics. News about experiments by **Acad. Gritskevitch O.V.** and **Lisniak S.A.,** Vladivostok, Russia.
2. Tesla, "time control" and other aspects of Tesla's research work, **Prof. Velimir Abramovich**, Rotterdam.
3. Future Energy Technologies, **Dr. Thomas Valone,** Washington, USA.
4. On the question of Work made by electrostatic field, **Alexander V. Frolov**
5. On general nature of forces and new methods to produce propulsion force by **Dr. Eugene Sorocodum,** Moscow, Russia.
6. Antigravitational wing, **Ponomarev D.V. and Shibeko R.V.,** Komsomolsk-on-Amur, Russia.
7. Radio-telescope in Pulkovo receives the signals from the Center of the Universe**, Dr. Alexandra A. Shpitalnaya and Dr. Alexander M. Mishin,** St.Petersburg, Russia.
8. There are no secrets in inertialess motion and antigravitation, **Dr. Anatoly Rykov**, Moscow, Russia.
9. Inductive conversion of heat energy to electrical energy, experiments with magnetic materials to get free electric energy from magnetic materials by **Nikolay E. Zaev,** Moscow, Russia.
10. Tetra-space co-ordinates, **Josef Hasslberger**, Rome, Italy.
11. To the question of multipolarity, **Alexander V. Frolov**, St.Petersburg, Russia.
12. Ball Lightning: description and experimental proposals, **Ivan Tshinarev,** Tver, Russia
13. The problem of electron and physical properties of time to the electron technologies of the 21st century, **Prof. Oleinik,** Ukraine
14. Parametrical generation of alternating currents by N.D.Papaleksi, **Alexander V.Frolov.**
15. Gerlovin's theory of activation, review of some experiments on the "structure activation" of matter, **Alexander V. Frolov**, Russia

On Possibilities of Vortex Energetics

Oleg V. Gritskevitch and S.A. Lisnyak

Recent time a lot of publications on vortex energy, mechanics, etc. appeared in scientific and technical world. Forty years ago there were a lot of publications on furnace of aerodynamic heating (FAH) in the press. FAH were applied to heat various materials in closed bulks. Principle of their work is based on the application of centrifugal air compressor included into closed aerodynamic system. Significant increase of temperature up to 700-800 C was received in this system due to molecular friction, acceleration and braking of air. Efficiency of these furnaces was not more than 0,8. Thus, physics of FAH is very simple: kinetic energy of gas is transformed to heat energy through braking.

Publications on Rank's air vortex tubes and their application in various industries as generators of cold (freezers) appeared approximately thirty years ago.

Nowadays the works on application of the tubes with liquid operating environment as converters of energy appeared in printed publications. We can place heat generating units YUSMAR by Potapov & Fominsky and Gritzkevitch's vortex tube among them. In the first case the units generate additional energy in 1.54 times more than their energy consumption. In the second case (Gritzkevitch's vortex tube VT) there were used wonderful dielectric properties of pure water during its vortex rotation for direct creation of electrical energy.

Theoretical ideas by Mr. Fominsky on rotational movement of physical bodies show a possibility to reach the coefficient of transformation of power (CTP) equal to 2 (during acceleration of rotation). And even CTP can be equal to 3 with the following braking of rotating liquid.

Perspectives of VT are very attractive since a possibility to create pure excessive energy of unlimited quantity appears. But there are no sufficiently strong ground of physics of the energy transformation process in the works by Mr. Potapov and Mr. Fominsky. There is only a statement that water itself will find a way to extract additional energy from itself and from environment!

VT physics is not clear yet, and the authors have not met a good explanation of it in other publications. But while observing rotation of liquid in the tube itself we can make remarkable conclusions.

Practically all VT (excluding Gritzkevitch's VT) are made fully of metal, which is a good conductor of electrical current, and operating environment of the tube is water with sufficiently enigmatic inner structure. In general, this construction and principle of operation is shown on the Fig. 1.

Water comes into vortex chamber (VC), where the flow is swirled along the whole height of VT, from the centrifugal pump (CP). An axial cold flow (CF) is formed along the axis of VT counter down and rotating opposite to the peripheral hot flow (HF). **Thus, a thermodynamic pair forms inside the VT**. But there is an open question, why the external flow heats up though it should cool down (moving with acceleration and expanding) according to all known physical laws. This contradiction can be eliminated, if we note the fact that during the rotation of liquid along the VT a **hydro-dynamical pair**
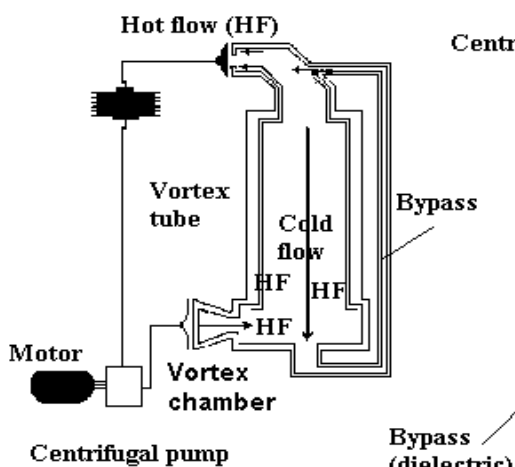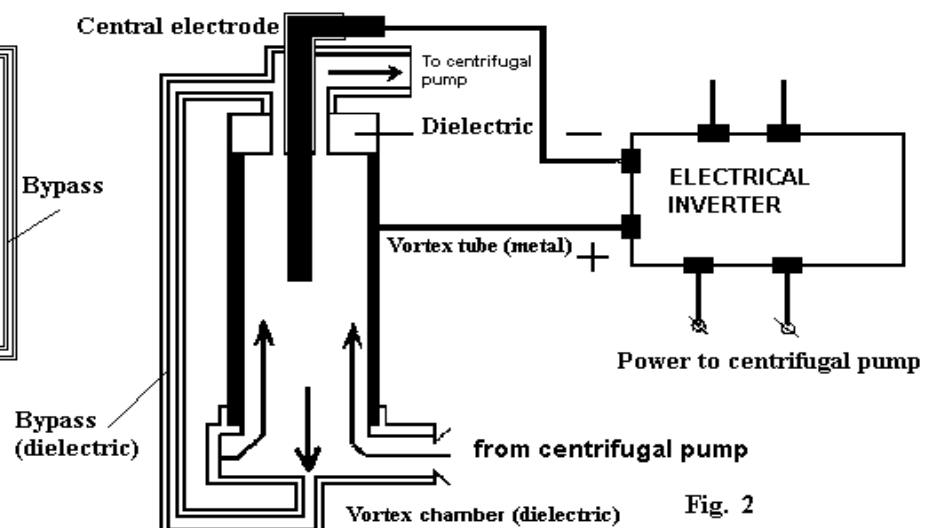

Fig. 1

Fig. 2

is formed from peripheral and axial flows separated form each other by the interlayer of thermodynamic process of continuous phase change (vapor – water – vapor). At that evaporation takes place on a small distance from the axis of the tube, and in this case a **part of energy (heat) is removed from the axial flow, that's why it cools down.** Then this vapor is condensed on the peripheral flow practically in the thickness of molecular layer, where it gives its energy to the peripheral flow! And this energy is big enough, 2.5 MJ to one kg of vapor.

Also some electrical potential difference is formed in the same layer and a powerful electrical filed appears. This field has tension of 0.4 – 120 KV/cm, which depends on the quality and temperature of water. But if the body of VT is a good conductor, then a closing of this field along the body of the tube takes place continuously, which is equivalent to the passing of electrical current of great strength through the peripheral flow. As a result, the additional heating of the flow takes place. The axial flow is a supplier of electrons to this process. Obviously, this process is related with the changes of vacuum structure of space since in the center of axial flow (according to the law of rotatory movement and the law of energy conservation) the angular speed should increase up to infinite values. But molecules of water have finite sizes, that's why the separation (evaporation) of water molecules from the axial flow and their condensation on the peripheral flow takes place on the certain distances from the axis of the tube due to the high centrifugal forces.

> **This process stipulates the transfer of energy!**

If the tension of electrical field between the axial flow and peripheral flow exceeds the electrical strength of gas or liquid, then electrical discharges (sparks, lightning, etc.) will take place continuously. These phenomena take place and observed during formation of powerful atmosphere vortexes, storms, tornado and others!

Practical conclusion from foregoing is the following: we have a real possibility to create electrical generators of vortex principle with the highest conversion coefficient. We should only check it in experiments.

The practical scheme of vortex hydrodynamic electrical generator is shown on the Fig. 2.

Experimental testing of the supposed scheme lies at first in the proving of hypothesis on thermo- and hydrodynamic pairs as sources of energy conversions in the VT as well as in the determination of main spatial and hydrodynamic ratios of drive and loadings.

In attempt to explain the processes taken place in the VT we should show the section of the VT in horizontal plane (Fig. 3) and sufficiently clear pattern of distribution of angular speeds along the section of the tube (Fig. 4).
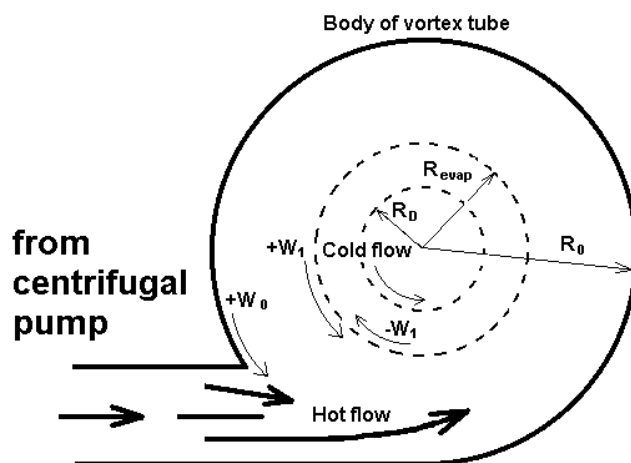
Fig.3
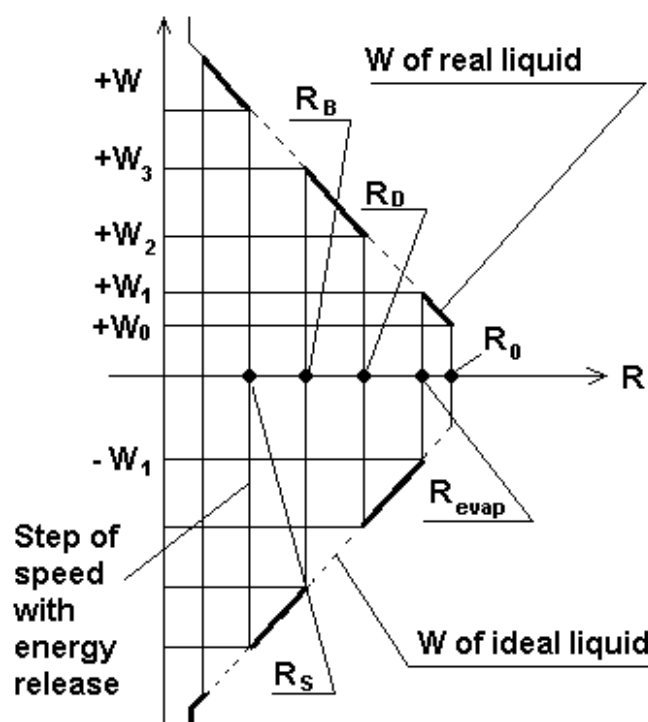
Fig.4

R_0 is a radius of the tube, $R_{evaporation}$ is the radius of thermodynamic break of cohesion, R_B is the radius of break of intramolecular bond of water with isolation of O and H and appearance of powerful field between the axial flow and peripheral flow. R_D is the radius of decay of nuclei of O and H elements. R_S is the radius of synthesis of new nuclei from O and H decay products.

As we can see from these figures, the rupture of liquid should take place along the radius of step R_{evap}. Though liquid is a fluid, but during the rotation the indivisible body of water experiences the more breaking force the closer it to the center. It occurs since with maintenance of continuos tangential speed the angular speed should increase and centrifugal forces grow together with this speed. These forces literally tear away molecules of water from the axial flow along the circumference R_{evap} for the given liquid. **In result of this, the part of water of the axial flow gets a huge negative acceleration of rotation and forms it counter to the peripheral flow!**

The released energy as a heat and electrical charges moves to the external flow. The quantity of this energy from the change of phase should be not less than 2.5 million Joules per one kg of broken mass and not less than 137 million Joules per one kg of disintegrated molecules of water!

One more circumstance follows from the Fig. 3 and 4. The closer R_{evap} to the center (i.e. the smaller it is) the bigger step of energy we will receive. Therefore, it is necessary to seek possibility of work with liquids, which have more energy connections inside molecules. Then in the moment of the energy step we will get a bigger energy at the output of vortex generator.

Going further, if we use liquid elements as a fluid materials (such elements as mercury, natrium, melts of other metals) and put them into the VT, then with certain initial angular speeds on the boundary of R_{evap} for the **given materials we can get nuclear reactions of splitting and synthesis!**

This certain initial speed also exists for water, i.e. there are conditions of initial angular speed, at which on the boundary of speed step the nuclear synthesis (as well as decay) of oxygen and hydrogen is possible. At that we can regulate these processes by changing the initial angular speed and calculating the output of energy at every atom or molecule!

From the diagrams on the Fig. 4 we can see that angular speeds of flows are equal at the absolute value on the boundary of the step R_{evap}, but they are opposite at the direction that proves the law of conservation of energy quantity and increase of energy goes due to thermodynamics of the step.

We can make a conclusion from these diagrams that the initial angular speed depends on R_o, i.e. the more R_0 is, the less necessary is the initial speed. The radius R_{evap} practically depends on the initial speed and rotating matter (material). Energy consumption for the rotation are determined mainly by the initial angular speed and mass of rotating liquid.

Tetra Space Co-ordinates

A Tetrahedron-Based System of Space Co-ordinates

Josef Hasslberger

Via San Damaso 23/A 00165 Rome - Italy
telephone: +3906 635884 fax: +3906 632196
sepp@lastrega.com

We are living in a period of such overwhelming acceptance of the Cartesian system of co-ordinates, based on three axes in 90 degree co-ordination, that it might be considered intellectual suicide, or at least a risky and eccentric affair, to speak of an alternative system of co-ordinates and to maintain, that such a different system would have considerable advantages over what is now generally accepted. Yet, an alternative system has been discovered and is available for refinement and use.

René Descartes, whose birth date we celebrate this year as having occurred exactly four centuries ago, has made prodigious contributions to science and philosophy, introducing reasoning where authority had been the dominating factor before his time. We will concern ourselves here with only one of his many feats, the introduction of a rational system of co-ordinates, with which to locate the precise position of any object inside a known space.

According to anecdote, Descartes invented the presently used system of co-ordinates observing and contemplating the erratic course of a fly in his room and realising that, if he could determine the distance to each one of the three "axes" formed by one of the rectangular corners of the room, he could be sure of its exact position, and that a succession of such co-ordinates would define the otherwise elusive curves that marked the fly's course. Although we cannot be sure that this anecdote correctly survived the centuries, it seems reasonable to assume that the Cartesian system of co-ordinates was in fact based on the geometry of construction that is prevalent until this day, that is, a rectangular configuration of most houses and of the rooms inside.

R. Buckminster Fuller, on the other hand, lived somewhat closer to present time than Descartes; he died in 1983 at the age of 87. Like Descartes, Fuller has made copious contributions to science and philosophy. He is probably best known for his invention of the geodesic dome, a structure of triangularly-interconnected elements that has the best ratio of weight to enclosed space of any artificial construction so far developed. More recently, Fuller has received much public acclaim for having predicted, with his geometry, the existence of spherical molecules. The

Tesla

Prof. Velimir Abramovich

Time Institute, Rotterdam,
velimir_abramovic@hotmail.com

"Things were created rather in the minds of angels, than in Nature, i.e. angels had all things clear in their minds and thoughts before they got a real existence."
Words by Augustine Blessed cited by H.P. Blavatskaya in her book "Secret doctrine"

"I will not work for the present no more, I am working for the future"- said Tesla to journalists in New York City more than seven decades ago. – "The future is mine!" Inventor of alternating current, polyphase motor-generator, reversible magnetic field, radio, teleautomatics… Tesla was inventor, on whose patents energetics of XX century is based, he worked alone on explanation of cosmic processes during decades, having a desire to join material and spiritual theoretically like he did it in his practical discoveries.

Mentioning of Nikola Tesla's name now mainly connected with the so-called Tesla coil, inductive motor and international unit symbol to measure the force of magnetic field. Many facts of his life and his extraordinary creative gift are forgotten.

The most productive period of his creative work Tesla spent in USA. He had patented more than 300 inventions in different countries. Many of them still were not repeated; for example, his receiver of radiant energy. We know nothing definite about its principle of operation besides that may be it is the question of **transformer of cosmic rays energy**. In the period from 1899 until 1900, he devoted himself to the research of electromagnetic oscillations of very low frequencies in the specially built laboratory in Colorado Springs. Two years later he began to build a World Translation Station on Long Island near New York and he didn't finish it. Tesla's friend American steel magnate J. P. Morgan financed this experiment. After this project was closed in 1905, Tesla up to his death preferred to work alone, far from people's sight. But this period was not without new discoveries. Just at that time being a mature scientist he came to fundamental conclusions, which should become a new milestone in future science. We know from history that when scientific thought finds itself at crossroads, the scientists address to the past seeking for support and inspiration. Let's try to answer many important questions.

How Tesla came to his discoveries? These discoveries are: influence of super low-frequency electromagnetic waves on biological systems, especially on the work of brain, merging of energy structures, the so called "fire balls", which produced by inductive fields of primary and secondary electromagnetic coils, superconductivity of natural and artificial mediums, the so called wireless energy transfer and so on.

What are the main axioms of Tesla's cosmology? How do they follow from his metaphysics? How did he apply them in his physical experiments? Why theorists and empiricists of modern physics of time are so interested in reconstruction of Tesla's theory of physical reality and his view on electromagnetic phenomena? Why Tesla didn't formulate his scientific theory and didn't publish it? Can Tesla's sight on ethic aspect of scientific discoveries help to refine modern natural sciences, especially physics, which is in crisis of ideas now? What can we expect from studying of Tesla's conceptions in near future? Whether it will be an overestimate to say that Tesla in 1900 grounded the possibility of global information-oriented society in his famous project "World-Wide System"? Whether it is actually technical and technological basis of that, we call now "New World Order"? Shall we consider Tesla to be a spiritual precursor of a new scientific and technological civilization named as Tesliana, where the **technology of "time design" is prevalent and only and inexhaustible energy source is the asynchronicity of various levels of physical processes.**

*(Editor's note: Time as energy source is the most important topic of many research efforts. How can we explain this way in simple words? To my mind it is difference in energy of oscillations that is formulated as $E=hn$, where n is frequency, that depends on scale of space, i.e. speed of time course. Let's assume that some system of energy E can be moved from space A in local space of accelerated time B. In projection to the space A this means increase of energy since the same wave-length in space B should be less. Let's assume some "bridge" or "energy exchange channel" between space A and space B. In this case we'll be able to create some energy exchange between A and B due to **natural gradient of energy density**. Prof. Abramovic wrote about "asynchronicity of various levels of physical processes" but more accurate notion here is **"relative difference in the speed of time"**, which connected with speed of light and physical properties of space. "Asynchronicity" can be detected for two oscillation processes of the same frequency and to my mind in this case it cannot be used to produce the gradient of energy density).*

TESLA'S RESEARCH METHOD

Let's return to the middle XIX century, to the little village Smilyan in Lika, which was Austrian-Hungarian province. In this village on July 10, 1856, Serbian Orthodox priest Milutin Tesla saw the birth of his forth child Nikola. Tesla's family didn't allow him to study in Polytechnic Institute. His father required him to be a priest. Nikola felt a deep and insatiable vocation to be an electrical engineer and he felt sick due to this disagreement. When crisis came and it became evident that he can die, father finally agreed with desire of his son. Soon Tesla recovered as if it was a miracle and was absorbed in inventive fantasy. After mental efforts

he began to suffer from a strange phenomenon. He saw clear visions sometimes accompanied by strong light flash. It is the ability of people who have para-psychological power - "In my boyhood I suffered from a peculiar affliction due to the appearance of images, often accompanied by strong flashes of light, which covered the sight of real objects and interfered with my thought and actions... When a word was spoken to me the image of the object it designated would present itself vividly to my vision and sometimes I was quite unable to distinguish whether what I saw was tangible or not."

He also described his spontaneous mind traveling: "Then, instinctively, I commenced making mind trips beyond the limits of the small world of which I had knowledge and I saw new scenes. These were at first very blurred and indistinct, and would flit away when I tried to concentrate my attention upon them but, by and by, I succeeded in fixing them; they gained in strength and distinctness and finally assumed the concreteness of real thing. I soon discovered that my best comfort was attained if I simply went on in my vision further and further, getting new impressions all the time, and so I began to travel - of course in my mind. Every night (and sometimes during the day) when alone, I would start on my journeys, see new places, cities and countries, live there, meet people and make friendships and acquaintances and, however unbelievable, it is a fact that they were just as real and dear to me as those in actual life and not one bit less intense in their manifestations. This I did constantly until I was seventeen, when my thoughts turned seriously to invention."

Tesla was satisfied to notice that he could clearly visualize his discoveries; **he even didn't need experiments, models and drawings. In such a way he developed his own method to give material form to creative ideas.** Tesla sharply distinguished ideas, which were coming into his mind as visions and those, which appeared due to analytical mind clearance. Tesla explained: "The moment when somebody designs an imaginary device is connected with a problem of transfer from raw idea to the practice. That's why any discovery made this way has lack of details, and usually it is inferior… My method is another one." He did not hurry up with empirical check. When idea appeared, he immediately began to elaborate it in his imagination. He would change its design, improving it and would "switch on" the device to begin its operation in his head. For him it did not matter whether he tested his invention in the laboratory or in his mind. He even had time to notice if something prevents his invention to work properly… The same way he could develop a perfect idea without any touch. Only then he would give a concrete look for this final product of his mind. All his inventions were developed by this method with no exceptions during twenty years… There is hardly any scientific discovery that can be foresaw only mathematically, without visualization… Introduction of unfinished, crude ideas to the practice is always a waste of energy and time.

Studying the mechanisms of his mental life, Tesla found that a number of visions "from virtual reality" always have certain connection with events of "true reality". Soon he got an ability to realize this causation. He was glad to understand that every his thought is a result of influence of external impressions. He noted that not only thoughts but actions also appear in the same way. Some time passed and it became clear to him that he was only a kind of "automaton of cosmic forces" endowed with abilities to move, responsible on irritation of sense organs and thoughts. Invention of teleautomatic control was a result of this conclusion many years later. He understood the laws of this control through firstly unclear feeling of external conditioning of his own behavior.

Nikola Tesla used imagination as a psychological precursor of well-ordered disclosure made by mathematical methods. We can say nothing of this kind about his contemporary inventor Thomas Edison, because he had "weak knowledge in mathematics, and he at first was guided by long and laborious experiments".

In his records, Tesla often speaks about his predisposition to the mental processes. Principle of these processes corresponds to the same principles, which Nature should follow. He consider this inborn gift to be given as a "diffused pressure", which calls a sense to make another invention, because the experiment of previous researcher was short of something. Here he sees not only a source of invention in general, but also some proof that the law of different reality affects the man. To be short, Tesla considers creative imagination to be a threshold of conscious discovery act.

According to his words, the certain conclusions were born in his mind spontaneously, **in the form of geometrical images.** Then followed the understanding of principle of discovery and its physical interpretation. Only then mathematical formalization took place followed by finding of necessary technical properties of material essential for continuous operation of constructed physical model. The work on inventions he understood at first as a struggle for mental clarification, i.e. elimination of secondary ideas and sensible details, which blur imaging principle and complicate the approach to the real nature of relations between fundamental geometrical elements.

At the same time when Crookes began scientific studying of spiritistic phenomena in London, Mendeleev began to do the same in Saint Petersburg in 70-s of XIX century. Committee of specialists formed in Saint Petersburg after a short work (about ten experiments) concluded that it is just a superstition.

Since then in England and Russia science is subdivided on secret, "fictitious" including Tesla's physics of ether and clear, "real", university science of commercial and even political direction, for example, nuclear physics and theory of relativity.

TESLA AS A PHYSICIST

In theoretical and experimental physics of XX century, we can clear define three different styles of thinking. Quantum mechanics as well as relativism (near-light speeds) and traditionalism to which Tesla belonged (really he is a non-recognized scientist of the future) tried to find truth, i.e. real nature of time, space and especially the essence of motion.

Before we'll go into Tesla's metaphysics, namely into the world of fundamental processes of his physics, let's try to pinpoint the place, which Tesla ranks in the world of modern scientific systems.

Plank's constant, Heisenberg's uncertainty relation, Pauli principle and wave function by Shredinger were the main theoretical instruments of quantum and mechanical approach to the cosmic phenomena. The main goal of quantum mechanics, which is to discover fundamental or elementary particle of matter, is still not realized. In spite of great success in studying of process of chain reactions activation and physics of atomic nucleus, processes of formation of nuclei of heavy elements from nuclei of light elements, many things are still mysterious and they are beyond technical control. **Starting from tendency of general development, we can make a conclusion that productive basis of notions of quantum-mechanical physics is exhausted.** It became evident that we should research such categories as time and space again, at deeper level of realization, at ontological level to determine a true nature of physical processes.

Special theory of relativity by Albert Einstein published in 1905 in German magazine "Annalen der Physik" marked the second milestone in theoretical physics and used four-dimensional space-time continuum by Minkovsky as a model of physical reality.

The third method to understand physical reality relates to Tesla's ideas. **Starting from works by M. Faraday and D. Arago from the one hand and L. Galvani and A. Volta from the other hand, Tesla could create his own original theory of world on the basis of theory of acoustic resonators by Helmoholz and modified ether model by lord Kelvin. This theory gave outstanding results in experiments. Initial axiom of his theory was that universal energy of one physical system is based on the laws of resonance of vibrations, on coincidence of oscillations of system's parts. He considered that theory of ether cannot be excluded from physics, because matter and space cannot at all be completely and strictly separated.**

(Editor's notes: You can find this simple and important aspect in the letter of M. Faraday to R. Tailor. It is Faraday's opinion about the nature of matter. In his letter to Richard Tailor of June 25, 1844, M. Faraday wrote: So, matter anywhere is continuous... it is not necessary to assume the difference between atoms of matter and some intermediate space. The forces around centers provide these centers with properties of matter... M. Faraday considered this aspect to make a conclusion for the nature of electric conductivity and insulation. However, his point of view can be developed in gravitational aspect also. Atom and space around of an atom (physical vacuum) is the same ether matter in different states. In some articles it was demonstrated that this difference can be defined as opposite directions of the time flow for "inner cosmos" of matter and "spatial cosmos" between atoms of matter. Energy balance is provided by this way in the Universe.)

It is Tesla's opinion that electrified state is a fluid state based on the substance having the properties of perception and elements of consciousness. In mathematics, the scientist was the follower of realistic approach, holding the idea the properties of mathematical and physical objects directly correspond to each other. In experimental approach, Greek mechanician Archimedes served as an example to him. Archimedes stated that "time should be excluded from physics" as an excess phenomenon. It should be noted that even in XIX century scientists H. Hertz and D'Alamber tried to create theoretical physics without notion of force, but this attempt failed. Russian scientist N.A. Kozyrev followed it, but his theory also didn't achieve the level of practical application. **Problem of relation between force and time in physics is still unsettled.**

Tesla's experiments mainly consist in ascertainment of deep common properties of physical systems, which should be brought to resonance. Evidence to it was his complex electromagnetic oscillator, Wardenclyffe Tower (built at Long Island near New York in 1901-1905). He could make simultaneous vibrations of ionosphere and the globe by means of this tower.

In mathematics as well as in physics, Tesla was the follower of strict determinism. He held sacred mathematics, but also considered that physical processes could be described not only by mathematical method. It is Tesla's opinion that control of process shall be made by foresight; just the foresight provides control. Such position is radically different from the theory of relativity. According to this theory, objective (immediate) cognition is impossible and reality is recognized by mathematical calculation.

Views of Tesla and Einstein on the problem of physical reality are fundamentally different. According to Einstein, human experience is relative, fictitious and doesn't correspond to true physical reality. For Tesla physical reality is universal and penetrates all levels of cosmic existence, i.e. nobody in any way can avoid certain cognition of the truth. According to Einstein, Ether is not a real category, but exists as a result of fallacious scientific opinions. For Tesla Ether is a unified undifferentiated field, which consists of time, space, energy, and formation of matter is a result of resonant processes in ether.

According to Einstein, Time is only a rank of phenomena, it is not a substantial physical entity or even category and it is registered only by means of measurements with

reference to every system. For Tesla Time is a real algorithm of materialized Mathematics and it is created from Ether due to resonance of physical systems, and it returns to Ether.

(Editor's note: Detailed conception on correlation between notions of Time and Ether you can read in articles by Dr. Belostotsky, Dr. Mishin and others, for example, New Energy Technolgies #3, p.15.

In short: **Control on time course can be designed as control on ether density and direction of the ether wind. Technically it can be realized with longitudinal electromagnetic waves and Tesla worked on development of this special equipment.***)*

According to Einstein, maximal speed is achieved in Vacuum, it is a speed of light equal to 300 000 km/sec. For Tesla speed of electromagnetic waves is not limited, and experiments and calculations were made and showed that transfer of waves and energy at any distance is possible in principle and speed of mechanical and electrical waves penetrating the Earth highly exceeds speed of light in vacuum.

Speaking to his friends, Tesla often refuted some of Einstein's statements, especially those, which were related with curvature of space. He considered that it breaks the law of action and counteraction: "If curvature of space is formed due to the huge gravitational fields, than it should become straight due to the counteraction."

(Editor's note on this Tesla's argumentation: This Einstein's notion of curvature here cannot be considered as usual spatial 3-dimensional curvature of some material object, but it is 4-dimensional notion. If someone became aware of its 4-dimensional sense, then this curvature and 4-dimensional elasticity become really useful notions for investigators of time. Just this elasticity produces force, which moves matter in time from the Past to the Future.)

Einstein was a pure theorist and Tesla was mainly an experimenter. There are no information about contacts and talks between these two scientists. **Nevertheless, Einstein congratulated Tesla with his 75 anniversary. He underlined Tesla's most important merit in science, multiphase system of generators and alternating current motors, which is one of his <u>least</u> important discoveries.** Tesla believed: **"We shall have no need to transmit power at all. Ere many generations pass, our machinery will be driven by a power obtainable at any point of the universe… Throughout space there is energy…"**

TESLA'S VIEWS ON NEW WORLD ORDER

There is no doubt that Tesla had a great feeling of uniformity of terrestrial nature and cosmic processes. He brought the essence of his "World system" (announced in 1900) to 12 positions, which reflect the very essence of modern technical and technological network of world telecommunications. This system is also a technological basis to establish global informational society. Tendency of this society to the universal unification manifests today in many things.

Tesla constructed his "World order" starting from principles of his own inventions. Let's enumerate some of them. **These are Tesla's transformer motors**, i.e. device for creation of electrovibrations with specific properties; **step-up transformer specially designed to excite the Earth** (this device with its electrical transmission means the same as a telescope in astronomy). **Then, Tesla's wireless system** including certain quantity of devices, which is now considered to be an unsurpassed method **to transmit electrical current without wires;** a **device for individualization of signal**, which in comparison with a primitive method to match signal means the same as advanced language in comparison with inarticulate mumbling. Due to this device, it is possible to transmit secret signal both in passive and in active form, because they do not interfere other transmissions and cannot be jammed by other signals. Any transmission is unique in its rhythm and has individual features; actually, it is an unlimited quantity of stations and instruments, which can act on one or two frequencies and at the same time they would not call any mutual jamming. **One more invention is wave processes in Earth's ionosphere;** in popular explanation this discovery means that **field of the Earth reacts on electrical vibrations of given frequency in the same way as a tuning fork resonates with a certain length of wave.** These electrical vibrations can have a strong influence on the field of the Earth. Such resonant effect can be used by different ways, and first to change universal energy system, which is far from to be perfect and didn't use up all its natural abilities.

Tesla defines the goals of "World Wide System" in such a way that it becomes clear: Establishment of dense communicational network of all kinds and levels should serve to humanize scientific technology. In this sense in the very beginning of XX century he was a prophet of XXI century, since **real metaphysical problems began to penetrate theoretical physics only now together with the problems of cosmogony, origin of the Universe, time and space.** Therefore, even in far 1900 Tesla considered that the following things would be necessary (they are already realized now):

1. Establishment of connection between existing telegraph stations or centers all over the world;
2. Organizing of secret state telegraph service without a possibility of jamming (it was not realized due to the fact that inventions by Markoni were used instead of Tesla's patents on radio transmission. Markoni's inventions required a separate frequency for every synchronous transmission);
3. Establishment of connection between existing telephone centers or stations on the Earth;
4. United diffusion of common gazette news by means of telegraph and telephone;
5. Organizing of service with principles of "World Wide System" to transmit private information (it was realized by the worldwide computer web, Internet);

6. Establishment of interconnection of all telegraph systems in the world;
7. Uniform timing mark by means of clock, which mark seconds with an astronomic accuracy;
8. Transmission of signs, words, sounds and so on as well as typewritten and hand-written texts (it is an exact description of fax machine);
9. Creation of service to record music;
10. Organizing of worldwide service for needs of mercantile marine, which should help in navigation, in compassless voyages? It will help to determine location and speed, to prevent collisions and accidents and so on;
11. Introduction of worldwide printing system;
12. Reproduction of photos and all kinds of drawings or hand-written texts with a possibility to send them over the world.

Though development of modern science and technology mainly confirmed Tesla's oracular ideas, it didn't match with them in fundamental sense, namely **all forethought ideas Tesla wanted to realize by means of transmission through the Earth, but not from surrounding orbits.** Due to the same reasons, which made him to stand up against using of nuclear (atomic) energy dangerous for people because of their ignorance of real structure of matter, Tesla considered that any infringement of cosmic space, magnetic field of the Earth is an infringement of harmony inherent to natural laws. In addition, it is a consequence of negative influence of people's free will, which becomes destructive in absence of ethical component in science.

Free will can be creative only with kindness, which accompanies to the higher understanding and conscious selection of positive intentions. He considered that humankind living on the Earth should understand all kinds of natural alliance with the planet otherwise people will be deprived of it.

In 1892-1893 in London Tesla read his famous lectures in Royal scientific society of Great Britain. Together with above-mentioned experiments he demonstrated many others, for example, lighting of lamps by wireless transmission of energy. Really, he only placed a vacuum neon tube to the field of transformer and the lamp lighted. Due to these wonderful lectures ("Light and other high frequency phenomena"), Tesla gained a good reputation and got many friends among scientists - William Crookes, sir Oliver Lodge and J.J. Thompson - lord Kelvin.

When returned to USA in 1893, he was absorbed in the problems of radio techniques, telecontrol and wireless transmission of energy at big distances without losses. He made successful experiments with direct electromagnetic field of the Earth and wireless transmission of energy at Colorado Springs. Though his dairy of this period of work kept safe and it was published, he didn't advertise his most important scientific results. However, all achieved brought him to an idea of universal system of wireless transmission of energy and information. Planetary transmission should be based on such extraordinary inventions as **Tesla's resonance transformer without an iron core and Tesla's Magnifying transformer. Tesla expected a lot from extending transformer. It was a particular transformer made for exiting of the Earth.** By means of this transformer he made very power electromagnetic discharge at Colorado Springs. This discharge exceeded atmospheric lighting and Tesla got electricity, which made white-hot more than two hundred lamps placed at miles around the laboratory. For Tesla it was an irrefutable proof that his concept of wireless transmission of energy (distant action) was true.

After experiments at Colorado Springs in June 1900, he returned to New York and prepared the first universal system of wireless transmission, Wardenclyffe Tower, which he successfully tested three years later. Technical specifications of Tesla's transmitting station now are still unknown, and we cannot state with certainty, what was its real destination...

After unusual night of July15, 1903 when he fired the sky not only above New York but above all vast area of Atlantic Ocean, in 1905 Tesla suddenly left his laboratory without a clear reason and left all things untouched. As we know, he never crossed the threshold of Wardenclyffe, never visited it and never appeared in this region. It was very strange, he didn't take from this laboratory any calculation, drawing or document, none paper.

Last time there were suppositions that Tesla was the man who called a strong and strange by its consequences explosion in Siberia in the region of Podkamennaya Tunguska in 1908! It was considered that this explosion could call a meteorite, but there was not still found not the faintest fragment of it. It is also true that Wardenclyffe Tower was good in technical sense and Tesla passed energy through the Earth and could accumulate and discharge simultaneously a huge quantity of energy at any place of the planet. It fully matched the results of his work of many years standing on studying of Earth's properties as a medium for propagation of electromagnetic waves.

MISSING THEORY

Tesla didn't give us his own physical theory, but with numerous experiments he created a basis for new - resonance understanding of electromagnetism. He considered that **World is a uniform continuous electromagnetic medium and matter is one of manifestation of organized electromagnetic oscillations described by mathematical algorithm. He considered that resonance law is the most general natural law, which eliminates time and distance, and that all relations between phenomena are established only by mean of various simple and complex resonances, i.e. consistent vibrations of physical systems, mainly of electromagnetic nature.**
Finally, instead of Newton's integrals, Leibniz's differentials and Maxwell's theory of field lying in his calculations Tesla used simple mathematics of Ancient

Greek mechanicians, at first Archimedes, making an analogy between mechanics and electromagnetism. It is not possible to fully evaluate the significance of such method of thinking, which directly points out the necessity of more full physical interpretation of elementary mathematical notions.

Obviously, studying of Tesla's heritage is not related only with history of physics. We shouldn't look for technological aspects only; its essence is in miraculous human creativity in science.

TESLA'S SCIENTIFIC WAY NEEDS UNDERSTANDING AND FOLLOWING

We need analysis of Tesla's evidences relating with creativity lying in the base of new physical and technical processes discovered by him. It possibly leads to opening of new way of cognition. It is important to understand an original scientific and research method of Tesla and non-developed cosmic principles (relation), which are realized, with the World of ideas. Tesla could create visual images competitive with images really perceived by organs of vision. **He as if changes the usual direction of nervous impulse on the opposite direction, from brain to retina, eliminated external image and substituted it with eidetic one. Tesla sent his impulses like from "inside". He called it mental laboratory.** In addition, it was his main method of experimenting. He had an ability to transfer mathematical, abstract notions into inside visible images, give them geometrical interpretation, and than transfer them into the form that could be physically realized as working models for realization in device.

He "made corrections" and "adjusted" a device for operation in his mind. When later this device was made of wire or another material, it always worked. As Tesla said, **there was not a case** when such invention didn't correspond to Nature, i.e. it didn't work as a physical prototype.

His method was unique in comparison with other scientific prophecies. Michael Faraday, for example, like Albert Einstein felt a kinesthetic premonition in the moment of striking (it was pressure and motion in peritoneum region), he had some kind of mental stress in the moment when an idea appeared. Dmitry Mendeleev dreamed of periodic table in three dimensions colored with bright almost fiery red colors like it is in all prophetic dreams. However, it happens very rare, with few people and at certain moments. Tesla was in this condition all his life and in addition he has been training during decades to maintain his spiritual and creative activity.

Tesla was a man, whose main philosophy and axiomatic didn't belong to the modern world. We can attribute him to the epoch before Socrates, ancient philosophy. It was not an accident that he was born on Balkan Peninsula. Antique civilization appeared in the old days in southern part of this peninsula. Probably, the reason is different geomagnetic informational field, algorithm, which is general to evolution of neural structures of Pythagoras, Plato, Zenon and Tesla.

Perception of Tesla's physics requires quite different understanding of mathematics; in some extent it should be sacral in the spirit of Pythagoras. Pythagoras considered that numbers and subjects are really interrelated. They correspond to each other in some properties due to informational and mathematical aspects of matter existence as one of manifestations of Divine Logos. Even less attentive researcher can immediately notice **that there are no infinitesimal or differentials in Tesla's works.** Tesla told about James Maxwell, creator of theoretical electromagnetism, that his elegant differential equations are the poetry. One could find Maxwell's works in Tesla's library; these works were published when Tesla was twenty and he was a student in Gratz. There is no another reason, which allows to explain, why Tesla didn't use them except one, very serious and deep: **he discovered more simple and more effective way and more felicitous physical interpretation of mathematical notions. By means of this notions he foretold course and results of experiment.** It is evident that he was a man of such strength and astuteness that he could keep away from conclusions of science, which was modern to him, its system of notions and mathematical apparatus, which were far from perfection. It is not occasional that he didn't uphold his diploma. It was an indication of spiritual independence for him, but not idleness or revolt as it can be sometimes.

His method of work could turn him to the absolutely different direction but it didn't happen. It proved that he could control the essence of his psychic visions and other conscious or unconscious manifestations that is the basis of creation. In the moment when he felt effects of impulses came from outside, he could override them, control and analyze. He could do an impossible thing: by means of exercises, which he developed himself, he got up to the level of man, who does not depend on impulses provided by external world, and at first on his own inner psychic states. Essence of his genius was in the fact that things understood by him and appeared in his subconsciousness under influence of external field was a picture of cosmic processes or the same natural laws. Because of it, he was distinctly different from other people.

He said about rotation of magnetic field, with which the rotor of an engine began to rotate under the influence of changes taken place in the external field: "Now I know, how Cosmos works".

This is the source of his theory on people as automates of cosmic forces. If we add Tesla's practically discovered axiom, that "energy of system is derived from environment", then we will find the reason of his conviction that entire Cosmos acts on the principle of vibration and resonance. Finally, if we agree with the fact that all **energy of system appears under the impact of external induction, than it will be easy to fancy Tesla's cosmological model as a series of circuits of**

magnetic fields, which rotate concentrically. Really, the Galaxy rotates, Solar system rotates around the center of the Galaxy, the Earth rotates around the Sun, and molecules, atoms and electrons rotate… All this is a range of rotating magnetic fields, which can be described by the only one law, the same law that was responsible for starting Tesla's inductive motor.

An open question is about **Tesla's real understanding of time and space categories.** We can say with certainty that in his research of how low frequency electromagnetic waves are transmitted through the Earth **Tesla didn't face with the problem of conjugacy of force and space, but, for example, general relativity theory (GRT) faced this problem.** GRT has some complexities in physical explanation of differential equations, which describe the properties of curved space under the influence of gravitational forces of different power. According to this theory, the constantly increasing attraction force can influence time itself returning events back and violating the principle of causality.

Rene Decart in creation of his coordinate system used the same geometrical notion to picture abscissa and ordinate. They are two straight lines interminable in their lengths, which he interpreted as time and space as if there is no difference between them. Is it possible? It is hardly possible. You know, space and time are different physical categories and we hadn't understood their nature enough. Besides, abscissa and ordinate are divided by an angle, which does not have a special physical interpretation. That's why if we are picturing physical phenomena in so geometrical way, we have a risk of not taking into consideration the criteria of reality in checking of mathematical hypotheses.

There is no doubt that Tesla by means of his physical research discovered a fundamental physical law, which is not clear yet, and applied it so easily and with a such astuteness, that a dilettante as well as a specialist could similarly understand that he spoke about exact knowledge. But now it is hard to imagine, what were these usual mathematical operations of division and multiplication, natural algorithm or square root taken separately, which are so significant in Tesla's experimental works. Physical explanation of mathematical methods, especially univocal, is situated on the boundary, from where we can see the field of transcendental mathematics. However, it is evident that **if all physical reality can be reduced to the mutual relation of electromagnetic fields, then mathematics is a theory, which can express the essence of these connections most effectively.**

If electromagnetic oscillations correspond to the mental plan (discovery made by Tesla at Colorado Springs is still proved experimentally now), **then it means that mental plan itself should have the same nature and follow to the resonance law.**
A conclusion arises that numbers are some "programs" of organization. Tesla's research, as it were, prove the verity of cognition theory by Plato.

In his theory, Plato stated that mathematics is a link between World of ideas and World of material phenomena. To be more precise, mathematical algorithms and mathematical logic is properly a method to realize ideas. Finally, all old innermost legends teach that matter is only a concentrated light, and it is Tesla's all-penetrating cosmic substance - "luminophore ether".

WARSHIPS AS TIME MACHINES

There is a story, book and two movies describing an event, when in 1943 American navy made an unusual experiment to make one of the warships invisible. It was necessary to make ship create a strong field around itself using power magnetic generators. This field should be able **to change the direction of light beams** as well as to grade the radiation from radar sets and thereby hide location of the ship. It took place as recently as six months after Tesla's death and disappearance of important scientific documents and apparatuses from his room. The event took place in Philadelphia seaport. When generators were engaged exceedingly, something unexpected happened. The number of strong electromagnetic fields **changed local time-space coordinates** and cruiser (Eldridge DE-173) disappeared for some time. Then the cruiser appeared for few seconds in another place, i.e. in one of the biggest sea base at Norfolk, in the port at south-east Virginia at Atlantic coast, which is 350 km far from Philadelphia. The strangest things happened to the crew. One half of sailors disappeared forever, some of them went crazy or got an ability to disappear and appear again by their own will. Part of the screw who survived, stated that they "have changed the world" and saw or even spoke to extraterrestrial beings. A thick greenish fog preceded to the disappearance of the ship. This fog covered body of the ship with starting of strong electromagnetic generators, which produced intensive focused electromagnetic fields.

Three ships took part in this experiment. The above-mentioned cruiser was in the middle, shell of bodies of other two ships served as a mirror. Actually, **the case in the point is open "lasers", which do not need vacuum. Beams of these lasers can be transferred at any distance and in any medium. Tesla produced such lasers in his New York laboratory even in XIX century. He illumined the room without any lamps by luminescence of air.**

Let's return to the significance of Tesla's experiments in Colorado Springs in 1899-1900 to see what are the real results of this work? When making experiments with ultra low and ultra high frequencies of electromagnetic waves, he obviously was successful **to determine the frequency and type of modulations, which is provided by fields of fine body of living people** as well as dead people (numerous articles are devoted to it, but these articles are lacking of theory and contain inexact suppositions). Most likely, he could create a field of ultra high frequencies, which corresponds to resonance frequencies of disincarnate

souls (it is soul, which already has no connection with the body) and thus he became proficient in visualization techniques of the so-called **astral level of being for biological organisms.** Calculations in Tesla's records could seem to be insignificant for modern specialist since they are very simple and cannot be understood without additional explanations. Only mind, which has similar perceptive ability, can understand Tesla's calculations.

SECRET OF "FIREBALLS"

Tesla could reproduce complex energy structures in laboratory conditions. He called the "fireballs". Russian academician Peter Leonidovich Kapiza also studied them, but he couldn't reproduce them in controlled mode without Tesla's resonance transformer. Nowadays physicists (Corum brothers in America) reproduce some of Tesla's experiments with a certain success. They could receive "fireballs" of a very short life period and only of three millimeters in diameter. Tesla produced "fireballs" of football ball size, kept them in hands, put them to the box and covered it with a lid, and then he took them from the box. These fireballs were almost stable structures, which could be kept for minutes. Certainly, Tesla knew much more about this phenomenon than modern science; he knew the secret of cold plasma fusion in free space.

Thus, Tesla penetrated to the field, which was unexplored before, i.e. the time engineering technologies. He also emphasized **that his electromagnetic waves were different from Hertz's waves**; i.e. the length of wave transmitted by him is equal to the distance on which this wave is transmitted. In other words, it is equal to the distance between sending object and receiving object. Hertz measures and space measures are changing in opposite directions: one Hertz is taken as corresponding to the wave length of approximately 300 000 km, 2 Hz – 150 000 km, 3 Hz - 100 000 km etc., which means that real length in space is decreasing with number of Hertzs which are increasing.... That is why Tesla did not count in Hz-s... Obviously, Hz's measures are not adjusted to technical properties of electromagnetic tools.

*(Editor's notes: To my mind, it is not so important to produce calculations in Hz or in meters, but the difference here is the qualitative **difference between transverse and longitudinal waves**. In "Pioneer Radio Engineer Gives Views on Power", New York Herald Tribune, Sept. 11, 1932 N. Tesla wrote: "I have showed that universal medium is a gaseous body. Only longitudinal impulses can propagate to this body. They create variable compression and decompression like those, which are created by the sound waves in air. Thus, the wireless transmitter does not create Hertz's waves, which are a myth, but **it creates the sound waves in ether. The behavior of these waves looks like the behavior of sound waves in air** excluding the fact that the huge elasticity and very small density of this medium makes their speed equal to the speed of light." In other Tesla's article "The True Wireless" he wrote about this great*

*mistake of modern science: **"The Hertz wave theory of wireless transmission may be kept up for a while, but I do not hesitate to say that in a short time it will recognized as one of most remarkable and inexplicable aberrations of the scientific mind which has ever been recorded in history.")***

Besides, there were not only circles of oscillator (a device, which took part in the transference) in resonance, but the entire system was also in resonance with natural electromagnetic waves of the corridor of their passing.

It meant that **an oscillator, which started the transmitting, almost "intercepted ether" in the space between transmitter and receiver and by this way it created a field of standing waves. Thus, a waveguide formed at first, which couldn't transfer energy of its own. Then Tesla turned on a low-frequency field and transmitted waves of lower harmonic components of the main field carrier, in the ratio of 1:4.**

In such a way he could transmit energy at the desired distance and he could make strong continuous electromagnetic discharges in certain zones while creating the wall from ionoplasma. Nothing could fight through such energy wall without decay on molecules or atoms.

TESLA AS A CLAIRVOYANT

It is evident that Tesla knew the phenomenon that we can call parapsychology in the lack of a better word. As we told above, a method he used to make his discoveries or work in the laboratory has no analogues in the history of science. There are more that 150 000 documents in Nikola Tesla museum in Belgrade, but he didn't leave any description of his scientific method, which is comparable only with states experienced by yogis or with things known by saints. Now few people consider Tesla to be a philosopher or spiritual man. They do not think he was a man who inspired physics, technology and science. Finally, he founded a basis of a new millennium civilization with all his life and work. Though now his influence on the modern tendencies in science is minimal, his role needs in revaluation. Only the future will give a real explanation of Tesla as a phenomenon, because he went far ahead and he stands higher than the methods accepted nowadays.

A well-known Indian philosopher Vivekananda, on of the members of Ramakrishna mission, who was sent to the West to find out a possibility to join all existing religions, visited Tesla in his New York laboratory in 1906 and immediately sent a letter to his Indian colleague Alasingh. He rapturously described his meeting with Tesla: "This man is different from other western people. He showed his experiments with electricity. His attitude to electricity looks like an attitude to a living being. He speaks with it and gives orders to it. I speak about spiritual person of the highest degree. It is no doubt that he has a spirituality of the highest level and can call all our gods. In his electrical

multicolored lights, I saw all our gods: Vishnu, Shiva… and I felt the presence of Brahma himself ".

PHYSICS OF TIME ACCORDING TO TESLA

Resonance is simultaneity, and if we change the periods of oscillations of electrical circuit, then geometrical picture of magnetic field distribution will change and generator is set in motion only under the influence of temporal factor. Motion is a result of asynchronism. It proves the fact that it is possible to obtain the change in speed of the motor and thereby its mass without an additional impulse, i.e. without an additional force. Tesla's reversible magnetic field can be a proof of this fact, isn't it?

Tesla wrote from Colorado Springs to his New York friend Johnson that he found a thought in "scribble" of high-frequency electromagnetic discharge and soon Johnson would be able to read his poetry personally to Homer, whereas Tesla would discuss his discoveries with Archimedes. The same way we can find a detailed description of "green" electromagnetic waves in his research journal. These waves looked like a fog, which appeared when the warship in Philadelphia disappeared. When Tesla returned to Colorado Springs, he told journalists that he made a connection with extraterrestrial civilizations. Only few people regarded seriously to this claim. However, there are evidences that Tesla continued his **research on "parallel worlds"** alone and silently without publicity of the results. To all appearances, he made a device to tune electromagnetic oscillations of his own brain, in other words, to control his mental activity. Thus, he could communicate with realities displaced in time (parallel worlds) without any problems.

These researches open a new page in the modern science. They show a possibility to merge material and spiritual aspects in human consciousness (matter and spirit in nature are already merged). **Tesla had an ability to develop both directions of uniform science. He studied physical basis of mind and mental basis of physics with the same success. He came to the essential general conclusions that matter consists of organized parts, which are manifestations of ether in its excited state. One of these manifestations is electromagnetic oscillation.** That's why resonance law is general natural law and it's of time nature, too. A connection between phenomena is provided by resonance of different kind. Electromagnetism is the basis for these resonances. Needless to say that from the one hand, if physical reality can be reduced to the interrelation of electromagnetic fields, then mathematics is a theoretical expression for these relations. From the other hand, if electromagnetic oscillations interact with mental plan, which has the same nature, then numbers are some reflections of organizational structure of electromagnetic fields.

(Editor's note: We discussed the above-mentioned possibility to create "energy bridge" between different levels of reality, i.e. between two local spaces of different speed of time. Now we should to clarify one more interesting Tesla's idea – "parallel worlds". Possibility of co-existence for two or more Universes in the same place can be physically and mathematically proved. The "time shift" is a new notion, which should be used for it. There is an old Shrodinger's conception of "flickering matter", which describes reality and allows superposing of two or more material objects in the same place with some time shift. The matter in this conception dynamically appears and vanishes. This principle mathematically is very close to theory of modern multi-channel telecommunication systems with time separation of signals. Period of time when the matter is "appeared" can be only small part of the cycle and by this way many "parallel Worlds" can be organized. The time course or rate of processes in all parallel Worlds should be the same but they should be asynchronously organized. So, this aspect is different in principle from idea of "energy gradient" between slowed space-time and accelerated space-time.)

I personally believe that mathematical and physical truisms, or rather geometrical and arithmetical phenomena, should join and become a basis of uniform Cosmology. Now we should take into consideration that we are staying on the threshold of this Cosmology. Somebody calls it a "New Science", but "Unified Science" is more appropriate term, because unified laws make the basis of our Cosmos. In fact, Unified Science is the Science of Time.

Tesla's electromagnetic theory was vivid illustration of unification of material and spiritual origins of the Universe. Practically he made a lot and due to this fact he did not leave his theory for us. Possibly, he could leave us a religion but he didn't want to do it since he knew that God needs conscientious followers in science.

"MYSTERIOUS PILGRIM" BY MARK TWAIN

A famous writer Samuel Clemens (we know him under the pseudonym Mark Twain) often visited Tesla's laboratory. Tesla was very close to him and several years after Twain's death he spoke about him as if he was alive. The writer Mark Twain died in 1910, and his enigmatic novel "Mysterious pilgrim" was published six years later.

In this novel, he told about an Angel who left heavens and came to a small Austrian village. There he met a group of boys and let them into the secret of the universe. If we recognize little Austrian village as Smilyany and figure of Angel as Tesla, then an explanation of a very strange theory on human destiny and cosmology will appear. This theory expressed in this short story made it to be different from other stories of this writer. Angel tells about the source of all people's troubles and misfortunes. **All it comes from misunderstanding of true sense of occasionally very small events.** Each of these events defines future links of the next events. As he considered, people's free will is an illusion since all is predetermined and will come to a principally predictable result. That's why the given

human individual psychosomatic structure has limited number of possible destinies (ranks of events) and a man can switch back and forth due to the will of higher beings. For example, Angel takes part in the event, when a person closes or opens a "window", which was predetermined to the person, so after this action the destiny of this person will go another way depending on the specific action, and this act will call a new succession of events. This entirely coincides with Tesla's idea of a man as an "automaton of cosmic forces"and it is brought out clearly by simple dramaturgic tools used by famous writer.

Finally, before Angel left his friends, he let them to the last magic secret, which would be terrible to them, i.e. secret of Non-existence. He said that all is only a thought. There is nothing existent... I am only a thought, lonely thought, which travels along the empty space of the Universe".

MYSTERY OF WARDENCLYFFE TOWER

Let's visit Tesla's laboratory in Colorado Springs again, where inventor made his experiments using electromagnetic field of high frequency. He studied operation of human brain on himself. He wrote to his fellow Johnson about some intelligent properties of electromagnetic field. **Biophysical principles of neurology were born.**

Just after this, in 1901, a construction on Long Island began. The matter concerns a complex transmitter of electromagnetic waves. Tesla applied all his knowledge to design it. They are: teleautomatic control, Hertz's wireless wave transmission, **unique ether theory, according to which any natural element of Mendeleev's system has its own gravitational acceleration and Tesla's techniques to control the speed of time course.** A new physics was born.

A question appears what concept of the World lies in the basis of experiment with resonance focusing of magnetic and electromagnetic fields. Let's return for a moment to a mystic Monard and his picture of Cosmos. Speaking about vibrations, he underlines the presence of different nations, races and tribes on the planet, but we cannot meet people, who could live without music and dancing.

Even 2500 years ago Pythagoras said to his progeny that **stone is a "frozen music"**. Every particle of the physical Universe has a certain property, which is pitch and pitches of its separate frequencies, i.e. its melody.

Nature of influence of music on a man is the same as the nature of its influence on the world of things and events, because vibration is the basis for all. Frequency of vibrations of subatomic particles is very high and waves in the center of subatomic nucleus move quicker. Vibrations of all radiant energies (radio waves, heat, light, X-waves and so on) could be ordered. Electromagnetic spectrum in such consideration contains more than 80 known octaves and visual light is only a part of this rank.

Electromagnetic waves as acoustic waves in music have their own harmonious high-pitch tones and there is some kind of octave principle, i.e. doubling of frequency. Laws of music and harmony applied to electromagnetism give splendid results. That's why Nikola Tesla used the works by Herman Helmholz about sound to develop his electrical resonators.

Johan Kepler, an astronomer, who lived in XVII century, believed that every planet of Solar system is alive and there is a guardian angel on every planet, which listens its music. Planets "play music" on their circumsolar orbits.

(Editor's note: Dr. Kirill P. Butusov, St.Petersburg reported about his discovery of correlation laws for all planet orbits of Solar system. They really confirm the laws of harmony.)

A particular combination of sounds, which we call music, is an expression of relation between things, in other words, their likeness and difference. It is also a principle of appearance and disappearance of phenomena as well as the principle, which shows how new young systems grow from coordinated harmonious systems. The deep inner structure of music is the same as the structure of all the rest.

A Dutch scientist Christian Huyigense in 1665 noticed that pendulums of two clocks hang on the wall near each other starts to work in rhythm. It is a universal phenomenon. When two or more oscillators begin to pulse with sufficiently small difference in time (with small shift in phases) their oscillations come to coincidence spontaneously. They behave according to the principle of minimum energy since every separate pendulum requires less quantity of energy with synchronous pulsation than in the case of arrhythmia. This co-ordination is everywhere, but we rarely notice it. We can say that all animate things are oscillators, which pulse and change their rhythms. Even the simplest unicellular organism is in complex oscillatory state. All motions on subatomic, atomic, molecular, subcellular and cellular levels are coordinated. In such an organism like a human one it is very difficult and even impossible to determine corresponding parameters. Our inner rhythms are closely interconnected and they are coordinated with external world. Physics of a man and states on his rarified plan (astral) change in one rhythm with the Earth's movement around the Sun, with ebbs and flows, change of day and night and with many other cosmic rhythms. With violation of coordination between these rhythms organism feels discomfort and even presentiment of near illness.

Our physical body serves as an exponent of our inner leading pulse and at the same time, it is our individual distinction in Cosmos. **The so-called "fine body" in**

essence has an electromagnetic material base. Life of each of us is characterized by certain rhythmical scheme, which is subjected to physical death and retains an extra-body experience of the spirit, which should be reincarnated.

There is a supposition that the so-called "Shuman waves" takes place in the telepathic transmission of image and thought. These are waves of 7.8 Hz frequency, which form a field of standing waves in the space between ionosphere of the Earth and its surface.

(Editor's note: There are two bands of the Shuman waves, i.e. short waves Earth-ionosphere and long 7.8 Hz waves around the globe. There is a conception, which considers them as different sides of the same phenomenon: the unified helical spiral wave in spherical resonator of the planet. In this case the short waves correspond to diameter of the spire and the long waves correspond to radius of the resonator. Why it is important? In biology we can see many examples of helical structures, for example, the DNA molecula. Shuman resonance can be considered by analogy with biology and processes in the global resonator of our planet become a kind of vital processes.)

It may occur that a brain enters the state of resonance with some external structure; a result will be appearance of its image at a distance, i.e. there is a contact made by means of resonance but not by means of radiation. Since these waves have a big length (38 000 km), then transmission takes place immediately. Waves with such an extreme low frequency cannot be screened by usual means. In essence, waves of an organism often coincide with these waves by phase. However, the problem is that waves with such low frequencies can transmit quite little information and therefore it is often impossible to receive a clear picture and give a full description of images of things.

(Editor's note: In this point I cannot agree with the author since the low frequency waves can "transmit quite little information" only for Hertz's case of standard modulation methods. Another case is longitudinal waves. For this case the modulation means changes of density of energy in point of receiver and it is not related with the wavelength. The analogy for this case is changes of electric field. If intensity of electric field is modulated by some technical way, then an electroscope will feel this changes as instant signal at the moment in any point of the field. In this case the wavelength is zero but frequency of changes of the field can be a very high frequency. Different information can be received in nodes or in antinodes of the standing wave and it is the reason why some places of the planet are better or worse in this aspect. In some articles it was discussed as scalar field modulation.)

Modern holistic (integral) approach to understand the Universe has sacral traditions per se. These traditions were laid in foundation of any religion, which are Judaism, Islam, Buddhism, Christianity, where we can find a clear **statement that every part of Cosmos includes the whole. It is analogous to the principle of holography.** It is considered that we can make a full hologram of the Universe based on any of its small parts. Formation of this hologram can take an arbitrary long time. Hologram of a **real** man is something different from physical basis of **ideal** cosmic rhythm.

(Editor's note: Yes, the more close to the ideal – the less the difference.)

Consciousness, which is a continual manifestation of rarified substance (astral) of a man, is shifted by its phase in comparison with genetic material, and conscious will is only a one of universal instruments of cosmic purposefulness. A "right" man acting in a "right place" is a man whose intentions are coordinated with cosmic rhythm. Conscious intention has a big power, and our main choice is to take a responsibility for its results. So, **actually we are made of waves but not of matter, which is called "solid". All that we call things and events are a manifestation of acting of these waves.** Every man has its unique cosmic identifier assigned by a certain function of waves, which represent us. Every man has his own hologram, which contains universal information about time. Identifier is a main element of Cosmos that characterizes an individual specificity of a person, who using this identifier. By means of this element the person can influence on everything by methods, which even seem to be unusual. We are a peculiar hologram, so potentially we know all about all.

After above-mentioned common statements, let's remember about Nikola Tesla. Secret of Wardenclyffe is deep-hidden, and it is impossible to speak about its real destination now. Nevertheless, many things show that the object built by Tesla in Long Island (that time it was a New York suburb) went ahead of all dreams of modern scientists. It was a translator of electromagnetic wave system, which could be easily checked. By means of these waves that scientist called earthquakes, "mental" shifts in people and animals, fired the atmosphere, made impenetrable energy barriers in ionosphere, controlled time, split and condensed the clouds by means of corresponding frequency of waves and, finally, he got an inexhaustible energy from ether using a principle of "ether" technology, which is still unknown for us. Great Master Tesla demonstrated his experiments to numerous witnesses, but he never announced all results and devoted anybody to his scientific principles. Real reasons to build this giant electromagnetic and mechanical oscillator were the motives much more serious than we can imagine.

A report by W. Pickering, professor of Harvard observatory, named as "Alternating light from Mars", was published in "New York Times" on January 16, 1901. It may be shortened like: "Last year in the beginning of December we got a telegram from Lowell observatory at Arizona. This telegram informed that a strong light flux was noticed coming from Mars and lasted for 70 minutes. Lowell observatory specializes on observations of Mars, and observer was an attentive,

approved and experienced man, so we have no doubt in his statements. We will consider these facts immediately and will notify Europe and America via telegraph. The light came from the known point on Mars and there is no unusual in this point according to scientific data. Whatever there was, now we have no means to research anything. We cannot say with certainty if it is a sign that there is an intellect. For the time present this phenomenon is inexplicable."

When this information appeared, Tesla was in New York. He just returned from Colorado Springs, where he in the course of year made epochal and inexplicable experiments with electromagnetic field of strange resonance property. (Tesla's laboratory in Colorado was situated precisely on the summit of Pike's Peak. It is interesting that Indians Hopi deified this peak, they consider it a Spiritual Pole of the World).

Encouraged by the information he got from Lowell observatory, Tesla stated in the gazette that during his research in Colorado Springs he communicated with Mars himself. That time he made hints about that he already designed a device available for interplanetary communication, which will be improved in future. He wrote: "I'll never forget the first feeling that I felt when I understood that I have a contact with something, which will have priceless and immense results for all humankind. Thing that I noticed, frightened me as if I saw something mysterious and almost preternatural. Little by little I understood that I am the first who hear messages sending from one planet to another…"

A respected Professor Holden didn't consider Tesla's contacts with extraterrestrial beings by means of electromagnetism, because he thought it was not a serious case. Tesla did worked with some extremely long electromagnetic waves of a very high frequency that does not correspond to the accepted theory, because increase of wave frequency is always related only with short-wave transmission. However, Tesla's waves were different from those discovered by Hertz. They propagated with a speed, which far exceed the speed of light, better to say that the propagation is instantaneous.

(Editor's note: We have already discussed this principal difference in modulation methods for Hertz's waves and for longitudinal waves. In this case the SETI program is not ready to receive any signal if their telecommunication specialists use Hertz's waves. It is necessary to develop longitudinal waves telecommunication equipment for SETI and other projects.)

Tesla has his own theory of electromagnetism, which still is not interpreted. He discovered not only the possibility of wireless transmission of energy through the Earth and atmosphere without any losses, but also he proved an unprecedented "breakdown power" of these waves in spreading through space. There is an unconfirmed legend that Tesla was the first who sent periodical signals to the stars. There were coded geometrical theorems like theorems by Tales,

Pythagoras, and an Archimedean formula of harmonic series (we speak about addition of the series $1+1/2+1/4+1/8+…$. Sum of this series is equal to two but number of terms can be infinite). Three days later Tesla was surprised to get a response. He guessed the principle, which lied in the basis of response code, and got a human face with regular features. At first he couldn't understand, if those who made this picture and sent this signal demonstrated that they know our civilization, or they drew their own image to demonstrate that there are similar beings in Cosmos. If it is true, then it should be clear that Tesla refused from any open discussion of this discovery because he couldn't get a due reaction. But soon something occurred that returned discussion of this problem in American press.

In 1902, a famous English physicist Lord Kelvin visited America. When spoke to Tesla, he expressed a full consent and understanding of the fact that details of Tesla's "extraterrestrial communication" were not for public discussion. After the banquet organized in his honor, Lord Kelvin said some good words about New York: "It is the city with the best illumination in the world and it is the only place on the Earth, which can be seen from Mars". In addition, as if in some kind of inspiration he finally exclaimed "Mars is signaling New York". This time nobody had objections. Even persistent Professor Holden kept silence. It was not polite to contradict to such an old and respected man as Lord Kelvin. Instead of objections an article written by the writer and publicist Julian Hotorn, Tesla's associate, appeared as a direct conclusion from this discussion. He described Tesla's sensational methods as a fantasy. Hotorn wrote: "It is evident that people from Mars and other old planets had been visiting Earth for years and attentively observe the development of our civilization. Besides, Tesla's birth changed all. May be, it is possible that people from the stars control his spiritual and scientific development, isn't it? Is there anybody who can know something concrete?"

In the heat of the disputes concerning Martians Tesla was alone in his Tower and continued to work hard and insensibly on the biggest project of his life, Wardenclyffe Tower to make radical changes in development of our civilization. These changes cannot easily be considered earnestly.

EARTH PLANET AS A RESONANCE SYSTEM

When made a decision to build a translation station, Tesla at first bought a plot at Long Island and then asked a famous manufacturer Morgan for help. Morgan was a member of numerous secret organizations; also, he was a genius of business organization. He already had cancer and had a hope that Tesla's science would help him to recover. He expected that Tesla somehow would connect him to some vital energy sources and would make him young and healthy forever. Tesla thought that Morgan should be a man who would maintain this plan. He considered that a man has predestination of his life collisions and every man is predisposed to its own activity.

Negotiations between two old friends were private and hard. There is no clear information about the time when Tesla decided to begin the construction of Tower and about expectations of Morgan as an experienced businessman.

During his public appearances, Tesla changed his statements on destination of the Tower at Long Island twice. At first, he stated that the question is about universal telegraph and telephone system of wireless energy transmission through the Earth. Technical properties of Wardenclyffe do not prove neither of them. The truth could be find in his letter to Morgan: „What I contemplate and what I can certainly accomplish, Mr. Morgan, is not a simple transmission of messages without wires to great distances but it is the **transformation of the entire Globe into a sentient being**, as is were, which can feel in all its parts and through which thought may be flashed as through the brain...”

Many authors, especially Tesla's biographers, blamed Morgan for reduction of financial assistance in the moment when Tesla was already on the threshold of very important discoveries, when it was necessary to finish and start his masterpiece, Wardenclyffe Tower. But Tesla in his autobiography clearly tells us about it. In spite of all that was said, Morgan fulfilled all his obligations regarding him. "My project was retarded by influence of natural laws. The World was not ready to accept it. It was too far ahead of time. But the same natural laws will prevail in the end and the project will be repeated with a triumphal success."

Tesla tested his transmitter at its full capacity on June 15, 1903. He began his experiment exactly at midnight. This night New York citizens witnessed the event, which was outstanding for future science. Glaringly bright strands of electrical plasma with the length of more then hundreds miles connected the spherical cupola of Wardenclyffe with the sky. The next day "New York Sun" wrote that people living near Tesla's laboratory at Long Island were interested very much in his experiments with wireless energy transmission. Last nights they were the witnesses of very strange phenomena, multicolored lightning made by Tesla himself, then inflammation of atmosphere layers at different altitudes and along the big territory: "Night suddenly turned to day. Sometimes air was full of luminescence concentrated along the edges of human body, and all people radiated a mysterious shine. They seemed to be a ghosts."

According to the initial Tesla's plan, five towers, the same as Wardenclyffe, should be built. The second tower should be constructed in Amsterdam, the third in China and the fourth and fifth should be built in the North and South Poles. However, this plan was postponed due to the reasons that should be investigated. Finally, if all this could be realized, then what would be achieved? **The Earth would become a uniform homogeneous system, which could be controlled by telephone commands destined for starting of certain oscillators, which produce and transmit electromagnetic waves of various frequencies. The same electromagnetic system should be completed with a system for mechanical resonance with the Earth. These systems consisted of a tunnel passed under the laboratory and filled with water and oil, and hydraulic pumps served as oscillators. By synchronized actions, based on exact mathematical calculations both systems could start vibration simultaneously together with rarified stratosphere, ionosphere and atmosphere as well as with liquid and solid structures of our planet.**

Before conjecturing relating to all possible consequences of such event, we should give two more examples that are unusual. In his interview of July 17, 1930 given to "New York Sun" Tesla redoubled his enigma stating that "people who live near Wardenclyffe and were frightened with my experiments could see much more...if during last two years they were more awake than asleep they could get acquainted with really incredible things. Sometimes, but not now, I'll announce something, which you cannot find even in fairytales."

After unusual night, when he fired the sky above not only New York but also above all vast area of Atlantic Ocean during his experiment, Tesla suddenly left his laboratory without a clear reason and left all things untouched. As we know, he never crossed the threshold of Wardenclyffe, never visited it and never appeared on this region. It was very strange, he didn't take out of the laboratory any calculation, drawing or document, none paper. It was a turning point in his public scientific work. He was living for 40 years continuously working, but he patented his mechanical discoveries only and published only the articles in newspapers.

TESLA'S ETHER TECHNOLOGY

Tesla discovered and used the law, which concerned fundamental properties of Ether, and the law, which structure the initially infinite and homogeneous ether. Supposition made about continuity of ether as one of the main cosmic mediums means that **imaginary "center" of Cosmos is everywhere, that law of structuring of such medium should have analogues with the law of location of points at geometric spheres.**

(Editor's note: Let's take a sphere... Two points of diameter, three peer point of equilateral triangle, four points of tetrahedron and so on...)

There is no information that Tesla formed and told his theory in such a way, but he left some systems working on the principles, which are unknown to modern physics. The question is about **ether generator, i.e. electromagnetic ball, which has constant electrical potential in spite of energy leakage,** then about a **synchronous motor working on gravitational waves of the planets of Solar system** (this motor turns on independently at the certain season and reacts on the corresponding arrangement of planets. It also

independently turns off, when resonance interval of time ends). Besides, Tesla designed a **metal disk, which could levitate at some height and has antigravitational properties**, which do not depend on gravity force of the given place.

Parts of the structured ether can be in resonance or not. In the first case a condensation of subatomic particles, such as electrons, protons, neutrons, takes place. **These particles appear by means of resonance synthesis of photons, according to the same principles as during formation of photons as specific particles of ether. Asynchronous, non-resonant parts of Ether form a space, in which resonating photons form matter.**

(Editor's note: This is an important point, which related with notion about parallel Worlds. Each World is a totality of elementary particles, which appeared by means of resonance processes from other non-resonant part of Ether. Different frequency means different type of matter. But elements of the same matter can co-exist in the same space "in parallel" with some time shift between oscillation processes.)

Tesla's Wardenclyffe Tower was a " Pythagorean" oscillator. Mathematical description of transmission of particular electromagnetic waves was identical with Pythagorean creative method. Signs used by Tesla in his equations have a single-meaning physical interpretation. Principles of Tesla's ether technologies belong to the level of cosmic existence, where it is possible to control space and time. **The principle of resonance and harmonic oscillation of ether seems to be so clear that all problems of modern physics, especially problems of energy conversion, will be solved with its development.**

By means of his vacuum tube **Tesla got protons, electrons and neutrons directly from physical continuum (ether) and reproduced them at any distance**. Instead of giving a possibility to the bundle of protons to move free through space to some place, he created conditions for momentary appearance of arbitrary quantity of particles in the given place. *Quantity of protons, neutrons and electrons was unlimited and difference in their quantity was stipulated by created shift in time.*

(Editor's note: Modern physics know how it is possible to create mass particles, for example, electron-positron pair, from physical vacuum, but they can not organize it without huge energy source of the beam accelerator. Tesla's resonance method is a real way to unlimited free energy sources by means of structuring of the vacuum. The first step to this technology is development of the theory and experiments with the longitudinal electromagnetic waves. Really, the theory of acoustic resonators already is well known. All we need is its application to electromagnetism.)

Starting from suppositions that Tesla knew some unusual for science and still inconceivable laws of nature, we should think about what technical goals he followed using Wardenclyffe Tower and what consequences he expected?

1. **To call oscillations of ionosphere.** Since the difference of voltage between surface of the Earth and ionosphere constitutes about two billion volts, then the Tower is continually oscillating on upper and lower harmonics of oscillations of ionosphere up to full coincidence with it by phase (up to resonance) and can discharge it in the same way as usual electrical condensers are discharged. Due to the reason that such a charge could pass immediately, there would be a real threat to New York. A high-energy plasma column of a very big diameter (possibly of several hundred kilometers) would appear from ionosphere, and all situated in this space would be disintegrated. Of course, Tesla had no intention to destroy New York. He only wanted to take energy from ionosphere by means of short oscillatory intervals to recharge his huge oscillator, which required maximum voltage of one hundred million volts. As a system for hyperfine oscillating, Tesla used **a huge quantity of ultraviolet lamps, placed at the top of his Tower.**

2. **To take energy from Ether. It is possible to shift time coordinates and produce an energy transmission by time cycles from the Past to the Future without any violence of electromagnetic equilibrium of environment by means of oscillation of non-resonance electromagnetic fields.**

   (Editor's note: Usually the term "energy transmission" means some distance in space between two points. In this case it is a case of two points in time, i.e. some moment in Past and some moment in Future. So, we can use gradient of energy in time (chronal gradient) instead of spatial gradient (voltage). I discussed this method in my early publications and some technologies were reported during St.Petersburg's congress New Ideas in Natural Sciences, June 1996.

   Of course, it should be done with strict following of mathematical law, which determines the interrelations of frequencies with a great accuracy. In an opposite case, the results can get out of control and an unexpected destruction of material and biological objects or their momentary drop out from segments of our reality can take place like in Philadelphia.

3. **To open temporary windows in "parallel worlds".** Since parallel worlds have an electromagnetic structure with the wavelength and frequency of oscillations different from those of the Earth, then is could be possible to make some connection between frequencies of oscillations of our world and other worlds by means of complex harmonic oscillating. Due to this, some pictures of these worlds could become apparent in our earth conditions (and vice versa).

4. **To accelerate human evolution.** If we make a permanent high-frequency field harmonizing with collective electromagnetic field of people, then little by little it will be possible to achieve an increase in sensibility of perception and increase in ability to receive ideas. But radiation of these frequencies could be harmful since any disharmony of this field (non-resonance states) calls a partial separation of astral and physical substance of a man, it can lead to sickness (for example, cancer) or mental disorders.

Full separation of one substance from another, of course, leads to death. In addition, all these processes act slowly. Due to their lack of knowledge, people pollute their electromagnetic environment more and more by radio waves, microwave radiation from locators (which call cancer, it was proved experimentally). Other electromagnetic radiation also has negative impact if these electromagnetic waves are in disharmony with frequencies of oscillations, which are natural for vital functions and for informational field of Solar system.

5. **To be able to transfer the Earth planet into "parallel realities".** If Tesla could finish the construction of system made of five transmitters and start it, then he could make the whole Earth to be in the state of oscillating as a uniform resonance structure, and such oscillation, which is peculiar to some other reality, and thus physically move us to the "parallel world". Thus possibly, he wanted to accelerate evolution of civilization. However, it could be very dangerous, because if the Earth enters the state of resonance oscillating with "parallel worlds" and it takes a long time, then catastrophes could occur like that was described in the myth about Atlantis.

Modern experimenters should keep in mind that secret of physical world lies in metaphysics and as long as our science will be blinded with research of "crude" matter only, we will be in the state of illusionary split consciousness.

It is necessary to provide a breakdown of human consciousness, and it will happen in physics. We should free human mind and adjust it to deep cosmological research.

Ethics is cosmic principle, which contribute to energy distribution, isn't it? Then it can get a status of natural law. And we will be able to explain to the supposed habitants of worlds, which are shifted in time, why we can influence on the Galaxy and stars by means of special reactors and why we take part in experiments, which directly change us.

If essence of ethics is a harmony and kindness is state of energy equilibrium, then mathematical, cosmic ethics certainly acts in the world. It is impossible to violate mathematical laws. "There is no czar's way in geometry" – said Euclid to the czar Edip, who worked on solution of difficult geometrical problem. Cosmos itself seems to be a big experimenter. Our mind asks it the questions, which are clever or not. That's why every true philosopher and scientist should reject the applied science appeared from defect and rigid theory, when he studies something concerned with cosmic phenomena.

Evolution of Tesla's philosophical positions beginning from oracular one and finishing with engineering ones, beginning from engineering ones and finishing with metaphysical ones, as Tesla's private life, these all are the milestones on the way of formation of a new paradigm of scientific and technical civilization. His attitude to people and himself is a result of transpersonal absolute manifested in him. He had no personal attitude to anybody including himself and that's why he did little mistakes during his life.

Tesla is often cited in modern science. The scientists, who didn't notice contradictions of Maxwell's electromagnetic theory until now, began to study Tesla, especially those who work on unification of electromagnetism, gravitation and strong and weak interactions. Is it true that matter is infinitely divisible or not? If space could be divided infinitely? Finally, what is the role of time in physical processes? May be time is only a measure, usual coordinate, as it is supposed in modern physical theories basing on the theory of relativity and quantum mechanics.

(Editor's note: Dispute about "substance time" or "mathematical time" can be solved in Ether Theory if density or direction of ether define parameters of existence of any matter, i.e. its time. In this case we need to discuss the time itself no more. We have to discuss ether and its local properties.)

Tesla's ideas about ether as a basic medium, which structurally joins space and matter, were rejected and it led to stagnation in physical thinking and to continual returning to out of date ideas. In scientific circles, which take a risk of creation of a "new physics" Tesla's concepts now become increasingly valuable and they are studied. There are experiments with ultra low and ultra high frequencies of oscillations, which have specific modulation and form the radiation of ionosphere. All possible consequences of it are still unknown. This includes control of meteorological phenomena, especially hurricanes and atmospheric pressure, **infusion of thoughts at a distance by means of electromagnetism, i.e. resonance with electromagnetic transmitters.**

It becomes evident that it is technologically possible to imitate external electromagnetic manifestations of human thinking. It is the position of Tesla's cybernetics. "A man is an "automatic machine" of cosmic forces" – underlined Tesla in his main articles and lectures. Experimenters can say that it is much easier to excite mass emotions of people by means of corresponding oscillation of ionosphere, which includes harmonics of collective unconscious state of

all humankind. The ionosphere is a key to control mass feelings and thoughts. Tesla understood all this yet in far 1899 living in Colorado.

Modern university science and in particular Serbian scientific community reject Tesla's ideas mainly because it cannot understand them. The second reason is the opposition, which Tesla demonstrated to nuclear physics, and his prediction that application of this technology would not be continuos and quantum mechanics has no serious scientific future.

Tesla as cosmologist had his own philosophical and religious position: Aristotle stated that there is an independent higher spirit in cosmic space - enteleheia. This spirit sets matter in motion and a thought is his main attribute. In the same way, Tesla believed that uniform Cosmos is unified in material and spiritual sense. There is some kernel (core or center) in cosmic space, from which we take all strength, inspiration, which attracts us forever. Tesla felt its power and its values, which it sends all around the Universe and keeps it in harmony. He couldn't guess the secret of this kernel but he knew that it exists, and when he wanted to give it some material attribute, he ascribed that it is LIGHT, and when he tried to understand its spiritual principle, then it were BEAUTY and SYMPATHY: "A man who keeps this religion in himself, feels strong, works with joy because he feels himself as a part of universal harmony."

RESUME ON PERSPECTIVES OF TESLA'S SCIENCE

Not only physicists, who continue Tesla's work, but all people who think a lot about scientific problems, are agree that modern physics is really a contradictory system of knowledge. From the one hand, time is relative and depends on the observer. From the other hand, it is stated that time of quantum transfer cannot be measured. Nuclear reactions are studied on cathedras of history of physics. In the course of these reactions transformation of matter into energy goes without a residue. In astrophysics, full transformation of matter into energy is not possible. It is known that mass calculated as an effect of the gravity force differs from the mass calculated from the speed of rotation of the stars around the center of Galaxy (we can got it by means of "Doppler's" shift of lines in spectrums of their radiation). Therefore a significant defect of visual matter or mass can be found, and it amounts to 90%. Instead of changing the theory, scientific schools speak about "defects of mass".

Tesla worked on special "vacuum tube with an open tip", which serves to transmit particles at any arbitrary large distances. The targeting was made by electrostatic way by the lines of electromagnetic layers of atmosphere, which can be distinguished by the naked eye. It is the layer, where clouds float.

*(Editor's note: We have discussed above **it was not a "transmission"** in classical sense but it was the **resonance structuring of physical vacuum** in some*

distant place and any particles can be formed by this way.)

It became known that multiphase system, inductive motor and generators of alternating current are the less significant Tesla's discoveries. **The most important should be those, which relate to his experiments with ether and time.** We can underline a perfectly new cosmological physics, which is based on electromagnetic resonance of ether, on resonance effects of time.

Main Tesla's discoveries are the following. The first is **transmission of energy** at any distances. Really, it is a superconductivity of **natural environments**. The second one is **"fireballs" (synthesis of structural elements of ether and matter)**, high-frequency resonance oscillator adjusted for waves, which are different from Hertz's waves, **waves with the so-called longitudinal modulation**. It is a kind of free choice of consciously selecting electromagnetic units, which initially and elementary codify working electromagnetic field of human brain, modulate brain oscillations or change their nature, and in sensitive aspect it leads to various emotions, changes in consciousness, creative impulses, super perception up to super cognition. The third one is **dynamic nature of attraction**, in which every element of periodic table has its own constant of attraction; in this case Tesla continued the works by Etvesh and derived several universal methods. And finally, **Tesla's electromagnetic theory**. This theory was not explained or published. This theory does not use the generally accepted notions, such as "energy", "wavelength", and «frequency". Instead of it this theory introduces the notions of "distribution curve", "vibration of spiral systems", "electrical pressure", "proportion of transmission", "ether", "dynamics of electromagnetic fluid", "geometrical abilities of tube" and so on.

From modern mathematical arsenal Tesla used only Fourier's ranges to separate electromagnetic oscillations into higher and lower harmonics, since it matched his main supposition on simultaneity of action of all parts of infinite ether. It is clear that infinity cannot be formed with nonsimultaneous parts.

Tesla's cosmology is a cosmology of a general type, which relates to isotropic and infinite Universe. At the same time, Maxwell's electromagnetism can be applied only at comparably small distances. In general, Maxwell just made a mathematization of Faraday's experiments, but he didn't build a final concept of this problem. Due to the incompleteness of Maxwell's theory, great difficulties in Special Relativity Theory appeared (interrelation of speed of propagation of energy and speed of light). Einstein himself ignored relativist changes of space-time with motion in photoeffect, since if energy changes together with speed, then there are no effect, if energy equivalent of electron trajectory (knocked out by photon) is absent. In general theory of relativity shortcomings of Maxwell's theory led to an idea of "world line" (in essence, it is a pancosmic extrapolation of magnetic force lines, which are

visualized by iron filings on laboratory tables) an, finally, to the notion of Cosmos finiteness, which alternately shrinks up to the "point", which is located out of dimensionality, or explodes… unlikely development.

It could be surprising not only for Tesla, but also for many antique philosophers and scientists, Pythagoras, Plato, Euclid and others.

Nikola Tesla and his science are very significant for the modern world of telecommunicational systems and as a way out of crisis of scientific and technical civilization, which needs philosophical ontology. During hundreds and thousands years, we had many great scientists, but nobody has a temple built in his honor. **Such temple is built in California, in San Diego, in the one of centers of world scientific and technical power.** Neither Plank, Einstein, Bor, Pauli, Torichelli nor Newton in spite of their interest in alchemy, theology and mystics, none of them could convince people of transcendental significance of their scientific views.

Christian civilization is based on suffering, sacrifice and atonement of Christ, on the mystery of christening, resurrection and the afterlife world. It is full of human feelings and emotions. Technical epoch under the badge of Tesla is a humane symbol of spirit and matter unity and it establishes not a religious belief, but belief in scientific principles, and gives a discernment in fundamental laws of Cosmos. **Historically, Tesla radically changes the form of religious belief on the planetary level.** That's why he is not only a scientist but also a universal and historical phenomenon of a higher level. **He changed spirituality of theology to the spirituality of science. Besides, modern physics already became a philosophy of new times, since it openly works with the structure of mater, genesis of Cosmos and, recently, Ethics.**

Quantum mechanics of Copenhagen circle including Bor, Heisenberg and Pauli does not give an answer on the question about structure of main unit of matter. Theory of relativity doesn't solve the problem of time substantiality and doesn't explain the essence of force concept. Tesla's physics relating to the real physical space or ether, and his scientific thought derived from positions of antique cosmology and Pythagorean mathematics (not from electromagnetism of XX century) couldn't be continued as long as appeared other limits on the way of creation of general physical theory, which includes events of physical reality. After Chernobyl all people understood that nuclear reaction is nothing more than irresponsibility without real understanding of matter structure. And tragedy of spaceship Challenger reminds us that humankind still does not have enough experience in long space travels and jet engines cannot solve the problem. It is better not to speak about medical aspects of interstellar travels. Tesla's physics gives answers and instruments to use it in cosmology.

Sometimes a notion that we use to denote some physical phenomenon didn't exist in times of Tesla. The same is with the method of introduction of mathematical symbols to make calculations. All it gives a great benefit to a young electrical engineer, who many times heard that Julius Mayer never used the word "energy"; that Archimedes and Galileo calculated all by mathematical method but had no signs for calculations, which can be used now; Newton, who opened infinitesimal quantities, nevertheless made all proofs by means of geometrical symbols as well as Euclid and all other scientists lived in period between them.

To understand Tesla it is necessary not only to read his works in original, but also to explain meaning of terms in his scientific understanding, especially the ciphered part of his archive, where the same notion is used in different contexts and has a lot of senses. Tesla's theory cannot be understood without a clear hypothesis and method of thinking, which is similar to his own.

Advanced modern science gradually begins to study Tesla's heritage. We do not speak about commercial or university aspects of scientific knowledge, but about summits of scientific thought unknown to wide intellectual community, about the knobs of separated net of worldwide global informational space for humankind, in which everybody is connected with the others by the channels of planetary telecommunicational net. **This connection is made by two main coincident parameters, conformity of ideas and intellectual level.** However, the thing that joins all is a subjective comprehension of Time as a basis for new civilization. All early civilizations originate only from their understanding of Space.

According to Tesla, in planetary community of the future all energy will be taken from inexhaustible and free sources. He pointed out that the Earth is a core (kernel) of a huge generator, which in rotation creates a difference of potentials equal to billions volts with a slowed ionosphere, that **humankind really lives in a spherical condenser of big capacity,** which continuously self-charges and self-discharges. In this condenser ionosphere is a "phase", atmosphere is a "dielectric" and the Earth is "zero". Thus, a global electrical process proceeds on our planet. Electrical energy does its work and then return to the natural environment of the planet Earth.

There are **linear "accelerators" by Tesla in the form of open vacuum tubes, i.e. tubes working at room temperature without energy losses,** since while laying at "target", electrostatic properties of the "target" itself are used; that's why it is possible to transmit any quantity of energy at any distance by means of induction. Kenneth Corum, who repeated Tesla's experiment in America and achieved some results, still **didn't understand the essence: Tesla's "particles" do not travel in space as other known particles or Hertz's waves, but they are self-generating from inductive field like "fire balls".**

The question is about an original Tesla's theory, which is related with cosmic radiation and was proved by him experimentally. Tesla's reversible magnetic field has a

universal significance. It is a mathematical idea, which is realized directly in every echelon of cosmic being.

I make bold to state that even Tesla's inductive motor, the so-called asynchronous motor, is not studied enough in conceptual sense. There is an undiscovered mystery of heavenly bodies rotation and rotation in general. Acceleration of motion of "Tesla's egg" is based on the change of field's geometry, but not on the properties of magnetic induction (actio in distans) or increasing of force (electricity input is permanent).

Among other Tesla's mysteries there are unstudied ones: in radio engineering there are some transmissions on the same frequency, which cannot be jammed (Twenty unused patents); in the structure of matter **("I used to split the atoms, without releasing any energy"** – it is Tesla's statement of 1933); concerning attraction force there is a model of gravitational motor with tin engine and glass stator working once a year under the influence of certain planet arrangement; in the theory of ether (**matter is structured from ether and dissolves in ether again following simple mathematical laws. But if the generated energy is more than disappeared one, then cosmic catastrophes take place!);**

Tesla's medical devices and **influence of low-frequency waves on the brain operation**, which calls contractile motions and change of subjective "second".

This is Tesla's relation to Buddhist idea that the "I" is illusionary: "Really, we are something different, we are like a waves in subjective time and space, and when these waves disappear, nothing remains from us. There is no personality. We cannot saw that waves in the ocean have individuality. There is only an illusionary sequence of waves, which go one after another. We are not the same that was yesterday; I am only a sequence of relatively existences, which are not quite similar to each other. This sequence is that thing, which create an effect of continuity, like a movie, but it is not my subjective and mistaken understanding of my real life."

I cannot imagine Tesla smiling. I see him to be sad, since I see what a man could draw, when he gave all his essence to the power of natural laws.

MOST IMPORTANT DATES OF NIKOLA TESLA'S LIFE

1856 – on July 10, at the midnight Nikola Tesla was born in Smilyan, in Lika (province of Austrian monarchy) in the family of Serbian priest.
1875-1878 – he studied in Polytechnic Institute in Graze (Austro-Hungary).
1882 – in Budapest, have been walking around the park, Tesla made a discovery relating to the reversible magnetic field.
1883 – in Strasbourg he was employed in Edison's Continental Company and built a model of the first inductive motor.
1884 – he left for New York and began to work in Edison's laboratory.
1885 – he left Edison, established his own company and started to produce motors and generators of multiphase alternating current.
1888 – on May 16 he read a lecture in American institute of electrical engineers on the topic "New system of motors and transformers of alternating current".
1890 – he announced his results on physiological influence of high-frequency electricity.

1891 – he read lectures on the topic "Experiments with alternating current of very high frequency and its application in artificial wireless lighting"; registered patents of "spark oscillator with resonance transformer".
1892 – he came to London and read lectures in Royal scientific society on the topic "Light and other high-frequency phenomena", in the institute of electrical engineers he read lectures on the topic "Experiments with alternating current of high voltage and high frequency"; then the same lectures he read in Paris.
1893 – he attracted public attention on the World Exhibition in Chicago. He passed a high-frequency current through his body and demonstrated a model of reversible magnetic field, the so-called "Tesla's rotating iron egg".
1895 – on May 13 Tesla's laboratory in New York was burnt with fire.
1897 – he registered twelve patents in radio engineering.
1898 – registration of the paten for teleautomatic control (experiment with the ship on the lake in New York, Central Park. Tesla made a wireless control of the ship and staggered all witnesses).
1899 – a construction of hydroelectric power station at Niagara was finished.
1899-1900 – experiments in Colorado Springs.
1901-1905 – construction of Wardenclyffe Tower at Long Island, near New York.
1909-1922 – he registered patents only in mechanical engineering (pumps, tachometers, bladeless turbines).
1943 – on January 7 Tesla died in New York, in "New Yorker" hotel. At first, he was read the burial service according to Orthodox tradition, and then his body was burnt according to Buddhist ceremony. (*My question is if he was truly burnt.... Or transfigured and conveyed...not as mere ashes... His main legacy is in Tesla Museum in Belgrade City, Yugoslavia. Prof. Velimir Abramovic.*)
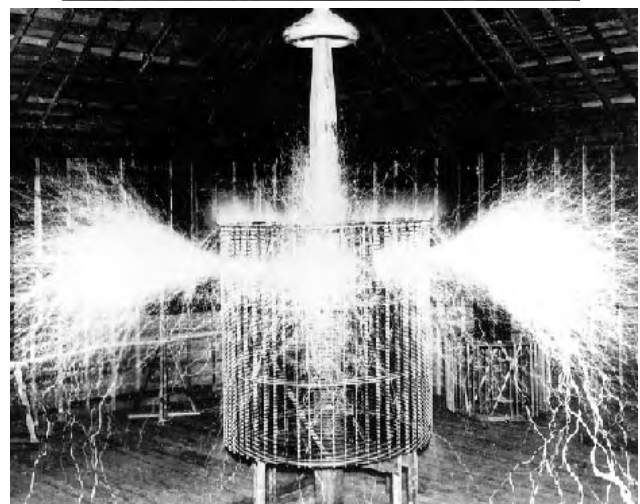
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electromagnetic field, which created them, weakens and disappears. They appear from above mentioned devices, which are situated in closed rooms, due to high conductivity of electrical wires.

Temperature of ball lightning

In conclusion, let's speak about the temperature of ball lightning and about frequent cases of "superenergy", which can appear from nowhere.

Eye-witnesses of ball lightning, who observed it closely, informed that lightnings didn't radiate much heat.

According to the version suggested in this article, particles of plasma mainly move in order in the formed ball lightning. During this process their kinetic energy can be significant, but we cannot say any definite about plasma temperature. We can speak about high temperature of ball lightning in the initial stage of its formation still in confused chaotic distribution of velocities and big number of collisions between plasma particles. But the highest temperature of plasma evidently manifests in the moment of electrical disruption of plasma condenser and following powerful explosion of ball lightning. It happens because the energy of electrical discharge summing up with kinetic energy of moving plasma, turns ordered motions of its particles into chaotic motion, with numerous mutual collisions; especially since ball lightning formed from the powerful discharge of linear lightning.

It is known that there is a small percentage of heavy hydrogen in the atmosphere. In the atmosphere of the earth there are also slowed muons (mu-mesons) of both charges. "At the sea level muons form the main component (≈80%) of all particles of space radiation" [3, p. 442]. Possibly, plasma of ball lightning contains deuterons and muons in the same proportion. Let's note that negative muons can form muon atoms (mu- mesonic atoms) with protons and deuterons or can be covered by the same protons and deuterons. The newly formed formations are neutral like neutrons. With catalyzed participation of negative muons in nuclear reaction fusion of hydrogen isotope nuclei takes place in normal earth condition , i.e. super-high temperatures are not required for pushing of respondent nuclei [3, p.441]. therefore, we can suppose that sometimes there are some nuclear reactions in ball lightnings, i.e. some quantity of fusion acts of proton-deuteron or deuteron-deuteron particles to helium nuclei are realized. A correspondent energy is liberated during these reaction, and this energy makes these unexplained huge destruction.

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Future Energy Technologies

Thomas Valone M.A., P.E.

Integrity Research Institute, 1220 L St. NW #100-232, Washington, DC 20005
http://www.integrity-research.org
202-452-7674, 800-295-7674, Fax: 301-513-5728,
email: iri@erols.com
Proceedings of World Future Society 2000 Conference and *Proceedings of Energex 2000*

Abstract

Today 85% of our country's energy comes from the combustion of dead fossils, a dirty fuel that is forcing the world's atmosphere to overheat. However, new 21st century energy sources that produce no carbon emissions and do not contribute to global warming are now emerging. Beyond the realm of fuel cells and hydrogen is the non-conventional world of "future energy." Some of the best examples are new and exciting generators that release trapped potential energy from nature in ways never dreamed of before. Others innovatively apply clean fuels in conventional systems that are surprisingly simple and yet very efficient. Still others qualify as promising theoretical technologies that are a focus of attention for NASA and the USDOE. Most of them have one thing in common: they are very scientific but are relatively unknown to the general public. This presentation summarizes the latest breakthroughs in future energy. With scientific explanations of the input energy and output energy, the overunity efficiencies can be understood by average audience members. Included in the quantitative article are the inventions of Brown, Graneau, Jefimenko, Miley, Shoulders, Wallman, and others. The energy revolution is now beginning. It is time to understand the clean alternatives to dead, poisonous fuel.

Keywords: future energy, overunity, betavoltaic, biomass, atmospheric electricity, COFE

Introduction

In 1998, the U. S. Department of Energy (DOE) issued its *Comprehensive National Energy Strategy* (CNES)[1] that included as one of its five goals, the following aspiration:

Goal IV: Expand future energy choices – pursuing continued progress in science and technology to provide

future generations with a robust portfolio of clean and reasonably priced energy sources.

Objective 1. Maintain a strong national knowledge base as the foundation for informed energy decisions, new energy systems, and enabling technologies of the future.

Objective 2. Expand long-term energy options.

However, the DOE has not engaged in developing, much less maintaining a robust knowledge base of future energy choices, nor expanded research into new energy systems or long-term energy options, mainly due to upper management decisions. In a study performed by Integrity Research Institute on the progress of the CNES two years later, it is surprising that instead the DOE has worked to actively suppress enabling technologies of the future. Furthermore, concern for global warming and the expected increase in carbon emissions by the American society clearly do not enter DOE policies. In the past, the DOE has: (1) endorsed natural gas use for future generations, (2) rescinded a Nuclear Energy Research Initiative (NERI) grant awarded to a prominent professor for transmuting radioactive waste, and (3) reversed an initial offer to host a Conference on Future Energy (COFE). Therefore, it is clear by these and many other DOE practices that it is up to the private sector to conduct scientific research into new energy systems and enabling technologies of the future in order to replace carbon-emitting fuel systems. As a guideline, it is generally agreed that emerging energy technologies that qualify as true future energy must not produce carbon emissions nor contribute to global warming if we are to have a future planet earth. The reason for this is as Worldwatch Institute notes: "Stabilizing atmospheric CO_2 concentrations at safe levels will require a 60-80 percent cut in carbon emissions from current levels, according to the best estimates of scientists."[2] Another good reason is that we are running out of oil, according to the US Geological Survey, who offers a free educational poster online explaining the problem:
http://geopubs.wr.usgs.gov/open-file/of00-320/of00-320.pdf.

Future Energy Overunity

To understand emerging energy principles, it is helpful to examine the operation of a heat pump, which converts environmental free energy into useful work. The standard heat pump is a good example of an "overunity" system (energy out > energy in) releasing potential energy from the environment where the heat energy output is always in the range of 2 up to 7 times the input electrical energy. This so-called "coefficient of performance" represents an overunity efficiency, that does not violate any physics laws, if one considers, as the consumer does, how much energy must he put in to get the predicted energy output. Thus, the concept of "overunity," as also the concept of "free energy" has evolved from the consumer's point of view. What does it cost him to receive his heat, air conditioning, cleaning, or propulsion outputs? The closer it gets to "free," the

more desirable it is for the consumer and, we might add, to third world countries who cannot afford to build the thousands of miles of high voltage wires (infrastructure) to support a centralized energy system. Locally installed, modular heat and electricity generators will replace present utility-based service in the future. Then, large area blackouts will be a thing of the past. Energy will be for the most part, a one-time investment, included in the house, car, or spaceplane of one's choice. However, much needs to be done for these systems to supplant the established energy businesses that are the nation's major polluters. A commitment to a carbon-free energy economy, with financial backing, is required for such large changes to take place.

Cold Fog Discovery

> *As reported in the Journal of Plasma Physics,[3] the output energy thus exceeds the input energy by about 100% creating a 2-to-1 overunity condition*

Many other systems exist today, in a research, development, or theoretical stage, which also convert potential energy into useful work. The first example is the "Cold Fog" invention of Dr. Peter Graneau from Northeastern University that converts chemical bond energy into kinetic energy. Intermolecular bond energy in water is an available amount of energy estimated at 2.3 kJ/g. When injected with a high voltage capacitor discharge of 39.8 Joules, normal rainwater is accelerated into a cold fog that loses about 31.2 Joules of low-grade heat and a comparable amount (29.2 Joules) in fog kinetic energy output. As reported in the *Journal of Plasma Physics*,[3] the output energy thus exceeds the input energy by about 100% creating a 2-to-1 overunity condition favorable for reduction to a motorized conversion system.
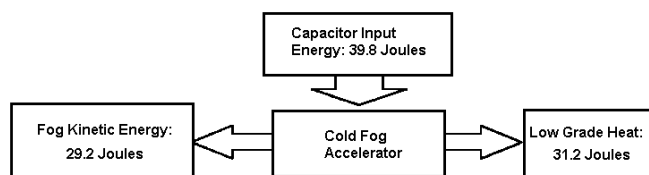

Fig. 1. Cold Fog Energy Flow

Betavoltaic Battery

> *The useful battery life is thus estimated to be about 25 years...*

The next technology of importance is the betavoltaic battery invention of Dr. Paul Brown (U.S. Pat. #4,835,433). It involves a benign nuclear source called tritium (an isotope of hydrogen) that simply emits an

electron (5.7 keV beta particle) over its half-life of 12.5 years. The useful battery life is thus estimated to be about 25 years. It is a cheap, long-life, high energy density battery with a wide range of applications. Presently, Lucent Technologies has been contracted to produce the tritiated amorphous silicon for use in the semiconductor industry and even for watch batteries. The amorphous silicon is placed between two electrodes in order to complete the battery construction. The batteries have a mean energy density of 24 watts per kilogram and are ideal for low power, long-life applications [4]. It is clear that no recharging of these batteries is ever needed. **The disposal is even safer than disposing of smoke detectors.**
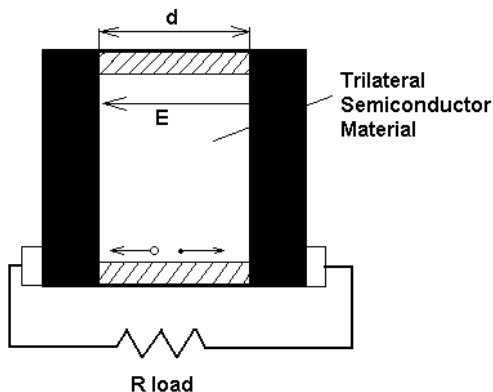

Fig. 2. Tritium Battery

Nuclear Remediation

It is worthwhile mentioning that Dr. Brown's other endeavor may give a boost to the nuclear power industry. He has discovered that low energy gamma rays (photons) on the order of 10 MeV, can function as an effective agent to transmute nuclear waste into short-lived isotopes, acceptable for burial anywhere. The remediation project is spearheaded by Nuclear Solutions, Inc. (NSOL) which plans to build a pilot plant to accept nuclear waste of any type and generate electricity at the same time. The Battelle Institute, Brookhaven Labs, and Los Alamos Labs have all been involved in the planning and testing stages of this new technology. Dr. Brown presented details of this invention at COFE [4]. Also, the State Department recently connected him with foreign markets that have assisted in proving its worth.
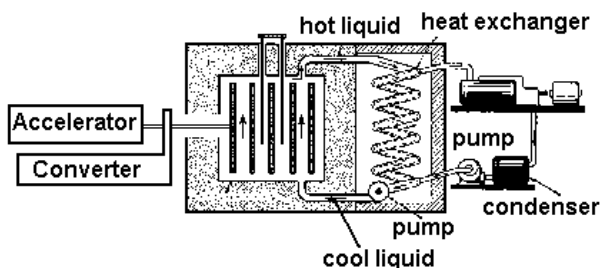

Fig. 3. Accelerator Driven Reactor

Electrostatic Motors

The next energy breakthrough is Dr. Oleg Jefimenko's electrostatic motors. Discovered by Ben Franklin in the
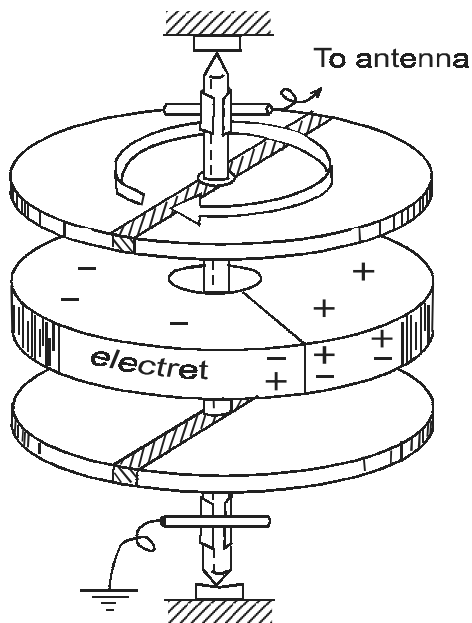
Figure 4. Electrostatic Motor Model

18th century, electrostatic motors are an all-American invention. They are based on the physics of the fair-weather atmosphere that has an abundance of positive electric charges up to an altitude of 20 km. However, the greatest concentration is near the ground and diminishes with altitude rapidly. Dr. Jefimenko discovered that when sharp-pointed antennas are designed for a sufficient length to obtain at least 6000 volts of threshold energy, the fair-weather current density available is about a picoampere per square meter. Such antennas produce about a microampere of current. However, small radioactive source antennas may be used instead that have no threshold voltage and therefore no height requirements. These antennas have larger current potentials depending upon the radioactive source used (alpha or beta source) and ionize the air in the vicinity of the antenna. Electrostatic motors are lighter than electromagnetic motors for the same output power since the motor occupies the entire volume. For example, it is expected that a motor one meter on a side will provide a power of one megawatt and weigh 500 kg or less.

Electrostatic motors also require very little metal in their construction and can use mostly plastic for example. They can also operate from a variety of sources and range of voltages. As Dr. Jefimenko points out, "It is clear that electrostatic motor research still constitutes an essentially unexplored area of physics and engineering, and that electrostatic motor research must be considered a potentially highly rewarding area among the many energy-related research endeavors."[5] The atmospheric potential of the planet is not less than 200,000 megawatts. He has succeeded in constructing demonstration motors that run continuously off atmospheric electricity. Jefimenko's largest output motor was an electret design that had a 0.1 Hp rating.[6] Certainly the potential for improvement and power upgrade exists with this free energy machine.

Biomass Gasification

Figure 5. Gasification Demo
Photo: Alternative Energy Institute

Clean fuels are difficult to find today. One example that satisfies a limited definition of "clean" is the carbo-hydrogen gas produced from biomass. David Wallman has patented the process for producing COH_2 from a high voltage discharge through any biomass solution (Pat. #5,417,817). This gas burns cleanly, producing water vapor and only the amount of CO_2 that was originally absorbed by the biological mass when it was growing in the ground. Contrast this with burning fossil fuels (oil and natural gas) which resurrect old buried carbon and add it to the atmosphere from ancient cemeteries in the ground. Instead, biomass gas burning recycles recently absorbed atmospheric carbon dioxide. The input energy is typically about a thousand watt-hours or about 3300 BTU to produce about 250 liters per hour of carbo-hydrogen (8.5 cubic feet per hour). With a heating value of over 500 BTU per cubic feet, the COH_2 output energy exceeds 4000 BTU, often approaching 5000 BTU in high efficiency designs. Thus, this biomass gasification process has an overunity efficiency of about 125% to 150%. However, when the entire energetics of the system are accounted for, including the ultraviolet light radiation, heat loss, etc., estimates of 200% to 400% are reasonable. Again, this process is a largely untapped resource while millions of gallons of farm-produced liquid biomass going to waste instead. Demonstrations of pilot plant designs are available from Wallman's company to replace present dependence on foreign oil (which is a fossil fuel). Municipal sewage treatment is a logical application for this invention. [7]
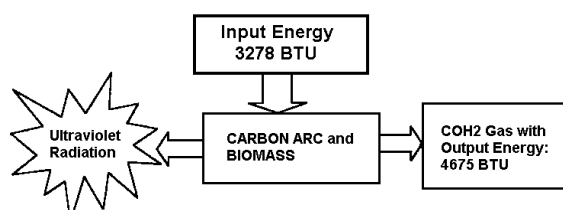

Figure 6. Biomass Gasification

Charge Clusters

An unusual energy source is the clustering of electrons by a discharge needle into a high density bundle equaling Avogadro's density of a solid[8]. Ken Shoulders has patented a process (Pat. #5,153,901) that produces electron clusters with such high energy density, they equal processes exceeding 25,000 degrees Celsius upon impact. Yet, he only uses 20 microjoules to produce the effects. The clusters travel at a maximum of one tenth of the speed of light and penetrate any substance with accuracy and sharp precision. It is similar to xenon clustering techniques currently used at megavolt energy levels. Low energy nuclear transmutation of the target has also been achieved with this process. Using a deuterium loaded palladium foil, only the bombardment areas show transmutation into silicon, calcium, and magnesium with electron clusters upon analysis with X-rays.

Fox has postulated that the high velocity electron clusters achieve results similar to ion accelerators, including penetration of the nucleus, with substantially less power. The new physics of like-charges clustering in bundles under low power conditions opens a wide range of applications including spacecraft maneuvering microthrusters. **The overunity efficiency is 9 to 1.**

Figure 7.
Charge cluster borehole into lead glass. Hole is about 10 micron diameter. Penetration is about 1mm per kV. The slowest speed clocked has been 1 cm in 50 nanoseconds. With an estimated 100 billion electrons carrying 100,000 positive ions, the kinetic energy exceeds 180 microjoules. It has been found that quantum mechanical forces overcome the Coulomb repulsion of like charges. (photo credit: Ken Shoulders)

Thin-Film Electrolytic Cell Power Unit

A product with the consumer in mind is Dr. George Miley's invention that produces about one watt per cubic centimeter of electrolyte [9]. Using a flowing packed-bed type electrolytic cell with 1-molar $LiSO_4$ in light water, small (1-mm diameter) plastic beads with a thin (500-1000 angstrom) film of metal (nickel, palladium, or titanium) are employed. A special sputtering technique to spray on the metal is used. With 2-3 volts of electrical power and only 1-5 milliamperes of current, the single film experiments produce an excess power <u>ten times</u> the input power! (The input

power is at most 0.01 watts while one half of a watt of heat is produced.) Observed power densities were 1 W/cc and above. It is also apparent that the physics of this reaction involve nuclear transmutations as well. As Dr. Miley notes: "The key finding from these studies has been the observation of a large array of "new" elements (i.e. different from the bead coating), many with significant deviations from natural isotopic compositions, after the run. Great care has been made to insure that these elements are distinguished from isotopic impurities by use of a "clean cell" with high purity components/electrolyte, in addition to the pre- and post-run analyses." Even low-energy radiation was detected from the beads days after

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> ***Future energy choices are already here...***

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each experiment. Application to space power, providing a 1-kW cell with only 500 cc of active electrode is predicted. Note that this particular invention, with its large overunity energy yield, was awarded a NERI grant by the DOE but then promptly withdrawn after certain individuals pressured the DOE into a re-evaluation of its grant to Professor Miley. The politics that override such grant decisions by the DOE Office of NEST are highly questionable.

Conclusion

Future energy choices are already here. In spite of the DOE lack of initiative in long range energy solutions, private inventors in this article have pioneered energy discoveries with a range of energy production possibilities. With Dr. Graneau's cold fog demonstrating a new energy source and a possible propulsion source, developmental efforts are ongoing with Hathaway Labs in Toronto to maximize the energy transfer to a useful machine for market. Dr. Brown's tritium battery is a milestone for long-term energy demand that is in production, while his nuclear remediation project is progressing rapidly. Dr. Jefimenko's electrostatic motors clearly demonstrate an available energy source yet untapped. Wallman's biomass gasification is ready to be developed on a large scale. Shoulder's charge clusters demonstrate extraordinary energy production on a microscopic scale with reasonable upscaling anticipated. Dr. Miley's electrolytic power unit also shows an extraordinary energy output, which deserves more research and development support.

Other inventors that meet the future energy criteria include Dr. Deborah Chung, from the State University of N.Y. at Buffalo, who has discovered "negative" resistance in carbon fibers[10]. Another, James Griggs, the inventor of the hydrosonic pump (Pat. #5,385,298), represents an overunity "apparatus for heating fluids" which even exhibits sonoluminescence (now marketed by HydroDynamics in Rome, Georgia). Dr. Paulo Correa also qualifies with his pulsed abnormal glow discharge (PAGD) energy conversion system[11]. It is our belief that all of these inventions have the qualifications to be acceptable to energy futures. Also, theoretically and experimentally, there is growing support for a breakthrough in zero point energy conversion[12], which is the subject of more than one patent, the most recent being Dr. Frank Mead's patent #5,590,031. Furthermore, the extraction of energy and heat from the vacuum has also been proposed by Drs. Harold Puthoff and Daniel Cole[13]. Certainly, if only the 2.6% disruption in the oil flow from the Mid-East in 1999 can cause immediate chaos in the gasoline prices in this country, we desperately need to cut the umbilical cord strangling us. Therefore, a more robust energy development effort is required to help us make the transition from dangerous fossil fuels. A more stable, long-term energy future is possible with new energy sources like these discussed in this article.

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To the Question of Work Made by Electrostatic Field

Alexander V. Frolov

We know some simple examples of work making due to the forces, which appear in electrostatic field. Since the field itself does not require energy consumption from the source (not taking into account the charge leakage), then free energy can be received with these forces. The first phenomenon that we are going to consider is a phenomenon of electrostriction. Mechanical forces appearing in dielectric under the influence of electrical field tend to deform it. Sometimes these forces are small, but they can be huge in special dielectrics. The character of deformation also depends on non-linearity of electrical field. Suffice it to remember that heating of a body takes place during deformation, and we can make a conclusion on possible using of the given effect in practice. Periodical deformation can be created due to the rotor or any other methods to change the field.

The second effect is not so popular. It was found by Hertz in 1881 that there is a rotation of dielectrical cylinder (or ball) in permanent electric field if it is created in some liquid or in gas, Fig.1
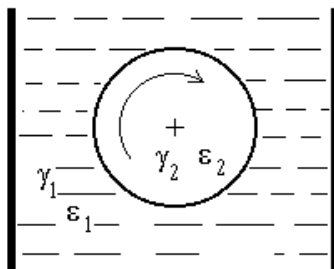

Fig.1

Here ε_1 is a dielectrical permittivity of the liquid, ε_2 is a dielectrical permittivity of the rotor, γ_1 is a conductivity of the liquid and γ_2 is a conductivity of the rotor. This effect was discovered by Hertz, then it was described by G. Quincke, Germany. Also Japan scientist I. Sumoto studied the effect in 1955. Modern research work was made by K.M.Polivanov, Moscow. There is the so called equation by Polivanov that describes special conditions, which are necessary to begin rotation ($\varepsilon_1/\varepsilon_2=\gamma_2/\gamma_1$ is the Polivanov's condition).

Forces of electrostatic field produce this rotation and it is a real free energy system that can trap energy from inner structure of potential field. Let's try to describe the mechanism of this effect and then we'll be able to increase the power of the system up to the level of industrial application. So, why does it work? To my mind, there are some differences in conditions for polarization of the rotor and molecules of liquid or gas those are surrounding the rotor since there is a difference in permittivity and conductivity.

Due to this reason the molecules are polarized both by the field of electrodes and by the field of rotor. The rotor
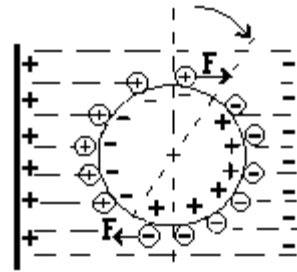
Fig.2

is polarized in the electrical field of electrodes, and molecules of liquid on its surface are polarized by the electric charge of the rotor, but not according to direction of the field. So, the rotor is surrounded by "screen" of molecules on its surface. The electric charge of this screen partially compensates the field of electrodes.

When some angle is created by the first initial turn, there is some part of the rotor surface, where molecules of liquid on the surface of the rotor are attracted to electrodes and it is the reason for future rotation. After some angle of the turn the polarization in this point of the rotor surface is changed but new molecules are incoming in the so called "sector of attraction" and the rotation is always accelerated. This well-known effect of 1881 is a very good example of possibility to produce useful work in load by means of electrostatic field only.

One more interesting effect is known as Faraday effect. In 1836 Faraday noted that raising of liquid upwards takes place in condenser with liquid dielectric (plates are installed vertically). During this process electrostatic field makes the work against gravity. A. Gyemant in 1926 established that value of this force is proportional to the square of voltage on condenser. Later in 1955 this phenomenon was studied in details by I. Sumoto, Japan. That's why in physical encyclopedias this effect is called "Faraday-Sumoto effect". In Tareev's book [1] it is pointed: "Under high voltage this phenomenon leads to flowing and turbulent boiling of liquid". I should remember for those, who cannot see any unusual here, that **it does not necessary to consume the power from initial source. Creating an initial field in electric capacitor, then we can use the received mechanical work.** It is evident that the gradient of electrical field creates the conditions for movement of liquid dielectric. A task to create conditions for liquid circulation is more complex, but it has solution, if we take into account the presence of one more static field, i.e. gravitational field. Joint action of electrostatic and gravitational fields stipulates the circulation of liquid dielectric even in the simplest constructions. Besides, electrostatic filed can be partially screened.

The analyzed examples should draw attention of experimenters to these obvious ways of how to create useful work by means of electrostatic field.

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to 10^{-6} %, which constitutes the so small value that it cannot change chemical properties of oxygen and does not call killing radioactive emanation.

There is a possibility to use energy properties both of oxygen and nitrogen of free air in the process of PTHF. To do this it is necessary to destroy nitrogen molecule at least in atoms or smaller fragments by some initiating influence. It is achieved by electrical discharge, magnetic flow, explosion and other means. These means consume much less energy than produced in PTHF. In particular, such processes were achieved in combustion engines. Such nitrogen mode of operation and combustion is accompanied by oxidation to H_2O, but not to CO_2, which is more effective in energy and ecological aspects. Accordingly, the power of engine increases and organic fuel is saved. Exhausts from this process mainly contain water vapor [3].

PTHF processes with excessive power release (more than consumed power) were also obtained in heat-generators operating with water.

Free energy diffused in the surrounding space could be transformed into mechanical, electrical or another kind of energy by means of vibration-resonance, electromagnetic and other energy systems. Classification of these systems as well as physical mechanism of energy transformation is given in [2]. The known Searl's engines can serve as an example of energy systems working with free energy.

The developed physical mechanisms of energy-release processes will allow to create industrial, stably operating, ecologically clean energy systems, which do not consume organic and nuclear kinds of fuel, harmful for humankind.

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On General Nature of Forces

Dr. Evgueni D. Sorokodoum

Entrepreneur and General Director, Vortex Oscillation Technology Ltd, Volochaevskaya Street, 40-B, Flat 38, 109033, Moscow, Russia
Telephone: 7-095-362-8084
e40dum@dol.ru http://vortex.viptop.ru

Introduction

In techniques and in our life we got used to certain physical notions concerning force. We usually use these notions in creation of automobiles, airplanes, rockets and other techniques, but we don't think about **the origin of forces** in general. Usually appearance of force in continuum is connected with presence of momentum gradient.

A number of works, which describe various versions about origin of a force appeared [1, 2, 5, 8, 17, 21, 22, 23, 25, 30, 35, 36, 38, 39]. Different mechanisms of appearance of force are considered in these articles. Usually they consider origin of a force in one of the fields,

which are: electromagnetic, gravitational and others. **There was a theoretical attempt to connect the force initiation with energy gradient [33]. Experimental proof of force initiation due to energy gradient was obtained in the works [7, 38].**

Below we made an attempt to show the general regularity of force initiation, which is connected with non-uniform distribution of energy in space. With this process, physical nature of any kind of energy and specific mechanism of force initiation does not play any role. These are only particular cases of general nature of force initiation.

General nature of forces

We are surrounded by space, which is full of energy. Here we mean the energy of any nature: mechanical, thermal, electromagnetic and others. Energy is related with material world and its value is connected with the volume.

Any particle (volume) of continuum has energy:

$$A = A(x, y, z, t) \qquad (1)$$

where x, y, z are Eighler's coordinates of the center of particle, t is time.

Transmission of energy from one point of space to another one can take place by various methods, both in connection with energy transmission by material particle itself (which is a "carrier" of energy in this case) and without such transmission (for example, with wave motion). For the volume degenerated in ideal point the energy will be zero. That's why it is more comfortable to operate with the energy density concluded in the

unit of volume. The energy density *a* depends on coordinates of space and changes in time

$$a = a(x, y, z, t) \qquad (2)$$

Interrelation between energy concluded in the space of *V* volume and energy density we can get from (1) and (2)

$$A = \int_V a(x, y, z, t) \cdot dV \qquad (3)$$

In general case energy in space (and, therefore, energy density) is distributed non-uniformly. In connection with non-uniform distribution of energy in space a transmission of energy between particles of space takes place. Using one of the forms of transference theorem [32] in its application to the change of energy density, we can write it as follows

$$\frac{d}{dt}\left(\int_V a \cdot dV\right) = \int_V \left[\frac{\partial a}{\partial t} + \frac{\partial a}{\partial x} \cdot c_x + \frac{\partial a}{\partial y} \cdot c_y + \frac{\partial a}{\partial z} \cdot c_z\right] \cdot dV \qquad (4)$$

$$c_x = \frac{dx}{dt}, \; c_y = \frac{dy}{dt}, \; c_z = \frac{dz}{dt}$$

where c_x, c_y, c_z is the speed of transmission of energy density along the axes *x*, *y* and *z* accordingly. In general case the speeds of energy density transmission in different directions will not be equal. If there is no change of total energy in the volume *V*, the integral (4) will be equal to zero.

Then (4) will become

$$\int_V \left[\frac{\partial a}{\partial t} + \frac{\partial a}{\partial x} \cdot c_x + \frac{\partial a}{\partial y} \cdot c_y + \frac{\partial a}{\partial z} \cdot c_z\right] \cdot dV = 0 \qquad (5)$$

The equation (5) is true for any volume, which does not include the source of energy, that's why integration element should be equal to zero

$$\frac{\partial a}{\partial t} + \frac{\partial a}{\partial x} \cdot c_x + \frac{\partial a}{\partial y} \cdot c_y + \frac{\partial a}{\partial z} \cdot c_z = 0 \qquad (6)$$

The first term (6) is a speed of energy density change in time (power density)

$$n = \frac{\partial a}{\partial t} \qquad (7)$$

and gradients of energy density

$$p_x = \frac{\partial a}{\partial x}, \; p_y = \frac{\partial a}{\partial y}, \; p_z = \frac{\partial a}{\partial z} \qquad (8)$$

are density of the force along the corresponding axes.

The equation (6) can be presented in a form

$$n + p_x \cdot c_x + p_y \cdot c_y + p_z \cdot c_z = 0 \qquad (9)$$

The equation (9) gives a universal dependence between power density, force density and speed of transmission for infinitesimal volume for any kind of energy. This equation describes the interrelation between energy and power characteristics of medium with distributed parameters. The equation (5) taking into consideration (3) can be transformed to another form

$$\frac{\partial A}{\partial t} + \frac{\partial A}{\partial x} \cdot c_{x0} + \frac{\partial A}{\partial y} \cdot c_{y0} + \frac{\partial A}{\partial z} \cdot c_{z0} = 0 \qquad (10)$$

where

$$c_{x0} = \frac{\int_V a \cdot c_x \cdot dV}{\int_V a \cdot dV}, \qquad c_{y0} = \frac{\int_V a \cdot c_y \cdot dV}{\int_V a \cdot dV},$$

$$c_{z0} = \frac{\int_V a \cdot c_z \cdot dV}{\int_V a \cdot dV} \qquad (11)$$

c_{x0}, c_{y0}, c_{z0} - is an effective speed of transmission of energy along the axes x, y and z, accordingly to the chosen final volume *V* of space.

In the case when transmission speed of energy density is constant along the corresponding axes, (11) is simplified and becomes

$$c_{x0} = c_x, c_{y0} = c_y, c_{z0} = c_z \qquad (12)$$

In this case effective speeds of energy transmission and speeds of transition of energy density along the corresponding axes are equal between each other.

The equation (10) is an equation of energy transmission for the medium without energy sources. The first term (10) is a speed of energy change in time (power) in the selected volume

$$N = \frac{\partial A}{\partial t} \qquad (13)$$

and **gradients of energy**

$$P_x = \frac{\partial A}{\partial x}, \ P_y = \frac{\partial A}{\partial y}, \ P_z = \frac{\partial A}{\partial z} \qquad (14)$$

are the forces on corresponding axes.

(Editor's note: Similar conclusion about nature of force can be made from consideration of energy as deformations and other processes in ether. In ether-dynamics any force can be considered as a result of the ether gradient. It is similar to aerodynamics pressure, see the article "The work" by A. V. Frolov).

Then from (10) taking into consideration (13) and (14) we will get

$$N + P_x \cdot c_{x0} + P_y \cdot c_{y0} + P_z \cdot c_{z0} = 0 \qquad (15)$$

The equation (15) gives an interrelation between energy force characteristics of selected final volume V of space, at that the characteristics of space distributed inside of this volume are replaced by equivalent ones. This equation is universal and can be applied to any kind of energy.

From (14), taking into consideration (3) and (8) we will get the interrelation between force and force density

$$P_x = \int_V p_x \cdot dV, P_y = \int_V p_y \cdot dV, P_z = \int_V p_z \cdot dV \quad (16)$$

From (13), taking into consideration (3) and (7), we will get the interrelation between power and power density

$$N = \int_V n \cdot dV \qquad (17)$$

The equations (16) show that the resultant force, which has an effect on the volume V is equal to the sum of forces, which have an effect on elementary volumes $p_x \cdot dx$ and so on.

The obtained equations of energy transmission show the relation between change of energy in time and in space and forces, which appear in this process, independently of nature of energy and kind of motion. These equations do not show how the motion of medium takes place, but they give an expression for the forces, which call this motion. Transmission of energy in space can be multidimensional or one-dimensional, direct and inverse, constant and periodical.

From (9) and (15) we can see that in the medium, in which energy is distributed uniformly, the forces, which act on the infinitesimal volume and selected volume, will be absent. Simultaneously, the change of power density and power in time also will not take place.

From the general analysis of the form of equation (15) we can see that with the same power the **maximal force along the chosen direction can be obtained in**

condition that there is no transmission (radiation) of energy in the other directions. I.e. the unidirectional radiation of energy can give the maximal force of all possible forces.

One-dimensional case

For one-dimensional case (9) and (15) are simplified and become

$$P_x = -\frac{N}{c_{x0}}, \ p_x = -\frac{n}{c_x} \qquad (18)$$

The same functional dependence can be transformed to another form; namely, **the force along the direction under consideration is equal to the ratio of energy (power) transmission speed along this direction to the speed of energy transmission.**

From the above mentioned the least definition of force it follows that with the same power the force will be the more, the less will be the speed of energy transmission.

The wave method is one of the methods to transmit energy. In general case, in disperse medium, transmission of energy takes place with a group speed of wave movement [32] $c_x = c_g$. In the case of non-disperse medium the group speed and phase speed are equal to each other. The equation (18) can be used to determine the force, which act on the surface of energy source of N power, which radiates the wave along x with the speed of energy transmission c_x. **Radiation in the form of traveling waves leads to the irreversible process of energy transmission along x.** Then the power of irradiator in general case will consist of active and reactive constituents. A reactive constituent (after averaging in time in the period of oscillation) gives zero and active constituent of power gives the stationary constituent N_r. Stationary constituent of power N_r induces the component of force, which is stationary in time

$$P_r = -\frac{N_r}{c_{x0}} \qquad (19)$$

If the source of energy moves with the speed U in the direction opposite to the energy propagation, then the speed of energy transmission regarding medium will be

$$c_{x0} = c_{x00} - U \qquad (20)$$

In this case the expression to determine tractive force will have a general form of

$$P_r = \frac{N_r}{U - c_{x00}} \qquad (21)$$

A number of unique phenomena such as Doppler's effect, change of wavelength [21,22] and others appear during the propagation of wave in moving medium.

The transmission of energy can be realized by various methods:

1. **By means of mass transfer.**
2. **By means of wave.**
3. **By means of artificially created medium with corresponding speed of energy transmission.**

By means of mass transfer

This method is interpreted as follows "impulse of force is equal to the gradient of momentum". It is used almost everywhere (screw and hydro-jet movers, reactive forces made by rockets, lift of wing, pumps and many others).

(Editor's note: In some aspect the wing can be considered as particular case of this method but the wing uses gradient of the medium also).

This method is a particular case of force induction by means of energy gradient. It has a big shortcoming in spite of high spreading in science and techniques. Induction of force is connected with the movement of mass of solid bodies, liquid or gas and, therefore, it is connected with high friction, vibrations and acoustic noises and other negative phenomena.

By means of wave

It is well known that waves during radiation, absorption or reflection of waves by body have a force effect on it.

(Editor's note: Which kind of waves? There are transverse and longitudinal waves, and their effects are very different. For example, the acoustic waves are longitudinal waves. But usual electromagnetic photons in common consideration by Maxwell are transverse Hertz's waves. Lebedev's results can be explained only within theory of longitudinal electromagnetic waves.)

Acoustic waves propagating in medium can have a constant pressure (radiation pressure) on barriers and irradiators [14-15,18,20,24,26,27,31]. Even in the past century Lebedev discovered the pressure of light on bodies [13]. Nowadays there are ideas to use pressure of light to move spaceships in Solar system [29]. Scientific interest to the pressure of radiation grows in connection with development of science about waves and wide application of its results in practice. But dissemination of physical notions to the other fields of science is very weak. It occurs because physics of this phenomenon is apart from many researches held before and now, and phenomenon itself is apart from our usual notions and experiments. Wave and one of their manifestations, which is pressure of radiation, exist in the processes of various nature. In connection with the fact that this pressure is very small there are almost no researches of radiation pressure.

The presence of energy gradient in surrounding space or on the irradiator and (or) reflector itself is necessary for appearance of force. Due to the big velocity of electromagnetic and even acoustic waves [20, 29, 31] the forces, which are induced by means of known waves, have very small values and are useless for practical application in the Earth conditions.

*(Editor's note: The only way is to try **to decelerate the speed of light** and in this case application of electromagnetic wave as propulsion method can be practically useful for flight in the Earth conditions and for space systems.)*

We should mention that in general case, due to dispersity of medium, the phase velocity of wave is different from the group velocity (velocity of energy transmission). In scientific literature the method of creation of the force by means of light (photons) is explained as reactive force of repelled particles (photons) and thus they try to reduce the wave method to the usual reactive method (by means of mass transfer). But creation of radiation force by means of acoustic wave gives us an example, and we can see that particles of medium do not repelled at big distances and only wave propagates at big distances in this case.

This force is a reaction of medium on the radiation of energy in it (radiation force, radiation pressure). The received formulation for radiation pressure coincides with an expression obtained in the work [31]. Thus, P_r is in direct proportion to the stationary part of radiation power and inversely as the speed of energy transmission. Let's give the numerical examples of radiation pressure force. For ease let's attribute the value of force to the radiated power (coefficient of power density, N/(Nm/s))

$$\gamma = \frac{P_r}{N_r} = \frac{1}{c_{x0}} \qquad (22)$$

From (22) we can see that

- for electromagnetic waves $c_{x0} = 300000000$ m/s,

$\gamma = 0.0000025$ N/horse power;

- for acoustic waves in water $c_{x0} = 1450$ m/s,

$\gamma = 0.517$ N/horse power;

- for acoustic waves in air $C_{x0} = 340$ m/s,

$\gamma = 2.2$ N/ horse power.

Numerical examples show that **with the decrease of energy radiation speed the coefficient of power density sharply increases. That's why the main attention we will pay to the search and analysis of waves, which have less speed than acoustic waves.** Effective propulsion drive or spacecraft can be created if we'll use low-velocity waves [33]. Such waves are little known yet. We should to seek these waves.

Energy transmission by means of low-velocity waves

In liquid the following waves are known besides acoustic waves: capillary waves, gravitational waves, ship waves, Stocks viscous waves, Tolmin-Schlihting waves, heat waves. Let's dwell on Stocks viscous waves. Solution for Stocks viscous waves, which describes the motion of liquid around the endless plate oscillating in its plane, is well-known [37] and it has the form of

$$u = u_0 \cdot e^{-kx} \cdot Cos(\omega \cdot t - kx) \qquad (23)$$

$$k = \sqrt{\frac{\omega}{2 \cdot v}} = \frac{\omega}{c} = \frac{2 \cdot \pi}{\lambda} , \quad c = \sqrt{2 \cdot v \cdot \omega} ,$$

$$\lambda = 2 \cdot \pi \cdot \sqrt{\frac{2 \cdot v}{\omega}} , \quad u_0 = s \cdot \omega \qquad (24)$$

where k, c, λ are the wave number, phase velocity and length of Stocks viscous wave, $\omega = 2 \cdot \pi \cdot f$, f is a frequency of oscillation, u, u_0 are the momentary values and amplitude of oscillation speed along the surface of the plate, x is a coordinate along the normal line to the surface of the plate, v is a kinematic viscosity of liquid.

It is known that energy in wave is transmitted with a group velocity ($c_{x0} = c_g$). The group velocity of viscous waves is equal to

$$c_g = \frac{d\omega}{dk} = 2 \cdot \sqrt{2 \cdot v \cdot \omega} = 2 \cdot c \qquad (25)$$

We can see from (25) the speed of energy transmission is two times more than the phase velocity of the wave itself.

Let's take an endless plate as a simplest irradiator of viscous waves. This plate oscillates in its own plane and it radiates energy only in one direction (see Fig. 1).
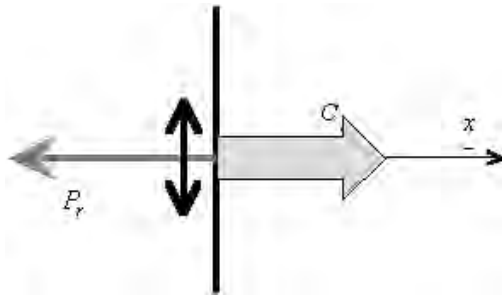

Fig. 1.
A plate oscillating in its own plane (vertical double arrow) generates Stocks viscous waves. The energy is transmitted by means of these waves with the group velocity c_g (arrow to the right) and radiation force appears (arrow to the left).

The power of viscous wave radiation from the area of plate's surface with the square F will be

$$N = F \cdot \mu \cdot [\frac{du}{dx}]_{y=0} \cdot u_{y=0} \qquad (26)$$

where m is a dynamic viscosity of liquid.

After substitution of (23) to (26) we will get

$$N = F \cdot \rho \cdot v \cdot u_0^2 \cdot k \cdot [-\cos^2 \omega \cdot t + (\sin \omega \cdot t) \cdot \cos \omega \cdot t] \quad (27)$$

where ρ is the density of liquid.

After the averaging operation in time we will get a stationary constituent of power form (27)

$$N_r = \frac{F \cdot \rho \cdot v \cdot u_0^2 \cdot k}{2} \qquad (28)$$

After the substitution of (24), (25) into (19), (22) we will get a stationary component of radiation pressure force

$$P_r = \frac{F \cdot \rho \cdot u_0^2}{8} \qquad (29)$$

power density

$$\gamma = \frac{1}{2 \cdot \sqrt{2 \cdot v \cdot \omega}} \qquad (30)$$

nominal pressure

$$q = \frac{P_r}{F} = \frac{\rho \cdot u_0^2}{8} = \frac{\rho \cdot s^2 \cdot \omega^2}{8} \quad (N/m^2) \qquad (31)$$

Let's make numerical examples (see Fig. 2). For water

$v = 10^{-6} m^2 / s$, $\rho = 1019 N \cdot s^2 / m^4$, for air:

$v = 15 \cdot 10^{-6} m^2 / s$, $\rho = 1.27 N \cdot s^2 / m^4$.

It will be easier to present the expression (30) in the following for, taking into consideration (24)

$$\gamma(u_0, s) = \frac{735}{2 \cdot \sqrt{2 \cdot v \cdot \frac{u_0}{s}}} \quad \text{(N/Horse power)} \qquad (32)$$

Power densities and nominal pressures in air under the oscillation rate amplitudes of 3-10 m/sec have the same values as flying birds and insects. A characteristic feature of propulsive force induction by means of oscillations in liquid is a participation of
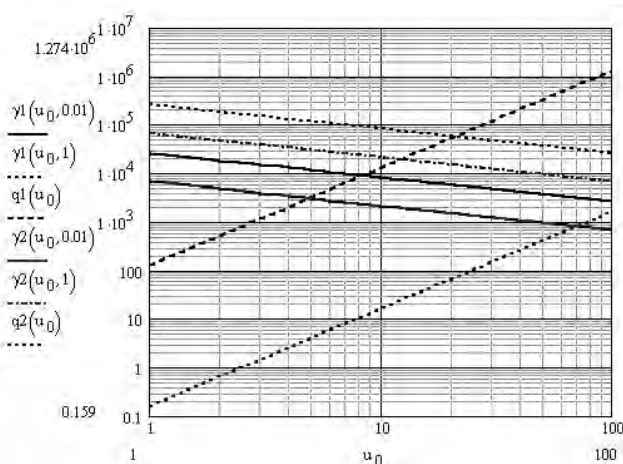
Fig. 2.
Dependence of power density and nominal pressure from the amplitude of oscillating speed of the plate (index 1 for water, index 2 for air).

Reynolds voltages in Stocks viscous waves in this process. Instead of continual participation of Stocks viscous waves in the process of induction of currents and forces including propulsive force, their role in these processes is still poorly studied. The role of Stocks waves in locomotor organs of flying and amphibian animals is still not understood. There are wave oscillations of body in locomotor organs of amphibian animals besides Stocks waves. Models of propulsive force induction [4, 28] per se are based on transfer of some quantity of motion by means of wave oscillations of the body and transfer it into liquid (into track). In Stocks waves as well as in wave oscillations of the body a general feature is a wave character of energy transmission.

Also there are some known and unknown low-velocity waves in nature. Using of these waves can give very high values of propulsive force.

By means of artificial creation of medium with corresponding velocity of energy transmission.

If it is difficult to find and use low-velocity waves in undisturbed medium, then it is possible to create an artificial medium, in which energy transmission will be with low velocity. Taking into account that device will move in fluid dead medium, we should create an artificial structure of currents, properties or other characteristics in this medium. For example, it is possible to create special vortex structure (vortex trail).

Practical aspects

General principles of force creation due to the energy gradient are shown in this work. Then it is possible to use general regularities of nature to create propulsion [34]. Dependence of force from the velocity of energy transmission [22] shows that we can get propulsion forces much more than they were created in aviation, shipbuilding, machine building and aerospace, if we use a low-velocity mode of energy transmission. If we use waves instead of moving mass for energy transmission, then we can get propulsion drives, which

create propulsion without reactive mass flow. Then it will allow to solve the problems of economy, low noise and ecological problems on a new, higher level. There are some researches in this field. There is already a theory how to create some kind of an aircraft by means of waves [9]. Theoretical aspects of how to create airplane of a new kind are considered in the work [39]. Experimental researches of propulsion, which can be received by means of air circulation through capillaries showed that studying of this phenomena in the frames of classical conceptions couldn't give an adequate answer [10-12].

Using of low-velocity waves (or a specially structured medium) can allow to create UFO-like airplanes.

Lifting of a man (1000 N) with using only his inner energy (0.1 horse power) and his flight will be possible if he can generate a unidirectional energy radiation in direction of the Earth with a speed not more than 0.07 m/sec. Thus, it is possible to create moving of a man like it is described in levitation. The problem is the search of such low-velocity radiation in human body or creation of energy irradiator with such characteristics.

If we find low-velocity waves and can use them, then a plane or mover will be created and it will have no reactive mass flow.

Conclusions

1. General principle of creation of force is a presence of energy gradient (for any kind of energy). Generation of force by means of momentum gradient is a particular case of general principle. Any methods of creation of force are a concrete realization of general principle, which is generation of forces by means of energy gradient.
2. There is no transmission of energy and force in the medium with uniform distribution of energy.
3. Energy transmission can be made by means of moving mass of medium, waves or specially structured medium.
4. The highest one from possible forces can be received with unidirectional radiation of power.
5. The value of force is in direct proportion to the radiated power and inversely proportional to the velocity of energy transmission. The value of force grows with decrease of the velocity of energy transmission.
6. Using the low-velocity and wave method of energy transmission we can create airplanes and ships, pumps and technological processes of a new kind, with much better energy and other characteristics.

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Fig.3 is the photo of the system. Its weight is equal to 32 kg, the vertical size is about 600 cm and diameter is about 370 cm. Consumed power is about 650 Wt.

Authors created the long-term program of the research work named as "Poisk-1". Also the POISK –2 program was created. It includes research into the gravitational spectrums of the solid body, medico-biological research, gravitational astronomy, earth and sun diagnostics, research into the interaction between gravitational radiation and matter, influence on the crystalline structure, influence on radioactive decay and many other topics.

The main results were published in our book "Introduction in Experimental Gravitonics", 1991, published in Russian. It was described why the "light barrier" is penetrable and the energy relations and the mechanism of "C-barrier" penetration were shown. Authors created and developed the microstructure models of the photon and electron. The "uniquants" put forward as the elements of the inner structure of electron and photon. The authors determined the "uniquanta parameters", described linear polarisation for photon, circularity polarised non-rotating photon and the circularity polarised rotating photon. Spin, magnetic moment of a uniquantum, gravitational mass, equivalent charge and radius of a uniquantum are postulated. Tangential velocity of uniquantum rotation, uniquantum magnetic field, gravitational constant of the uniquantum, gravitational field of the uniquantum are described.

There is "Quadruple generator of directed gravitational radiation" known as "Yoilka" (Fig.3). It can produce a swing of mass or swing of gyroscopes, precession of masses and precession of gyroscopes was studied by
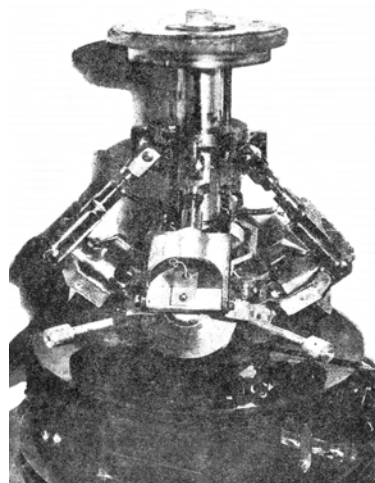

Fig.3 Four gyroscopes of the "Yoilka"

the authors. Experimental verification of new gravitational equations and research into the effects of shock rotation and effect of shock braking of the rotating gyroscope was produced. The authors reported the experimental results on creation of the propulsion force and explained the mathematical model of the generators in their laboratory.

To make the experimental verification of the **natural relation between magnetism and gravitation**, corollaries from the microstructure model of electron, gravitational interpretation of magnetostriction were proposed. In the experiment some change of the trajectory of optical laser beam was obtained after that this beam passed through the magnetostriction substance. Also the authors proved some calculations from their experiments with homogeneously-magnetised ferromagnetic material, which were known before as "gravitational frequency shift" of optical beam.

Antigravitational Wing

D.V. Ponomarev and R.V. Shibeko

Correspondence address: Shibeko R.V.,
Lenina Ave. 27, State Technical University,
Komsomolsk-on-Amur, 681013, Russia

One of the main barriers for humankind on the way to the development of cosmic space is gravity. Using modern rocket-space technologies we should spent a lot of efforts to overcome the forces of gravitation. Present spacecraft consume a lot of fuel, that's why now the development of cosmic space is very expensive and non-effective.

Humankind has come close to the problem of control of gravitation, and now it is not a scientific fantasy, but working hypotheses. A lot of natural phenomena are laid in the basis of these hypotheses and character of them is really an antigravitational one. Serious scientific

works, theoretical and experimental researches are devoted to the problem of antigravitation; international scientific conferences on antigravitational research are held regularly. But the nature of antigravitational phenomena is still unknown; there was no theory to answer all these questions.

Actually in April 2001 researchers of Komsomolsk-on-Amur State Technical University offered to public attention a theoretical explanation of nature of antigravitational phenomena, which have huge opportunities to become a basis for further studying of antigravitation. Potential model of antigravitational interaction of the bodies by Dmitry V. Ponomariov and Roman V. Shibeko is based on the general theory of relativity by Albert Einstein and fully complies the frames of relativist kinematics, i.e. it is not in contrary with the modern theory of gravitation and laws of conservation. That's why it is headily spreading and it finds more support in various regions of Russia and abroad.

Followers of possibility to create antigravitational forces in rotating co-ordinate system now got a reliable support for their scientific research. Even skeptical scientists recognized Ponomariov's idea to be very interesting, because they should oppose mainly Einstein's theory but not only the new notion of antigravitation, to disprove it. That's why it is natural that nobody suggested a generally recognized and well-founded theoretical refutation of potential model of antigravitational interaction of bodies.

Followers of Ponomariov's idea from various cities organized a wide network in the Internet to distribute materials on proposed theory. So, it became known that some interest in potential model of antigravitational interaction of bodies already appeared from NASA.

The most important thing is a postulate stated by Ponomariov that antigravitational interaction between two bodies can be obtained if material points of one body are moving along elliptic trajectories relatively to material points of another one. This postulate brings us to the attentive and more serious consideration of such phenomenon as UFO.

Talks and disputes on existence of alien civilizations and their presence on the Earth have been holding for few decades. Many publications on histories of eyewitnesses, hypotheses of scientists are devoted to this problem; radio and TV programs often announce about it. The grounds to all these announcements are the "inexplicable" phenomena observed in atmosphere, traces of UFO presence on the Earth and so on. Of cause, in most cases some astronomic, atmospheric or man-caused phenomena were recognized as UFO. But there are some announcements about UFO, which are not explicable in such a way. Let's ask a question, why the main shapes of observed UFO are discoid or spherical objects. It is not occasionally that the phrase the "flying platform" got assimilated and is known for everyone.

If we suppose a hypothesis that "flying platform" is a reality and they are the vehicles of aliens, than it is natural that their shape should be explained to a greater extent by technologies used by aliens. So, we can inscribe a disk or a system of disks in most shapes of UFO.

But a conclusion from the cumbrous definition of antigravitational wing given by Ponomariov is the following: antigravitational wing can be a material body of any shape, which rotates around its axis with a certain angular speed, or a material body, in which the motion of electrically charged particles is registered. That's why the most acceptable shape of antigravitational wing for technical usage is a disk or a system of disks (any elements of disk) in any modification.

We should note, basing on the rates of spreading of the work by Dmitry Ponomariov and Roman Shibeko and interest to it in the world, that big hopes are connected with potential model of antigravitational interaction. It gives us the possibility to create an antigravitational wing in the near years.

All information on possible variants of cooperation please send to Ponomariov D.V. to the address: vredir_ls@mail.ru.

AN INTRODUCTION TO GRAVITY

Lew Paxton Price
From the theory developed by Lew Price
and Mart Gibson

PO Box 88, Garden Valley, CA 95633, USA
e-mail: lewprice@softcom.net

[Author's Note: This article is condensed and abbreviated from a series of small books. It's concepts cause most minds to make major adjustments over a time. To understand these concepts, it is advisable to read the article several times with at least one full night's sleep between each reading.]

Possibly, the first being on this planet to seriously contemplate the existence of gravity was the first to attempt to walk on land after it emerged from the ocean. Similar occurrences have led only to the conscious discovery of the *existence* of gravity. The discovery of the *nature* of gravity must come from at least a slight understanding of electromagnetism and light. So a small part of the nature of light is what will come first in this introduction to gravity.

Pulkovsky Radio-Telescope Receives the Signals from the Center of the Universe

A.A. Shpitalnaya, A.M. Mishin

Central Astronomic Observatory of Russian Academy of Science, 196140, Saint Petersburg, Pulkovskoye highway, 65/1

Fig.1

It was announced in the article [1] that discovery of the main etherodynamics law allowed to determine coordinates of the Center of the Universe (CU). It is an area of Metagalaxy in the direction of Southern Fish constellation (main star is Fomalgaut) with coordinates in the second equatorial system: right ascension $\alpha=330$ degrees and declination $\beta=-30$ degrees. Also it was found that CU sporadically radiates the waves of unknown nature, which most of all correspond to the powerful gravitational disturbances in their characteristics. From March 2001 the monitoring of the given radiation was made by means of laboratory device with artificial biofield. Principle of operation of this device is based on usage of many-dimensional properties of world ether [2].

In October 2001, according to the suggestion by Dr. Alexandra Alfredovna Shpitalnaya, a big radio-telescope belonging to CAO RAS in Pulkovo was included to the estimated time. This time the discovery proved to be true, radio-telescope registered non-traditional signals from CU!

To prove the non-electromagnetic nature of the waves received, the irradiator of antenna was closed hermetically by a massive metal lid. It didn't influe on the selective properties of the antenna and value of the signal received. Thus, it was proven that in this experiment the wave physical processes are analogous to those, which were studied by Prof. N.A. Kozyrev on the optical telescope [3].

Now one important circumstance is still a riddle. Devices with artificial biofield contain special elements to maintain necessary operating mode [2]. How a usual radio-telescope was able to act the same way? How an artificial biofield could be created on the most sensitive receiving channel with the length of wave equal to 20 cm, and existence of this biofield was proven by special experiments? Research in this field is still going.

It was also stated in the publication [1] that radiation burst of CU is accompanied by the following increase of solar activity. The results of astrophysical observations given below prove this fact.

The diagram a) on the Fig. 1 corresponds to the non-traditional signal from CU normalized by the amplitude, registered by telescope on the wave of 20 cm with a closed horn in December 2001 (dates of month at 00 hours are laid of on the horizontal axis). The diagram
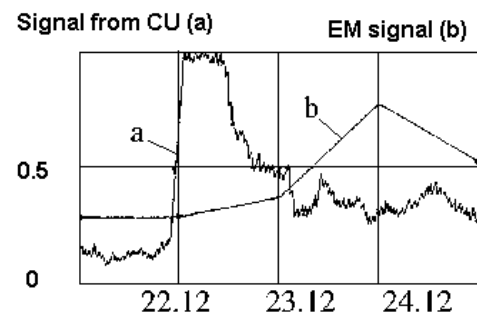
b) shows the change of solar radiation flow on the wave of 4,4 cm received by the telescope in standard mode. In the given case, as it follows from the comparison of these diagrams, correlative shift in time is equal approximately to 2 days.

Corresponding states of corona are shown on the Fig. 2, where a) is undisturbed corona and b) is a corona after the affect of gravitational blast wave. On the second picture you can see that disturbance occurred from the direction of wave arrival from CU, i.e. on the Sun disk left below. It was noticed that in following days this disturbance spread to all visible hemisphere of the sun. Increase of activity of our star also reflected on the Wolf number; the growth of the number from 160 to 290 was registered in the given case.
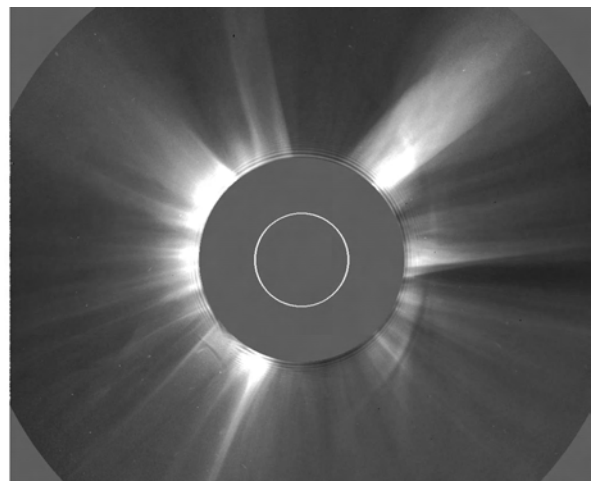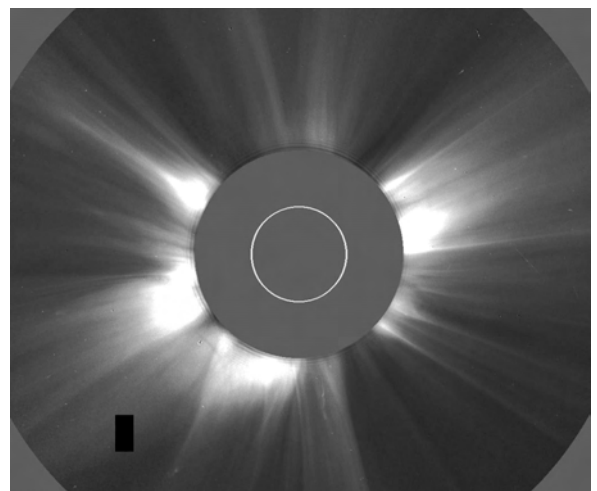

Fig.2A

Fig.2B

The documentary materials mentioned here prove the real possibility of short-term forecast of solar activity, which is very important for emergency services on nature cataclysms on the Earth and in Space. It was recently established with North-Western region of Russia as an example that development of active areas on the Sun is correlated with atmospheric circulation and, therefore, with meteorological situation. A method was created on this basis, which improved reliability of meteorological forecasts [4]. The analogous methods can be developed to forecast biosphere and other aspects of solar and earth relations.

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Antigravitation and New Energy Processes

Alexander M. Mishin

The author describes his experiments on creation and detection of ether vortexes, which can be considered in connection with a notion "local space-time". Anisotropy of space, which is related with the real movement of the Earth in the world ether was experimentally proved.

A developed empirical model of stereodynamically multidimensional ether allowed us to predict theoretically and prove experimentally the existence of new physical phenomena in Nature. As a whole, the obtained results are the harmonious and constructive concept of modern metaphysics, which should be called "flickering" physics for the Earth conditions.

On the Fig. 1 the diagram of a spatial part of real space-time energy spectrum of turbulent motions of the world ether in the global scale is given. The main peculiarity of such motions lies in the fact that in contrast to the well-known hydrodynamic mediums (water, air), every scale of vortexes on the axis Λ of the spectrum differs due to its principally new material (quasimaterial) properties. This gives us a foundation to make a conclusion that spectral characteristic of the vortex-wave quantum movements of ether corresponds to the numerous possible parallel worlds. Each of these worlds can be described by its own physics. And the main question is: according to what law these worlds interact between each other and our classic world?

The author in his previous publications [1-6] informed that with the growth of the sizes of ether vortexes, i.e. during the movement along the axis of the spectrum to the right, their energy grows according to the law of flicker noises. The speed of propagation of energy interaction decreases proportionally and time becomes slower. The macroworld of classic elementary particles (left part of the spectrum) is a unique storey of the Universe due to its energy and stability. Energy interaction between the macroworld and macroscopic ether is limited by energy and information barrier (the law of triad) and the value of interaction decreases by the exponent law. The constant of time of this exponent depends on the ratio of the sizes of interacting vortexes. As a result the parallel worlds penetrate to our world as "flickering" physical phenomena. The total action of these phenomena are called flicker noises. The area of the spectrum to the left from macroworld, where the speed of interaction more than speed of light, as well as the weak "wattless" interactions, which ignore the energy and information barrier, require special consideration. These interactions are stipulated by particular wave processes.
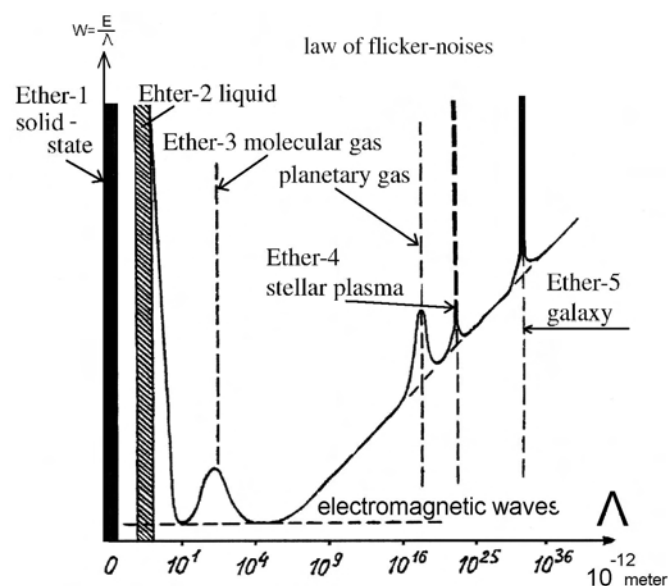

Fig. 1

The main conclusion is: electromagnetic phenomena at all three levels of Ether are equivalent and they are determined by the number **137.036** and speed of light (dielectric and magnetic Ether constants).

Ratio of speed of light 2.99792458 ·10^8 to speed of the movement of electron on the first orbit of atom of hydrogen 2.187691 ·10^6 is equal to 137.0360.

Gravitational constant of Ether of the Universe also depends on Ether basic parameters and number 137.036:

$$G = \xi e_o^2 \cdot 137.036 / m_{Pl}^2 = 6.6726 \times 10^{-11},$$

where Plank's mass is a denominator.

Inertial force of the mass *m* and its acceleration *a* are also determined by parameters of Ether and the constant 137.036

$$f = ma = 15.5\pi \cdot 137.036 \cdot b \cdot \Delta r_a,$$

where $b = 1.155065 \cdot 10^{19}\,(\text{kg/s}^2)$ is **an elasticity of Ether structure**. This formula shows how it is possible to transform elastic energy of Ether to energy of substance at acceleration of mass.

Editor's: Theory by N.A. Kozyrev considers the cause-effect relations from positions of the concept of active properties of time. In this concept the speed of the course of time is defined as a ratio of distance between the cause and the effect to the period of the time delay between them. For our space it is equal to the product of the speed of light and Zommerfield's fine structure constant, i.e. the speed of the course of time is 137 times smaller than the speed of light. Let's note, that it is not the speed of motion in space, but the "rotation speed of the cause-effect connection". To my mind, there is a clear analogy between this four-dimensional rotation and the so-called torsion technologies. In his work Dr. Shipov presents the mathematics of four-dimensional rotations and firstly introduces the notion of torsion fields. Besides, Dr. Spartak M. Polyakov in his work noted the features of the internal structure of photon. On the assumption of this structure, minimal prolongation of any electromagnetic quantum is equal to the product of the wavelength and ratio between the fine structure constant and the speed of light. So, the internal structure of photon according to Polyakov reflects the features of inner structure of space, according to Kozyrev. This link between two theories had not been discussed before. The work by Rykov about fine structure constant is another theory, which can be used to create a new scientific paradigm of Ether. In my view, there is some analogy between Rykov's notion of "elasticity of Ether structure" and Kozyrev's "hardness of cause-effect connection".

Alexander V.Frolov

There are no Secrets in Inertialess Motion and Antigravitation

Dr. Anatoli Rykov

Actually the way to open this secret was shown by the article "Structure of vacuum and community of interactions" and the publication "Principles of ether theory" [1]. The main thing to be done successfully in these works was to find the structure of ether. It was formed by massless elementary charges (+) and (-), analogs of electron and positron. The basic distance or arm of dipoles formed by charges is equal to 1,398688·10^{-15} m and a limit of electroelastic deformation was determined according to photoeffect in vacuum (ether) and it is equal to 1,020672·10^{-17} m.

Interaction of usual substance and ether takes place through the forces of gravity and inertia, through electromagnetic tensions. Deformation of ether from acceleration of forces is given by the equation:

$$\Delta r_g = \sqrt{\frac{g}{4\pi E_\sigma S}} = 1,2703 \cdot 10^{-22} \text{ [m]}$$

To make the formula shorter the value of gravity acceleration was already substituted as acceleration of Earth 9.82 m/c^2. Direction of deformation coincides with the slope of the bob to the Earth. **To decrease gravity we should only decrease the value of deformation in this direction.** We can do it by electrical or magnetic effect around the body that we want to have antigravitational properties. Classical way to affect the value of above-mentioned deformation by another body is to place another cosmic body (for example, the Moon). **In the point of libration between the Earth and the Moon there is ether with zero deformation and accordingly the forces of gravity regarding the Earth and the Moon are absent in this point. The cause of it is evident. The Moon creates deformation of ether in this point, which is equal by the value and inverse by the sign of deformation of ether from the Earth.**

What is inertia from the point of view of ether structure? It is determined by the ratio: f=ma=16πα^{-1}b·Δr$_a$, where m is mass of the body, a is acceleration of the body,

$\alpha^{-1} = 137.036$ is a reverse value of the well-known electrical constant of fine structure, **b = 1.155·10^{+19} is a coefficient of electrical elasticity of ether.** The last value in the formula $\cdot \Delta r_a$ is deformation of dipole of ether, which appears with accelerated movement of mass of the body. From this point we can conclude **the sense of inertia: it is a force of elastic resistance of ether to accelerated motion of any body.** And in order to the body doesn't have inertia, it is necessary to compensate the deformation of ether automatically to zero by means of above mentioned interactions or (that probably also is possible) to break the structure of ether around the given body at all. One can observe luminous effects during the destruction due to annihilation of real electrons and positrons, which appear during this process. Possibly, it is observed during the movement of UFO.

Thus, theoretical grounds of inertia-less motion and anti-gravitation do exist. The next step is to create technologies to realize real projects of spacecraft without inertia and gravitation. Another interesting thing is source of almost free energy for humankind since **"perpetual motion machines" and "perpetual sources" of energy on the Earth are realized in case of the negative inertia.** Really, there is no violation of physical laws of energy conservation, since elastic energy of ether converts to the energy of substance. Energy of the Universe is still the same. The well-known principle of transformation of energy like it was for fuel energy, falling water, wind, or nuclear energy to the useful electrical form.

Naturally, the question appears: What do we have now in reality? During the last hundred years "technicians" and inventors, beginning from Mr. Tesla, have been doing a lot in this direction. The reader can find a lot of material about it in the Internet. It is not necessary to dwell on it. But we should give a real example. I speak about the book by V.F. Zolotariov, V.V. Roschin and S.M. Godin "On the structure of space-time and some interactions" [2] and the article "Experimental research of nonlinear effects in dynamical magnetic system".

The author had a chance to get aquatinted with S.M. Godin personally and with V.V. Roschin in absentia. What did they really do? As far back as in 1993 they realized the unit with rotating magnets (*Editor's note: see details in this book or in the above mentioned publications)*. This unit rotated an electrical generator of 6 KWtt output power not less then 15 minutes without any consumption of electrical energy. Rotation of the magnets with magnetic induction B or magnetic tension ∇H in some point of ether structure creates variable electrical tension $E_r = V \cdot B_x = V \cdot \nabla H$ as it is rotating. Then this tension calls deformation of ether structure $\Delta r_E = (e_0 E_r)/b = (e_0 V \nabla H)/b$.

It is enough that direction of ether deformation from the rotor of the unit would be opposite to the vector of gravity to make the rotor to experience the decrease of gravity. It was achieved about 35% of effective decrease of gravity of the rotor. If we replace the direction of speed by an opposite one, then attraction by the Earth would increase at 35%.

The term "effective" means a circumstance, when during rotation in every immovable area of ether, a deformation variable at its value forms due to discontinuity of arrangement of magnets on the rotating parts of the unit. In some moments of time deformation can reach its critical value that will lead to appearance of free electrons and positrons. During their annihilation various gamma-quantum of radiation appear. The authors of the unit noticed this effect. So, on average, 35% decrease of gravity we called "effective". The formula for electrical tensions is given as an abstract one. We should introduce a differential of magnetic induction by time instead of the speed V. Then the change of the sing of deformation from the direction of rotation of the rotor will be evident.

At the same time with the above-mentioned effect of gravity change, a component can be found in the vector of magnetic induction, which will decrease inertial properties of the rotor.

> *The effect from it will be in acceleration of its rotation, in appearance of the force, which is able to rotate electrical generator to produce "free" electrical energy.*

There is the only conclusion: There are no secrets in gravitation and inertia. There are some real methods to control gravitation and inertia. Wide abilities of ether to produce non-limited energy and to travel in space without inertia are open now [4].

It's a pity that in the last work only some general ideas in this direction are given. Specific ways of technological break-through to the future are shown in the given article.

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V. Conclusions

1. The long-term work on realization of capacity converter with η>1 with the power of few watts was finished on variconds VC2-B with the specific power of 2,1 kWt/m^3, 0,44 kWt/ton.
2. The main difficulty of realization of cycle "C-D" with the higher power was established: commutation of battery of variconds between the source and the load, introduction of inductancies in the circuit "C" and "D" improves the situation.
3. A scheme of generator of energy (capacity converter) was suggested. This converter works on the part of the energy output and spending the part of its power to the active load.

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Inductive Conversion of Heat Environmental Energy to Electrical Energy

N.E. Zaev

Abstract

*The author gives a ground for realization of the cycle "magnetization – demagnetization" of inductance with a magnetic core in the mode, which provides generation of excess energy during "demagnetization". Experiments, which prove these conclusions, are described in details. Realization of the ratio φ = **energy of demagnetization / energy of magnetization >1** in the device based on inductance with magnetic core. The author believes that presence of spontaneous magnetization in the area H=(1,2÷1,4)H$_c$ is a basis for φ>1, when demagnetization is made by the due to the factor of kT (i.e. heat environmental energy). **The author experimentally confirmed φ>2 at 1 kHz.** The author called this heat converter "ferrocassor" (concentrator of environmental energy).*

A task of detailed consideration of energetic aspects of the cycle "M-D" (magnetization – demagnetization) is to find a way to realize the ratio

$$\frac{A_M}{A_D} = \frac{energy"M"}{energy"D"} = \varphi > 1 \qquad (1)$$

A foundation for realization of (1) is the evident difference of A_M and A_D in Nature, which is not usually mentioned. The work A_M is sum of the part of energy ("injection"), which came from the outer source $_1A_M$ and energy of spontaneous magnetizing $_0A_M$ (it is free energy of magnetic core), which is "mobilized" by the work $_1A_M$. The work A_D (demagnetization) takes place only due to the disordering effect of the factor kT, i.e. due to heat energy of magnetic, which is renewable energy from environmental. This is a principle difference of our research of energy of "M-D" cycle (we are considering rectangular impulses with V_0=const and duration of t_u) from other engineering solutions of applied problems [1-6], when apriory the work is considered as

$A_M > A_D$ and $\frac{A_D}{A_M} < 0$. In similar tasks the time t_u is about 10μc and calculations are made with canonic ratios [7, page 140]:

$$i = \frac{V_0 \cdot t_u}{\omega L} e^{-\alpha t} [\omega \cos \omega - \alpha \sin \omega t] \qquad (2)$$

where $\qquad \alpha = \frac{R}{2L}, \omega = \sqrt{\frac{1}{LC} - \alpha^2}$.

However, it is strictly proved in [8], **similar expression (since it was got from Maxwell's equations) cannot be applied for impulses (incomplete circuits).** As the author [8] states, δ-functions, Duhamel's integral and staircase function can not be used for such sort problems. Apparently, these recommendations can be a basis for other vision of energy processes in inductances and in their main component (magnetic core) with pulse currents in particular.

Thus, the ratio $\mu = \dfrac{B}{\mu_0 \cdot H}$ can be presented as

$$\mu = \frac{BH}{\mu_0 \cdot H^2} \qquad (3)$$

and it should be then interpreted as a ration of energy, which is existing in inductance (per 1 m³) to the energy of primary magnetic field in vacuum (in 1 m³), since this primary field called the formation of energy BH.

Further, there is the question about possible way of maximum economical creation of the field $\mu_0 H$ and about the extraction of the energy $\dfrac{BH}{2}$ (even particularly).

The energy available for selection on the step "D" ideally is:

$$\Delta = \frac{1}{2}\mu_0 \cdot H_2(\mu - 1)\frac{J}{m^3} \qquad (4)$$

but actually:

$$\Delta = \frac{1}{2}\mu_0(\frac{\mu_{max}}{\mu_{init}} - 1) \cdot H^2 \cdot \mu_{init}\frac{J}{m^3} \qquad (5)$$

In other way:

$$\varphi = \frac{\mu_{max}}{\mu_{min}} - 1 \qquad (6)$$

A prospect in integral form looks like this.

The special features of current impulses with a steep (sharp) front are the "terra incognita" land long since the engineering investigation of ignition systems in combustion engines.

Thus, in [9] authors note that during t_0 (short stage of impulse) the current in inductance changes so quickly, almost steps-wise, **that we can doubt in adaptability (or efficiency) of the second Kirhof's law during t_0:**

$$L\frac{di}{dt} + RI = V(t) \qquad (7)$$

Really, in the experiment [9] it is similar the first term seems to be absent. To find the way out, in [9] they use sufficiently "fine" admissions to have no doubt in classical physics. But we can do it in another way, we can keep (7) to be true if we'll introduce $L\dfrac{d^2i}{dt^2} \cdot \delta t_0$ instead of $L\dfrac{di}{dt}$. Thus, the "short stage" of the impulse, which was noted by the authors in [9] is an interval of time when $\dfrac{d^2i}{dt^2} \neq 0$.

We have got positive results with an inductance, which consists of 16 separate ring coils with two identical windings on each, $L_1 = L_2$. 16 coils of L_1 are jointed in parallel (first winding), and 16 coils of L_2 are jointed in series (second winding). With H_c about 2A/m, the current $i_c = 9,4$ mA (measurements are made according to GOST 12119-66 inductive method), Fig.1.
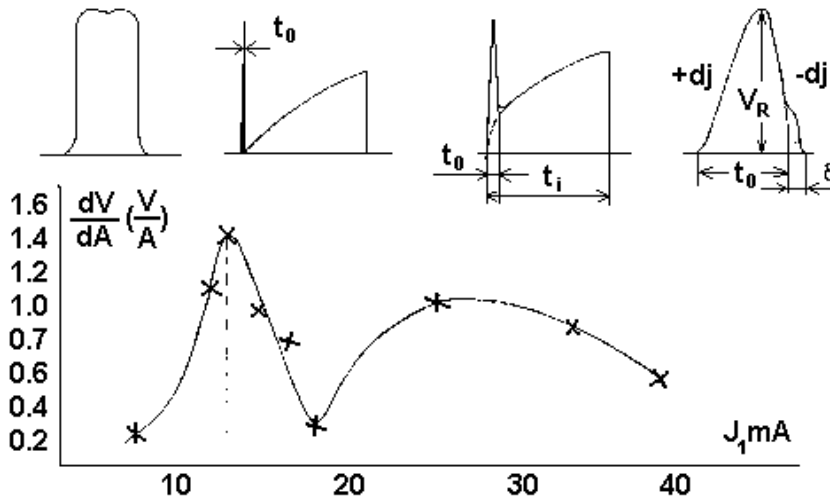

Fig.1.

Reaching of maximum current in a short stage before the event of key (on breach) we can consider to be the result of immediate magnetization. **It is the most secret enigma of formation of magnetic energy in a magnetic core that was suggested before in [10]. The initial magnetic field with intensity of $_0H(i)$ appears in vacuum very quickly, i.e. in a fraction of t_0 and it calls (provokes) a spontaneous magnetization, which goes avalanche-like (like chain reaction).** It takes place, according to the theory of magnetism, particularly on the area of reversible displacement and in Relay's area [11-13]. Here, as it is known, there are enough small, "fuse" or "touch string" external field to call the inner (Veiss's) field, which is in $\sim 10^3$ times more than this external field. The action of the field H during t_0 can be compared with an impact, and effect of this impact tells upon in magnetic for a long time as a fading "ringing".

Editor's: According to N. Tesla we call this effect free vibrations. He used non-sinusoidal impulse (arc dischargers) primary source and then his circuits generate resonance sinusoidal oscillations due to its capacitance and inductance. Also N. Zaev's understanding is similar to free energy conception, which was suggested by Thomas E. Bearden, USA in his famous article "Final secret of free energy". The initial primary source should produce short impulse "activation" of some "collector" and then in period of "relaxation" time it can be possible to take energy from this collector free of the primary energy source.

During the time t_0 the most part of magnetic energy $\dfrac{BH}{2}$ appears (is created) and "payment" for this appeared energy is really symbolical. On the Fig. 1.2 and Fig.1.3 we can see the growth of current after t_0 in the area of rotation of vectors of magnetization. It is evident, the "payment" for the increase of $\dfrac{BH}{2}$ on this stage is incomparably higher than on the area H_c.

On the Fig 2 there is a scheme of measuring device with necessary explanations. The screen of the oscillograph is 8x10 cm. Reading is with an error of $\pm 3\%$. The object
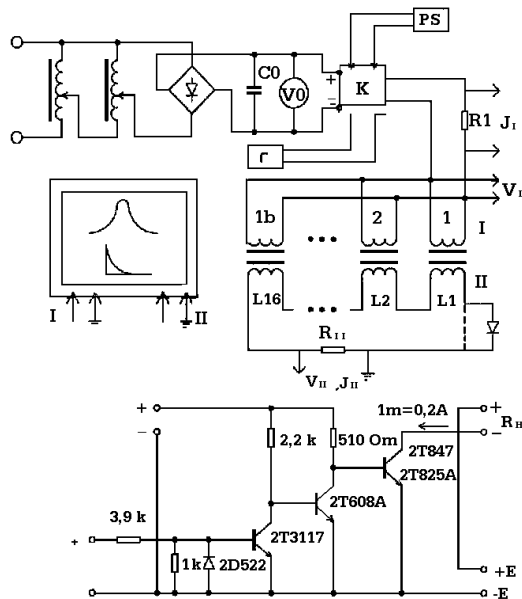

Fig.2

of this research was the mentioned above totality of 16 inductances. Any of them is a toroidal core made of permalloy 79HM of 0,05 mm width ($D_{ext}=90$ mm, $D_{int}=83$ mm, h$=16$ mm, volume is 15,2 cm³). Its magnetic properties corresponds to GOST 10160-75, first class;

$$\mu_{initial} \cong 20 \cdot 10^3, \quad \mu_{max} \sim 115300, \quad \frac{\mu_{max}}{\mu_{init}} \sim 6 .$$

There are 60 turns of cooper enamel wire on every core. This wire is of 0,43 mm diameter, R$=0,4$ Ohm, i.e. this $L_{max}=107 \cdot 10^{-3}$H. Rated inductance of the first winding (16 windings connected in parallel), its μ_{max} equal to:

$$L_I = \frac{1}{16} \cdot 107 \cdot 10^{-3} H = 6,69 \cdot 10^{-3} H ;$$ rated inductance

of the secondary winding (16 windings connected in series) $L_{II}=16 \cdot 107 \cdot 10^{-3}=1,712$H. The current in the impulse (at the upper level of picture on the screen) of the first winding for $\mu_{max} \sim 160$ mA, resistors are of MLT type. The value of nominals according to the digital ohmmeter is given to within $\pm 0,8\%$. The calculation of energy is made by the squares under the curvature of voltage $V^2 - t$ or by means of the step multiplication $\Delta t \cdot (V_i \cdot i_i)$ with the following addition of the results.

To check the changes of m(i) for inductance L_I (in assemble of all coils) it was made determination of changes $\dfrac{\Delta V_{II}}{\Delta V_I}$ at the frequency of 50 Hz; and you can see the results on the Fig. 1.5, which correspond with official technical ratings of this magnetic core.

Let's make numerical estimations of ratio between heat energy of inductance (without windings) and its maximal magnetic energy.

The volume of all 16 cores is about 243 cm³ and their mass is about 2 kg (with the density of 7.8 g×cm⁻³). The heat capacity of permalloy is about 0.46 kJ/(kg×K), that's why the cores contain 255.7×10^3 J with the temperature of 20°. With m_{max} $L_I=6.7 \times 10^{-3}$, current is about 10 mA in every winding, and all magnetic energy

$$A_0 = 0,5 L_I \times i^2 = 0,5 \times 6.7 \times 10^{-3} \times (0.16)^2 = 85.6 \times 10^{-6} J$$

Therefore, magnetic energy is only $\dfrac{85.6 \cdot 10^{-6}}{255.7 \cdot 10^3} = 3.35 \cdot 10^{-8}$ part of heat energy. Really, it's a drop in the bucket of heat.

(*Editor's: So, this metod of direct heat-to-electricity energy transformation is very perspective and technically it can made as a very compact device with a great output power*).

Recession of the current of impulse-leader up to the point a (Fig. 1.4) is called by increase of L(i). At first the current grows (due to the smallness of $\mu \sim \mu_{initial}$) as at the absence of inductance. But from the moment of start of spontaneous process (when H(t) reaches some startup level $H_{st} << H_s$)

$$i = \frac{1}{R}\left(V_0 - L(i)\frac{di}{dt}\right) \quad (8)$$

growth of the current slows down $\left(+\dfrac{di}{dt_1} \prec +\dfrac{di}{dt_2}\right)$;

at maximum $i\dfrac{di}{dt} = 0$ and then $\dfrac{di}{dt}$ becomes negative, the current falls before the break in circuit (Fig. 1.4).
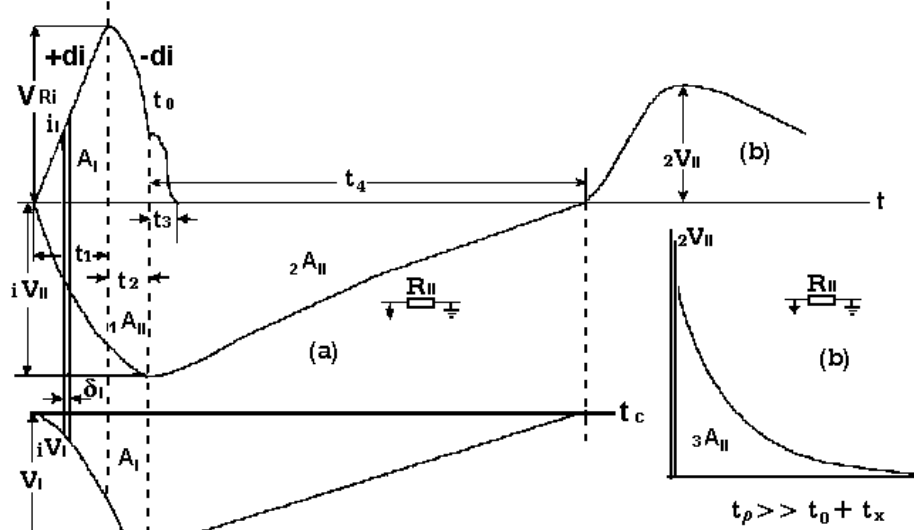

Fig. 3

However, the process of magnetizing didn't stop (Fig. 3a) but the step (sharp) growth $\dfrac{dV_{II}}{dt}$ changed to be more gentle recession, considering it from the achieved level of the flow Φ_0. We can see it from the changes of V_{II}: from $_{II}V_{max}$ to $_{II}V = 0$ the decrease goes during t_x.

The phenomenon of growth of Φ_0 after t_0 is known. Thus, it is mentioned in [14] that in ferromagnetic materials with quick changes of tension of field induction lags. Particularly it becomes apparent with small tensions of field in the area of maximal values of permittivity of materials with high value of μ. The same you can find in [11] and in full in [13]. Usually this phenomenon is attributed to **magnetic viscosity** and quantitatively the intensity of its kinetics is usually described by the expression

$$\Delta M = (M_\infty - M_0)\left(1 - e^{-\frac{t}{\tau}}\right) \quad (9)$$

where M_0 is the magnetization immediately after the change of magnetic field (t=0), M_∞ is a new equilibrium value of magnetization, τ is the time of relaxation (it can be from 10^{-9}sec up to many hours). **Diffusion of dirt and defects or thermal fluctuation are considered to be the energy basis of ΔM effect.** In the last case (according to Neel) the fluctuations contribute to overcoming of energy barriers by domains, which

provides the growth of μ and Φ. **More common name of this viscosity is magnetic accomodation.** With the growth of t (with τ=const)

$$\Delta M \to (M_\infty - M_0) \quad (10)$$

i.e. the growth of magnetization stops when reaching M_∞. But in our results the changes of ΔM has two sings: positive at the beginning $+\Delta M$ and then negative when $M_\infty \to 0$. **This circumstance becomes the basis of technology of energy trapping from magnetic core of the inductance.**

There were some attempts to use "Magnetization - Demagnetization" cycle to transform heat energy of magnetic material. Thus, in [15] the application of rare-earth gamete-ferrite at T_N (Neel's temperature) is described, when magnetization on ΔM_S changes (in presence of the field H). If the sample is in the coil, then the transformation of energy of spontaneous magnetization $F\Delta M_S^2$ (F is the exchangeable parameter) to the electric energy takes place. Then the sample is cooled again with the change ΔM_S; but the efficiency here is not more then for standard Carno's cycle. Another method [16] is based on the spin re-orientation of magnetic moment, when it changes at $90°$, for example, in the crystal $Nb \cdot Co_5$ in the interval 245 - 225. Negligible efficiency and complexity of transition between two states condemned these methods to the full oblivion.

An idea of total asymmetry (is action equal to reaction?) of energy of force impulse which acts on the system and energy of answer, i.e. energy of its reaction, appeared in 1964 from the work by P.A. Florensky ("Dielectrics and their technical application". M. 1924) and also from analysis of equation of inner energy of dielectric by B.B. Golitzin, who added the third member in the equation, which has the kind of both heat and electrical energy ("Selected works", M. 1960, Vol. 1).

So, it was derived by Golitzin alredy in 1893!

Conclusions

1. **A possibility to convert environmental heat energy to electrical energy by means of non-linear magnetic material and dielectrics** (it was also earlier discussed in [17, 18]) is experimentally proved here.
2. The area of energy conversion in magnetic material (core of an inductance) is determined by the interval of impulse current, which creates intensity $H = (1 \div 3)H_c$ with duration of impulse-leader $t_0 \sim 10^{-2}\tau$, when $\eta \sim 30 \div 50$ with $L_{II} >> L_{I}$.
3. In the given interval (according to our measurements) the magnetic viscosity of material 79HM is bipolar, that's why that phenomenon can be called more exactly as the **"magnetic inertia"**.
4. Phenomenology of energy generation or, rather, energy transformation, seems to be a non-linearity of processes in "Magnetization-Demagnetization" cycle; their thermodynamics is in thermofluctuational exchange of energy with spontaneous orientation of domens according to Neel's theory.
5. Increase of coefficient of transformation from the achieved one (~ 3) to $8 \div 10$ is possible by increase of H_c up to $10 \div 15$ A/m, i.e. by selection of material for magnetic core.
6. Increase of power density is possible by increase of H_c, increase of frequency, by separate selection of energy $_1A_{II}$ and $_2A_{II}$ from energy $_3A_{II}$, and also by means of additional diode in the circuit II, if it can provide high operating speed.

The described inductive converter of environment heat energy, which consists of generator of impulses, inductance with magnetic and receiver of energy, I suppose to name as FERROomagnetic Concentrator of Environmental Energy – FERROCEE or (ferrocassor in Russian).

Notations

A_M is the energy of the source of current, which is spent for magnetization;

A_D is the energy received on the load during demagnetization;

k is Bolzman's constant;

T is temperature, K;

t_u is duration of impulse, sec;

i is current, A;

V_0 is EMF, V;

ω is circular frequency, sec^{-1};

α is attenuation constant;

L is inductance, H;

R is resistance, Ohm;

C is capacity, Φ;

μ is relative magnetic permittivity;

H is intensity of magnetic field, A/m;

B is magnetic inductance, Tl;

μ_0 is magnetic constant $1,2566 \cdot 10^{-6}$ H/m;

φ is coefficient of conversion;

η is coefficient of using of current of magnetization;

M is magnetic energy, J;

Q is heat energy, J;

τ is time constant, sec;

$$x = \frac{t_u}{\tau};$$

z is coefficient of using of magnetic energy in the circuit II;

t_0 is duration of "short" stage of current impulse when $t_u >> t_{0-} - t_{0+}$;

Φ_0 is magnetic flow, Wb;

w is quantity of turns.

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The released energy as a heat and electrical charges moves to the external flow. The quantity of this energy from the change of phase should be not less than 2.5 million Joules per one kg of broken mass and not less than 137 million Joules per one kg of disintegrated molecules of water!

One more circumstance follows from the Fig. 3 and 4. The closer R_{evap} to the center (i.e. the smaller it is) the bigger step of energy we will receive. Therefore, it is necessary to seek possibility of work with liquids, which have more energy connections inside molecules. Then in the moment of the energy step we will get a bigger energy at the output of vortex generator.

Going further, if we use liquid elements as a fluid materials (such elements as mercury, natrium, melts of other metals) and put them into the VT, then with certain initial angular speeds on the boundary of R_{evap} for the **given materials we can get nuclear reactions of splitting and synthesis!**

This certain initial speed also exists for water, i.e. there are conditions of initial angular speed, at which on the boundary of speed step the nuclear synthesis (as well as decay) of oxygen and hydrogen is possible. At that we can regulate these processes by changing the initial angular speed and calculating the output of energy at every atom or molecule!

From the diagrams on the Fig. 4 we can see that angular speeds of flows are equal at the absolute value on the boundary of the step R_{evap}, but they are opposite at the direction that proves the law of conservation of energy quantity and increase of energy goes due to thermodynamics of the step.

We can make a conclusion from these diagrams that the initial angular speed depends on R_0, i.e. the more R_0 is, the less necessary is the initial speed. The radius R_{evap} practically depends on the initial speed and rotating matter (material). Energy consumption for the rotation are determined mainly by the initial angular speed and mass of rotating liquid.

Tetra Space Co-ordinates

A Tetrahedron-Based System of Space Co-ordinates

Josef Hasslberger

Via San Damaso 23/A 00165 Rome - Italy
telephone: +3906 635884 fax: +3906 632196
sepp@lastrega.com

We are living in a period of such overwhelming acceptance of the Cartesian system of co-ordinates, based on three axes in 90 degree co-ordination, that it might be considered intellectual suicide, or at least a risky and eccentric affair, to speak of an alternative system of co-ordinates and to maintain, that such a different system would have considerable advantages over what is now generally accepted. Yet, an alternative system has been discovered and is available for refinement and use.

René Descartes, whose birth date we celebrate this year as having occurred exactly four centuries ago, has made prodigious contributions to science and philosophy, introducing reasoning where authority had been the dominating factor before his time. We will concern ourselves here with only one of his many feats, the introduction of a rational system of co-ordinates, with which to locate the precise position of any object inside a known space.

According to anecdote, Descartes invented the presently used system of co-ordinates observing and contemplating the erratic course of a fly in his room and realising that, if he could determine the distance to each one of the three "axes" formed by one of the rectangular corners of the room, he could be sure of its exact position, and that a succession of such co-ordinates would define the otherwise elusive curves that marked the fly's course. Although we cannot be sure that this anecdote correctly survived the centuries, it seems reasonable to assume that the Cartesian system of co-ordinates was in fact based on the geometry of construction that is prevalent until this day, that is, a rectangular configuration of most houses and of the rooms inside.

R. Buckminster Fuller, on the other hand, lived somewhat closer to present time than Descartes; he died in 1983 at the age of 87. Like Descartes, Fuller has made copious contributions to science and philosophy. He is probably best known for his invention of the geodesic dome, a structure of triangularly-interconnected elements that has the best ratio of weight to enclosed space of any artificial construction so far developed. More recently, Fuller has received much public acclaim for having predicted, with his geometry, the existence of spherical molecules. The

experimental discovery of the Buckminsterfullerene, a spherical and extraordinarily stable large molecule of carbon, is only a few years old.

Fuller's geometry goes by the name of Synergetics and has been developed by experimentally observing the behaviour of spheres of equal diameter, when packed as close as possible to form regular geometric figures. The basic and most simple stable geometric configuration of synergetic geometry is the tetrahedron, formed by four spheres laying next to each other, in perfect triangular configuration forming four angles of 60 degrees (Fig. 1).
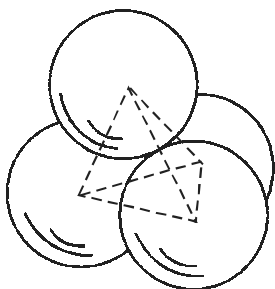

Fig.1

 Other important elements are the octahedron (formed by six closest-packed spheres) and the vector equilibrium, which is the result of twelve spheres nested around a thirteenth, central sphere, in omnidirectional closest-packing, 60 degree co-ordinated configuration.

The cube, which is at the basis of our present-day construction methods and of the x-y-z Cartesian co-ordinate system, is not in and by itself a stable configuration. Eight spheres forming a cube are inherently unstable. To gain stability, they must be artificially stabilised by interconnecting them in the way the tetrahedron is connected. In this way, two tetrahedra of four spheres each, joined at their respective centers, form one cube of eight spheres.

It happens that this geometry, as developed by Fuller, is in perfect accord with how crystals grow in their various forms, and that its application in engineering reveals to us the possibility of very efficient structures in terms of economy of raw materials and strength of the resulting construction.

Now how could the discoveries of Fuller be utilised to form a co-ordinate system and why should we venture to do such a task, seeing that the Cartesian x-y-z co-ordinates have done perfect (or almost perfect) service for such a long time? For one, Cartesian co-ordinates may be a convenient mathematical construct, but they do not accord with nature's ways any more than modern chemistry will ever be able to duplicate the conditions of living organisms.If we utilise x-y-z co-ordinates not for orientation in a known enclosed space (such as did Descartes), but in space with unknown extension, if our system of three axes in other words does not form one of the corners of a known space, but the point of origin of space extending in all directions, the original three axes are no longer sufficient for orientation. We must

double the system, adding a mirror image of the three axes, to be able to describe the space "on the other side of the corner" (Fig. 2).
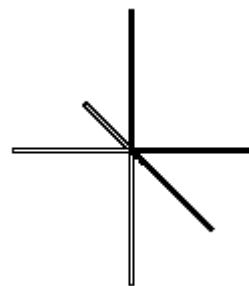

Fig.2

Normally we do not think of this action as a doubling of the axes, as we simply assign negative values to one of the sides, and positive values to the other. But rigorously, we now have six axes: plus x and minus x, plus y and minus y, as well as plus z and minus z. The fact that the plus and minus parts of each axis seem like one continuous axis does not justify considering them to be one. In fact, for the purpose of orientation, we must specify whether we are locating something on the plus axis or on the minus axis, even if we chose to do so by considering positive numbers to belong to the plus axis and negative ones to the minus axis. So we have, in actual fact, six axes to consider and in order to locate an object in space, we must define its position in relation to three out of six axes.

This is where Fuller's synergetic geometry suggests a way of simplifying our task enormously. If we decide to reduce the number of axes from six to four, taking the basic and most simple stable geometric figure, the tetrahedron, as our point of reference, we may locate any point in space by defining its position with regard to three out of four (not three out of six!) axes of reference. The four axes of reference in this system of co-ordinates are the axes that originate at each one of the vertices of the tetrahedron, intersecting at its midpoint and passing through the middle of each one of the triangles opposite these vertexes (Fig. 3). These axes are co-ordinated with angles of 109 degrees, 28 minutes. The four of them represent the minimum set of reference axes emanating from a common origin needed for defining all possible directions in physical space.
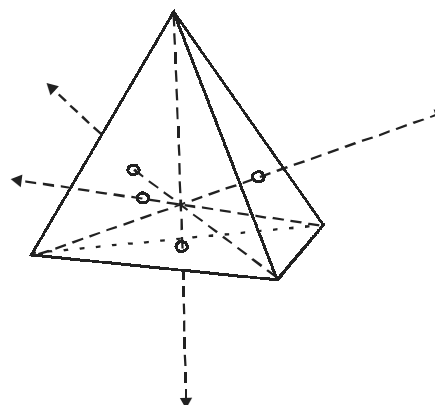

Fig.3

I have developed, in order to make this concept more clear and to allow its application as a tool for instant and intuitive orientation in space, a colour coding system that combines these tetrahedron-based space co-ordinates with the currently widely used method of color separation for printing purposes, the so-called CMYK color separation process.

CMYK (cyan-magenta-yellow-black) are the four colors used by present day printing presses. The combination of these four colors in various percentages creates a large number of different colors in almost endless continuous shading. Assigning one of the basic colors to each one of the four axes of the tetrahedron, and blending them towards the other axes, we obtain in fact a unique color for each one of the thousands or millions of possible directions that we may want to instantly identify. Naturally we can also express direction in terms of degrees, minutes and seconds of arc in relation to the three nearest axes.

A part of this article is a printed version of a tetrahedron to be cut out and pasted together, which will beautifully illustrate the principle.

A co-ordinate system of this kind, suitably developed and refined, may be used with profit in astronomy, in navigation (especially space navigation), in holographic representation of images, in crystal-based electronic information storage and possibly a whole range of other, yet-to-be-thought-of activities. By its use, we transform our four directions of orientation on earth (east-west-north-south) into four directions of orientation in space. We need to develop and use this tool if we are seriously considering to expand our influence into planetary or interstellar space, not only in the sense of observation, but also of exploration and navigation.

One last comment on the concept of "dimension", which seems to be not very well understood by current scientific inquiry. We are accustomed to calling this physical universe a three-dimensional universe. Text books and encyclopedias tell us that space has three dimensions, without considering that the number of dimensions we assign to space depends only on the kind of geometric reference we are using. I was tempted to say, in a first moment, that considering tetrahedric space co-ordinates, obviously space must have four dimensions. But that would be making the same mistake as our current authoritative teachings.

Space in fact has only one "dimension", which we may also call 'extension'. It extends equally into all directions. It does not matter how many directions we choose to refer to in our systems of orientation, three, four, six, maybe ten. We are still considering the same space. The term three-dimensional has as little physical relevance as would the term four-dimensional or n-dimensional. Dimensions, after all, are only a conceptional tool of convenience for expressing in mathematical terms a particular way of looking at or of trying to comprehend the reality of what we call space.

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GRAVITY

Ilfir F. Hayrullin

E-mail: hif@bashnet.ru
http://ilfir.narod.ru/chronos/index1/htm

This article gives us a description of experiment on creation of gravitational effect, which is considered by the author as a result of ether vibrations.

We believe that material objects emit ether in the environment from the nucleus of atoms. With this the emitted ether is partially absorbed by leptons, but the main mass of the ether is spread in the near space. When the mass object is rotating ether in the near space is involved in the rotation. It is known that the particles inside the object always move chaotically. The properties of ether are such that any movement of the ether causes the rarefaction of density of the ether. The conclusion is: rarefaction of the ether increases directly proportional to the square of distance from the material object. Ether in the space between two objects is always more rarefied therefore the objects will tend to move to each other. Gravitational effect is a mutual attraction of two or more material particles due to the larger intensity of vibration of the ether between them.

EXPERIMENT

Experiment with the centrifuge proved the given hypothesis (Fig. 1). And what is more, the experiment showed that minimum value of gravity not always coincides with the center of rotation of the centrifuge. It is another confirmation of the concept of local time, because this shift can be explained with interaction of vibrations created by the centrifuge and the ether flowing above the Earth.
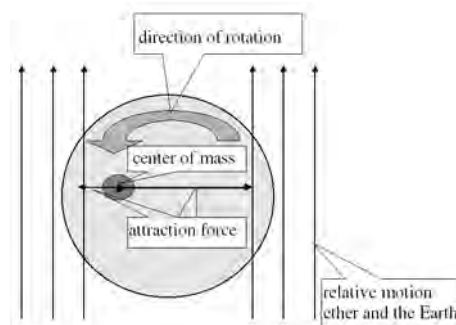

Fig.1.

With the rotation of a cylinder the gravity of movement appears. With this the forces of attraction increase with increasing of rotation speed of the walls of centrifuge.

To the Question of Multipolarity

Alexander V. Frolov

Conception of multipolarity plays a great role in physics, in all natural sciences, in philosophy and in politics and other fields of human activity. Triple-charged state in physics should be understood not as a totality of positive, negative and another charge. It should be understood as a totality of three interdependent and equal in activity charges, for example, peer charges A, B and C. Any multipolarity state should be considered by similar way.

In the rare book "The Principles of Multipolarity" [1] it was noted that modern science basically tries to bring all phenomena to bipolar (two-polar) interactions. There are classical electrical and magnetic bipolarity, two-charges dissociation of chemical compounds, two-digits notions about matter and anti-matter, discussion about World and anti-World… This has been restrained the development of techniques and civilization in a whole for a long time.

What is two-polar annihilation? In this case we assume interaction of matter and antimatter. It is possible to say that time direction for an element of antimatter is opposite to time direction of matter elements. So, the problem is hidden in understanding of notion about "time". If we presume to go away from the dogma of bipolarity, then we should allow a possibility of organization of multipolar annihilation, during which three or more peer charges annihilates and this process lead to radiation (energy release). Similarly to the classical case of pair formation of particle and antiparticle, multipolar elements (charges) can be created or annihilated only in the complex of three, four or more peer elements. To my mind, this is the basic principle of creation (designing) of multipolar charges and currents. If we consider physical vacuum (or ether) as universal potential source of any matter, then the properties of the material particle, which we can create, depend on the structure of multipolarity in the experiment. Now it is known how a photon (two-polar electromagnetic high-energy quantum) can produce electron-positron pair from physical vacuum. For the case of multipolar high-energy quantum (multipolar photon) we can assume a possibility to produce multipolar particles from physical vacuum.

V. V. Lensky and A.G. Kotchnev [1] wrote: "In mathematics polynar operation is a totality of interdetermining polar relations. For example: $A+B+C+…+P=0$ expresses the superposition of interinverse (polar) objects that differs it from the existing binary equation $-A+A=0$. In tripolar charge state all three charges will equivalently interact with each other. In all modern devices electrical and magnetic two-polarity is laid to register polar phenomena, that's why the object with tripolar properties will not be fixed by any standard device."

Something similar we can find in the attempts made by physicists to determine characteristics of multipolar energy processes in living systems indirectly, by presence of concomitant electromagnetic and other phenomena.

Properties of multipolar currents found experimentally allow the authors to state "Materials, which are dielectric in bipolar interaction, can serve as a conductor for the case of multipolar interaction. For example, metal can be substituted by polymers" [1]. It is one more serious reason to think about multipolar nature of any interactions in biology.

Further, in the Chapter 5.2 [1] the authors write about the methods to form (to create) multipolarity. There are a lot of variants to design these systems. It is evident that six-polarity can annihilate not only as two anti-objects, but also as three two-polar objects. So, it is possible to organize two methods of creation of six-polarity. We should seek a prompting in Nature. As the authors fairly note, "The case is that functions of elementary particles entirely correspond to certain multipolarity".

So, to form some certain multipolarity, on the first stage an experimenter can operate only with classical bipolar phenomena: "On the first stage "pseudo-multipolarity" is formed with two-polar sources (masses, generators, accumulators) and synthesis of the sources. This pseudo-multipolarity creates conditions for separating (removal) of local multipolarities in their real form." [1]

In their work the authors do not consider the question of "removal" or "separation" of created local multipolarities in details. Thus the "pseudo-multipolarity" itself is a composition of known physical fields, i.e. it is also some physical field. The more complex case is a notion of multipolar charges. Assuming that we speak about creation of a certain energy structure in a certain area of space, we can allow the physical transfer of information on the given structure to some mediums, which get the properties of multipolar charges (analogously to electrization or magnetization). Such multipolar "magnetization" or "structuring" of water, crystals and other substances has been studying experimentally by many authors for a long time and specially it was applied for medical sciences. Now these researchers can rely on the mathematical grounds of multipolarity to develop their research work.

The authors [1] distinguish two methods to form multipolar relations, which are different in principle:

1. "Localization of the objects according to the certain principle and creation of new sources of field, which differ from two-polarity ones: For example, to get two-charge states in electroforous methods, the localization is made by vectorial-opposite movements. Localization of three and four interactions (electroforous, gravitational) leads to the formation of multipolar relations.

Let's note that known collectors of electric charges like Leyden jars (condenser) are useless here because of their two-polar properties. Functional features require new correspondent design." It is a valuable remark on designing aspect to create new special collectors of multipolar charged particles.

2. "A more simple method is a superposition of bipolar (or unipolar) sources, between which a relation in the form of pseudo-multipolarity relations (special fields, currents, forces) is created."

Spatial superposition of sources of fields, currents or forces can be complicated by certain phase correlations. The authors [1] note *"Synchronization is an important feature for periodical sources"*.

As an example we can consider the cases where **Ohm's law and rules of vectorial addition of currents in complex electro-technical systems are violated, when generators, engines or transformers are grounded by one wire that spontaneously creates some multipolarity.** The violation of Ohm's law is natural in these cases because such currents are subjected to the local laws of multipolarity:

$$"A=BC…R$$
$$B=AC…R$$
$$R=AC…K$$

where *A, B…R can be of any value, but superposition of the rest of polarities should compensate them"*. Further there is a conclusion, which is very important for future energetics: *"… pseudo-multipolarity creates an effect of efficiency increasing to the value much more than 100%, since if we project it on two-polarity, then we will set a significant degree of distortion"* [1].

So, multipolarity is real physical and mathematical basis of over-unity energy system. Physically a projection of periodical pseudo-multipolarity on two-polarity can be easily obtained by means of rectification of currents. Let's consider an example:

"With unification of three sources in one scheme we get

$$A=1/2(B+C), B=1/2(A+C), C=1/2(A+C),$$

that is strange since in the initial state of compensated polarization we have

$$A+B+C=0, where A=B+C, B=A+C, C=A+B.$$

…from the position of experiment considering the value A to be the main unit of charge (energy), the state of energy ½ of A appears. Such states (1/2 of binary quantum) appear with localization of 6, 9, 12, 15 and so on. Personally we got into the habit that if A+B=0, then A compensates B in correspondence of 1 to 1. But compensation of some value by its part seems to be very strange" [1].

Really, it is unusual. However, from this point of view, Tesla's desire to innovate three-phase and multi-phase

currents in industry becomes clear. Actually, now we can say that **Tesla was the first person who creates high efficiency and over-unity technical systems based on the periodical pseudo-multipolarity.**

Symbols and schemes of multipolar relations reflect the known geometrical figures. Three-polarity is described by equilateral triangle with angles of 120 degree. Four-polarity can be illustrated as four peer elements situated on the corners of tetrahedron. Fig.1
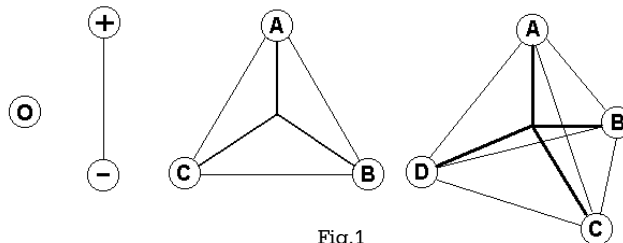

Fig.1

Special case, which we should note, is a possibility of **dynamical multipolar interaction** as many-phase currents and fields. Another example: rotation with linear transfer creates a helical path of the point. Taking into consideration the possibility of right (clockwise) and left (counter-clockwise) rotation, it is possible to design two mutually compensated 3-polarities.

In fact, even the notion of "space" itself depends on what multipolarity we will choose for its description. Notion "one-dimensional process" here means some changes of energy in some point as function of time. Physically it is related with some potential (scalar) function. Usual two-polar energy interactions, for example, electrical phenomena, gave us a possibility to study linear physical processes, such as usual electrical current. Three-polarity source allows creation of energy processes in planes, i.e. two-dimensional processes as changes of energy density in some flatness. Let's note that a long time ago Faraday studied and described such "flat currents" or "surface currents". At last, four-polarity interactions correspond to some volumetric (spatial) energy processes and important note can be made here about natural co-ordinate system of our real space. Dr. Josef Hasslberger's article [2] introduced a new and different way of looking at "dimensions" by proposing an alternative system of co-ordinates, based on Buckminster Fuller's ideas. Really, 4 peer elements of tetrahedron allow using only 4 co-ordinates instead of 6 Decart's co-ordinates (3 negative and 3 positive directions), Fig.2.
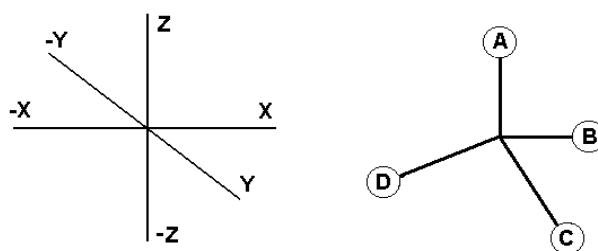

Fig.2

The navigation in space can be provided with this tetrahedron-based system. It is a natural way and inner structure of some crystals demonstrates it.

It is necessary to note important perspectives of this geometrical (stereo metrical) method. **Future research on five-polarity should be related with clarification of physical sense of time.** Really, we cannot design 5 peer static points in space since five points cannot be situated in usual space to have equal distance between all points and due to this fact the points cannot be considered as 5 peer elements. **The only way is dynamical method,** i.e. new dimension (one more time axis) should be used for it.

There is an important aspect: the quality of elements should be changed with the quantity of the elements. We can design a triangle as three line segments and then to design the tetrahedron as four peer triangles (segments of surfaces). By analogy we can assume that the number of elements to create five-polarity is: **five peer tetrahedrons,** which compose some structure in the process of its dynamical change. But let's remember how the "new dimension" was introduced in each previous case of multipolarity. For example, to produce changes of energy in some point we can consider motion of the point and it is the time axis. To describe some simultaneous changes of energy density in some line, for example, changes of density of electric current in some wire, we have to introduce one more dimension and it is the time axis. Then, the dynamical surface can be designed as motion of the line in new direction.

So, new dimension in any design of space always is a result of motion in some new direction, which is not included in previous consideration. **Projection of the new dimension onto previously designed space should be equal to zero.** This method was described by Pavel D. Ouspensky [3].

But also we can assume that two tetrahedrons will form two-polar symmetrical complex, Fig.3, if we'll introduce the new time axis by means of rotation. **In some sense it is an "inner structure of point".**
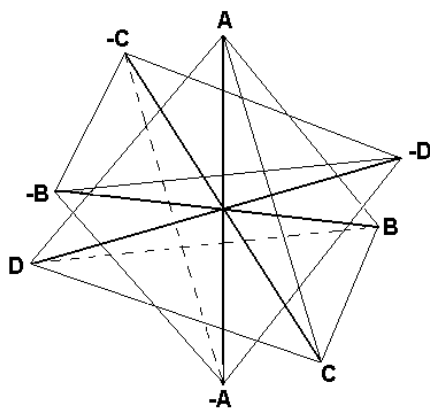

Fig.3

In static case it can be considered as octahedron. Dynamic case assumes rotation of each tetrahedron in different directions (clock-wise and counter clock-wise).

In conclusion I have to note: now the theory of multipolarity **is developing in the frames of nuclear physics as a quark theory.** Theoretically, electrical charge of quark is 1/3. Also high-energy particles collision experiments by Levin E.M. and Frankfurt L.L. [4] demonstrated that it is not a simple two-bodies collision process. The high-energy particles can be considered as some complex structure (several quarks). Each element of this structure (i.e. the quarks) produces collision with each element of another structure. This behavior of quarks corresponds to the multipolarity mathematics we considered above.

So, it is possible to make an important conclusion: **Multipolarity is a real phenomenon and we can found it in Nature as an inner structure of elementary particles.** At the first level we can see negative and positive particles, i.e. two-polarity. Next level is three-polarity and from this point of view it is possible to explain the difference between electron and positron as a result of their different inner structure.

Similar inner structure of electron also was described by Dr. Poliakov S.M. and O.M.Poliakov [5], Fig.4, but authors considered it without any relation to the theory of multipolarity. According to Poliakov's theory, inner structure of electron consists of negative and positive elements - so called "uniquantums":
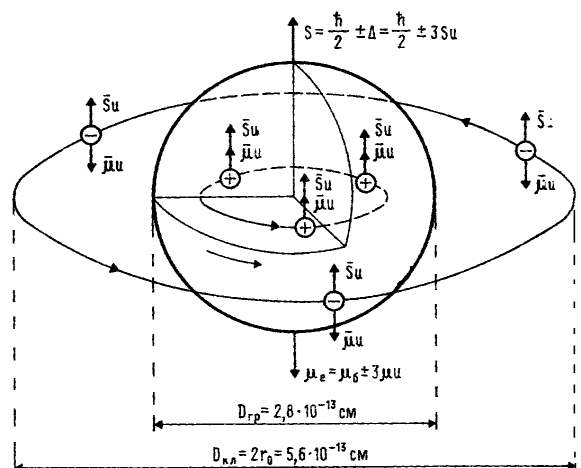

Fig.4

My proposal is to develop this idea as multipolar quark situation and to consider this structure as a compensated three-polarity, i.e. inner A,B,C complex of three quarks with its external -A, -B,–C anti-complex. Hence, internal and external quark complexes are typical two-polar system.
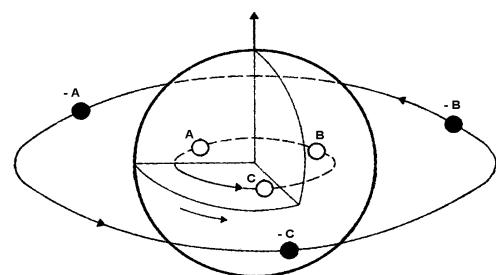

Fig.5

So, at the first glance, the world of elementary particles is a two-polar world. Then, if we consider the inner three-polarity structure of the particles, then this world can be described more clearly as a **multilevel hierarchy organization.** Each three-polar element (quark) can be clock-wise or counter clock-wise rotating structure that provides possibility of quark annihilation and possibility of negative, positive or neutral electric properties of elementary particle (quark complex).

From this we can consider the usual annihilation of positive mass-particle and negative mass-particle (for example, positron and electron) as compensation of inner motion in their three-polarity structures. Energy, which corresponds to this inner motion, should be released and radiated in this process of annihilation. **More deep and powerful annihilation is a compensation of inner structure of each element of the three-polarity complex. It can be called the "quark annihilation". Application of this principle in energetics allows much more powerful energy sources than any modern nuclear plants.**

According to our previous suggestion about 4-polarity, it is possible to assume that **inner structure of any quark consists of four peer elements, which are situated in space as a tetrahedron complex. By analogy with Poliakov's conception of electron, for quark we can assume 4-polar compensation, which**

was discussed above, Fig.3. More detailed description of this level of inner structure of matter requires more deep understanding of physical sense of time. **The technology of annihilation in this case is the time rate control technology.**

To my mind, this multilevel hierarchical approach to the space-time engineering is very easy since it directly follows from geometrical laws and it promises to be productive in the frames of ether conception. In this case, any "changes of density of energy" mean "changes of ether density". Multipolarity or dimensionality of space-time in any process is related with parameters of designed process. Thus, studying of multipolarity becomes an applied science, which allows developing of new technologies with new physical and mathematical basis.

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High Efficient Electromagnetic Transformer

Alexander V. Frolov

This month we have very good news from Thomas Bearden and his team. **USA patent #6,362,718 granted on March 26, 2002 for "The Motionless Magnetic Generator"** is one more example of extracting energy from a permanent magnet, i.e. new kind of alternators.

Sure, it is just my own opinion to say that it is an alternator without moving parts. Perhaps the authors are not in agreement with this point. But main fact is that "this system works beautifully and produces COP=500%" as Thomas E. Bearden said. Other inventors are Stephen L. Patrick, James C. Hayes, Kenneth D. Moore. Production and sales will start next year as 2500-Watt system, which will generate electric energy free. There is Magnetic Energy Ltd Company, which will develop this technology.

In description of the principle Thomas Bearden said that it is not usual electromagnetic transformer but a new type of the system, which use longitudinal electromagnetic waves of the vacuum.

In article "MEG Scalar Energy Device…" by Bill Morgan (wmorgan@nycap.rr.com), March 28, 2002 we can read

standard description of the technology: "The MEG provides electrical energy by tapping the longitudinal electromagnetic (EM) waves, which exist in almost infinite abundance in the vacuum of space. This ocean of energy which permeates everything is sometimes called the "zero point" energy…" It is obviously the authors are not interested to disclosure their know-how, even if they have it. Really I wonder in this point since Tom wrote me about his participation in this project (see his letter below). He was included in the team as adviser to find some acceptable scientific explanation for some experimental facts. So, one more time we can see example of empirical science, i.e. priority of experimental work. Only way to find something really new is experiments but not a theory. The theory can predict something new but it will be something that is logically follows from previous technologies and knowledge. The Experiment can produce really new knowledge. **So, it is not a fact that the explanation by Bearden's theory or by other scalar and zero point energy theories can help in development of the technology.**

I have to note that Dr. Gennady Nikolaev and his well-known Russian research team in Tomsk developed the same approach to magnetism for many years. Our magazine New Energy Technologies #2, 2001 have published Nikolaev's article (and some photos from his laboratory) on the longitudinal magnetism. But let's leave the theory since now it is more useful to discuss basic principles of the system than to develop theoretical dispute about scalar and vector potentials.

Explanation of Ball Lightning

I.P. Tchinariov

170000, Tver, Shmidta street 5, apt. 51
tel: 7-082-242-6010

In December 1975 the journal "Nauka i zhizn" ("Science and life") addressed to the readers with a question about observation of ball lightning. Among 1400 letters 0,3% of them stated that ball lightning they met had a shape of torus [1, p. 103]. In the same journal there is an opinion that in most cases ball lightning forms due to the energy of linear lightning discharge. Relying upon these statements, I hope, I found approaches to the explanation of ball lightning's nature.

Linear lightning can be several kilometers long. The difference of potentials between points of discharge can reach 10^9 V. Duration of lightning discharge constitutes from tenth to thousandth of a second. Current strength is in the limits of $10^3 \ldots 10^5$ A. Total charge carried by lightning reaches 100 coulomb. The quantity of radiated energy can reach from $10^9 \ldots 10^{10}$ J.

Formation of ball lightning

Observing lightning in nature, we don't notice that its discharge consists of several (sometimes up to ten) serial impulses. Each impulse lasts about 10^{-3} seconds. Plasma in the central channel heats up to $2 \cdot 10^4$ K and in intervals between impulses cools up to 10^3 K. Plasma central channel is very thin, not more than 1 cm in diameter. An outer channel around it is about 1 m in diameter and has cold plasma temperature of about 1000 K. Discharges of lightning take place not only between storm-cloud and surface of the earth, but also between heteronymously charged clouds.

A transverse magnetic field is created around the high-temperature channel of lightning as a conductor of current along all its length. Closed force lines of this field are situated as concentric circles with general center in the middle of the channel. This powerful transverse circular field holds plasma in the central channel of lightning by its pressure in spite of high temperature and accordingly high pressure inside it. I.e. circular transverse magnetic field carries in itself more than a half of linear lightning energy.

Here we should note that this powerful magnetic field penetrates cold plasma (1000 K) of external channel by dense network of its circular force lines and holds it in itself very peculiarly. Ions and electrons in cold plasma move in strong magnetic field collectively ordered. It means that the charged particles felt within strong magnetic field and moving across its force lines at an angle to them, rotates around force lines of the field, along the so called Larmor spirals with a constant speed until they collide with other particles or until magnetic field disappears [1, p. 149; 2, p. 69]. Thus, ions and electrons rotating around force lines of the field along Larmor spirals simultaneously move along force lines [3, p. 536-537]. Since, force lines of the field are closed around the central channel, then spirals of ions and electrons envelop the central channel. Plasma in cold channel is created by influence of hard ultraviolet radiation on air. This radiation forms with recombination of ions in hot central channel [4, p. 231] as well as stage excitation and following ionization of air atoms by visual light of high intensity (density of photon flow) radiated by hot channel [3, p. 229-230]. Gas pressure of cold plasma P is small in comparison with magnetic pressure P_m of powerful transverse circular field. With small relations $B=P/P_m$ the role of heat motion of charged plasma particles is small. Such plasma is considered to be magnetized. Radius of spiral rotation of nitrogen and oxygen ions around (and along force lines of circular field) as we can see according to the width of channel, does not exceed 0,25 m. May be, this fact determines the size of cold channel.

Radii of Larmor rotation of air ions in magnetic field correspond to their mass and speed of motion. Therefore, the radius of Larmor hydrogen proton spirals should be ten times less than the radius of nitrogen and oxygen ion spirals. Rotational speed along spiral orbit depends only on magnetic field intensity, intensity of charge and ion mass. All ions of one type in a certain magnetic field rotate with the same rotational speed [2, p.71]. It means that their current filaments are almost parallel, that's why the closest of them, located at the distance of magnetic interaction, tighten or group in one general spiral tube. Thus, the outer channel of cold plasma is a great many of collective spiral tubes of nitrogen and oxygen ions, hydrogen protons and electrons, beaded on the hot linear channel. Nitrogen and oxygen ions move along the perimeter of collective tubes of a big radius, and protons and electrons move inside these tubes and between them along spiral tubes of a small radius. Neutral air atoms move everywhere in the cold channel. They can easily leave this channel.

Currents of magnetization of combined ions rotating along the spiral tube sum up and form their own longitudinal field, which inside the spiral tube is directed towards circular magnetic field of linear lightning and weaken it. Over the tube it coincide with circular magnetic field, i.e. strengthen its density. Own longitudinal surface magnetic fields of neighboring spiral ion tubes also strengthen magnetic field of linear lightning. Therefore, the density of magnetic field of linear lightning particularly strengthens in the intervals between neighboring spiral tubes adjoining to each other. As a result, the uniformity of circular magnetic field of linear lightning is somewhat broken. A possibility of pinching of hot central channel of lightning in the places, where density of its magnetic field increases, appears.

Its own transverse magnetic field appears simultaneously with its own longitudinal field. It closes around ion spiral tube and it is created by translational motion of ionized particles along the force lines of linear lightning field, which are located inside the tube, as

well as by spiral motion of ions around and along force lines of the same field (if the motion of ions in one direction prevails).

Proton and electron spirals also create their own magnetic fields including those, which are situated in the wide ion spirals, but there they are almost mutually compensated. We will speak about them further.

If own longitudinal fields localize only along its own spiral, then own transversal magnetic fields of ion spiral tubes can join. They sum up with the near by ion spirals, cohere with them and form one general magnetic field, which passes along the periphery of cold channel and closes through the central hot channel passing it lengthwise (when prevailing motions of ions in neighboring spiral tubes coincide by direction).

Actually, collective ion spiral tubes of a big radius with thin spirals of particles of other types inside them are sources of ball lightning. But spirals of cold plasma are evidently fail to accumulate rotation energy in magnetic field of short linear lightning and when its discharge ends they quickly collapse and ions with electrons recombine into atoms.

The circular transverse magnetic field of linear lightning keeps hot plasma from expansion along all length of the central channel of lightning, but it does not hold plasma on the ends of channel from the direction of its end surfaces, and discharge of lightning takes place due to this reason. The conduction currents headily flow radially from all sides of the earth to the end of channel, which set against the earth. At the opposite end the currents flow from the channel to all sides of the cloud. Plasma, which is situated in the channel under high pressure, is pushed through the ends of the channel in the cloud as well as at the side of the earth, and overpasses opposing motion of electrons in the clouds and opposing motion of ions at the side of the earth. May be due to this reason as well as due to the voltage drop on the big length of the channel, the discharge of lightning is interrupted several times. Magnetic field at the ends of lightning channel is the same powerful and should be noticeable extended as mouthpiece, because the currents at one side coincide with the end, and at another side they diverge from the end to all sides, i.e. density of the field some what extends. It is possible that the part of turbulently thrown hot plasma can cover itself near the ends of the channel around magnetic field during the discharge of any next impulse of lightning. I.e. particles of hot plasma spreading aside cross the force lines of circular magnetic field of lightning crosswise or on the angle and move in it along Larmor circumferences or spirals. Electrons rotate with a small radius clockwise around force lines (if force lines are directed away from us), and positive nitrogen and oxygen ions and protons rotate counterclockwise with a radius of hundreds times more, if they flied to the field with the same speed as electrons [2, p.8, 43, 70, 71]. Significant part of Larmor electron and proton spirals appears to be inside wide spirals of nitrogen and oxygen ions.

By this way cold plasma near the ends of linear lightning is replenished with sufficiently big portion of hot plasma. Quickly rotating in the heated spirals and moving with a high speed along closed force lines of magnetic field, electrons and ions appear to be strongly tied by own magnetic fields mutually with magnetic field of impulses of continued linear lightning. **Evidently, a plasma-magnetic formation has time to form from heated spirals to the end of lightning discharge. It looks like toroid, which is pushed to atmosphere.** Possibly, plasma toroids are formed on both ends of lightning as well as in the center of channel, because ball lightnings are usually observed to be fallen from above.

Here we should note the following. In the process of plasma toroid formation the ionized particles of plasma moving spirally around and along force lines of lightning magnetic field closed in toroid, make drift movements under the action of other forces. Drift movements of the particles have the same known property, which lies in the following. The constant force acting crosswise magnetic field calls the movement of particle in the direction perpendicular to this force and this magnetic field. It happens without acceleration but with a constant speed. drift movements of ionized particles are characteristic to plasma toroid. They appear due to heterogeneity of magnetic field along and across its direction. Crosswise heterogeneity lies in concentration and rarefaction of force lines of the field, longitudinal heterogeneity lies in deformation of force lines [2, p.82, 86].
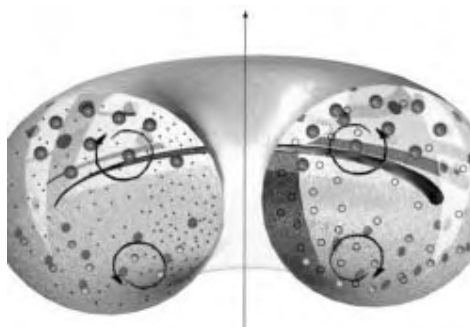
Fig. 1.

Current of linear lightning discharge is directed upwards, therefore, its transverse magnetic field is directed clockwise. Plasma toroid is bisected by vertical plane. In the right section of toroid magnetic field of linear lightning (it is shown by small circles) is directed away from us, and in the left section it is directed toward us (it is shown by points). Concentration of force lines, i.e. density of field, increases in the direction of toroid orifice, and rarefaction is directed to its external sides. In the zone of field concentration the radius of rotation of charged particles is smaller, in the rarefied zone it is bigger.

As a result, spirals of protons drift upwards and spirals of electrons drift downwards, i.e. separation of charges takes place due to the field gradient. Centrifugal drift gives the same result. (We do not show nitrogen and oxygen ions rotating along big orbit).

To understand drift movements let's imagine a plasma toroid lying horizontally. Let's bisect it by vertical plane. Assume that we saw a magnetic field in the right section of toroid directed away from us, then in the left section it is directed towards us. Transverse heterogeneity leads to the fact that radius of ionized particle spiral circle is smaller in the area of concentrated field than in the area of rarified field. That's why the circle with a particle will be pushed across the field with a force proportional to magnetic field gradient. This force calls gradient drift. As a result of this drift proton spirals move upward the toroid and electron spirals move downwards.

With the movement of ionized particle by spiral along the curved force line of the field, which lies with its convexity directed to the outer side of toroid, this particle experiences centrifugal force directed to the outer side of toroid. This force increases (extends) the radius of rotation of the particle beyond the line of convexity of force line of the field. As a result, proton spirals drift upward and electron spirals drift downward the toroid.

Thus, gradient as well as centrifugal drifts of ionized particles calls the same separations of charges in plasma toroid. These separations lead to the fact that some part of proton spirals appear to be on the upper half of toroid and the part of electron spirals appears on the lower half of it.

Such noticeable separation of charges leads to formation of strong electron field. In this case plasma toroid can be considered as a charged condenser.

Formed plasma toroid separated from linear lightning remains with the energy given by linear lightning. For some time (10-20 sec) the movement of ionized particles goes by Larmor spirals along trapped magnetic field of linear lightning until it penetrates outside while reducing to the center. Immediately after separation from linear lightning plasma toroid quickly shrinks. Own magnetic fields having elasticity delimit plasma from environment and while compressing toroid decrease its sizes until the equilibrium with backpressure from the inside (from the side of plasma) doesn't come. With increase of pressure in plasma the temperature in it also increases, i.e. movement of plasma accelerates, which means prolongation of life for toroid. The hole in the center of toroid reduces and becomes invisible, and toroid becomes similar to oval. Collective motions of ionized particles stabilize plasma by the fact that the main part of their ways is separated. Electrons rarely can be met with ions, that's why recombination of plasma decelerates.

Plasma can be in equilibrium without walls, if its gas pressure is balanced by the pressure of external magnetic field [2, p.56]. the formed ball lightning doesn't have external (outside) magnetic field. It has own magnetic fields, and due to them plasma toroid compressed to oval, has surface tension on the boundary of plasma-atmosphere and doesn't mix with air. The nearest linear lightnings while inducing currents in toroid maintain ionization of plasma and prolong toroid's life. Photo-ionization of plasma by ultraviolet radiation also affects the life of toroid as well as visual light of a big intensity and density of photon flow (step ionization) from the same nearby lightnings.

We should note that in electrical field formed as a result of charge separation (which is directed vertically in horizontal toroid) an electrical drift of remaining plasma to the outer sides of toroid should take place [2, p.74]. magnetic shell of toroid experiences deformations depending on inner pressure of plasma on it. That's why we can have an impression that electrical drift will call the expansion of toroid in width. However, gradient and centrifugal drifts mean the initial process in relation to electrical drift. Drifting vertically in the opposite sides, spiral of protons and electrons at first will expand the circular section of toroid body vertically, and electrical drift of remaining plasma called by appearance of electrical field only will prevent sides of toroid from overcompression with its vertical expansion. That's why ball lightnings sometimes could be observable as an oval pulsing by its width (struggle of vertical and horizontal drift continues).

Thus, plasma toroid in completion stage of formation is contracted by two own magnetic fields to the oval shape with through vertical hole of small diameter on the place of central vertical axis. Central hole of toroid reduced because the elasticity of force lines of trapped magnetic field of linear lightning and elasticity of force lines of own longitudinal field are directed to the central axis of toroid. They tend to reduce up to possible minimal length. All force lines of another own transverse magnetic field of toroid close through this hole. They also tend to reduce up to minimal length. The reduced toroid (it is an oval now) in cross-section looks like two vertically oblong convex-plane ovals situated near each other and facing to the hole with their flat sides. Massive ions move along the periphery of oval, i.e. by wide spirals compressed to oval, forming a closed oval tube as a result of such movement. Inside along the tube, in its upper half protons move with some advantage by the spirals of smaller radius. In the lower half mainly electrons move by their spirals of the very small radius. Though plasma oval in a whole remains quasineutral, but since positive ions predominantly move by periphery of the oval, thereby they screen the negative charge of inner electrons and outwardly ball lightning shows a positive charge.

Fig. 2.

A ball lightning in its cross-section is shown on the Fig.2. It is a plasma toroid contracted by two own magnetic fields. In it section toroid looks like two convex-plane ovals facing to the center hole with their flat sides. Longitudinal field by convention is colored with blue, transversal field is colored with green. These fields are also conventionally shown one above another. Really they mutually penetrate each other. Nitrogen and oxygen ions moving along spirals on the periphery of toroid forms an oval tube of a big diameter, which is closed on itself. Protons and electrons move inside the tube by the closed circle along the spirals of small diameter. With formation of toroid the part of proton spirals moved upwards and the part of electron spirals moved downward the oval tube. Separated protons and electrons form an electron field or, in other words, charged electrical condenser.

Observes inform that sometimes several ball lightnings jump out of glowing ball appearing on the lower end of linear lightning discharge. There were observed ball lightnings, from which the lightnings of smaller size jumped out even with explosion.

I think that suggested idea can explain such phenomena. During the discharge of linear lightning some spatially separated portions of hot plasma fly into magnetic field with cold plasma, which covers the end of lightning. **Every separate portion of hot ions and electrons with existing ion and electron spirals forms there an isolated heated spiral tube closed in toroid.** As a result, electrons and protons those that were before and those that flied into cold plasma together with portion of hot plasma move in magnetic field along their spiral lanes inside every heated toroidal tube. Moving in heterogeneous magnetic field inside ion tube, protons and electrons partly separate and form electrical field. If the formed autonomous toroids had no time to join cohered by own transversal field, then they are pushed to the atmosphere separately. If they had time to join, then a single big ball lightning is pushed. It has a shape of oblong oval. It is told in [4, p.120] that "M.T. Dmitriev notes that ball lightning (or rather its central part surrounded by aureole) represented a ball stretched along vertical diameter". As it is said further "Number of other observers inform about stretching of lightnings along vertical diameter, rarely very significant, but in most cases it is small".

Thus, ball lightning can include several autonomous lightnings. Autonomous toroids of lightnings are bearded on one general axis, which pass through the central holes of toroids. Each toroid is locally covered by its own longitudinal magnetic field, and own transversal magnetic fields of toroids put together form a single general transversal magnetic field. This field covers all autonomous toroids and closes through general central hole of ball lightning. with appearance of instability, this joint lightning can separate, sometimes with explosion, i.e. one of them explodes and some of them can remain whole.

Fig. 3.

A complex ball lightning is shown on the Fig.3 (also in cross-section). In particular, it consists of three autonomous lightnings (i.e. big toroids), each of them is locally covered with own magnetic field, which is conventionally marked by blue color. Transversal magnetic fields of autonomous lightnings were summed up in one general transversal magnetic field (colored green), which covers all three lightnings from outside and closes through general central hole of lightning. Inside big toroids and between them single proton and electron spirals as well as small toroids of joint spirals of like charges, which belong to the same particles, can be in motion. They are not shown on the figure due to its complexity.

Formations of complex lightnings are possible by another way. Impulses of charge of the same linear lightning following one after another form several plasma toroids, which cohere by their vertical magnetic fields and can joint in one ball lightning. If they don't have time to join, they fly separately.

Ball lightning decay

There were observed ball lightnings, which separated in several pieces from the middle part of linear lightning channel [4, p.127]. It can occur with pinching of the channel by own increased magnetic field. With this the pressure of hot plasma sharply increases near the zone of pinching. A bulge forms from hot plasma, which expands magnetic field, and hot plasma is thrown into external cold channel. Plasma toroids of cold channel, which are filled by solid portion of hot plasma, are pushed to the atmosphere. There they are quickly contracted by own magnetic fields to the oval form.

Also there were observed some cases, when two slowly falling ball lightnings were as if tied by a thread of fluorescent pearls. Pearl thread soon disappeared, and later ball lightnings also disappeared. It is possible that this pearl thread can consist of proton closed spirals (possibly with electron spirals inside), which during formation of double ball lightning appeared between lightnings. Double lightning soon separated after formation and proton-electron closed spirals didn't have time to spend their rotational energy and were shrunk into small balls by their own magnetic fields. These balls could be observed between two divergent ovals of ball lightnings.

In the beginning of the article we spoke about cases, when ball lightnings were observed in the form of toroids. In principle, toroidal spirals of ionized particles pushed from linear lightning can stay for some time in this form only in the case, if they have very weak or no own longitudinal magnetic field, which makes toroidal spiral to shrink into oval. With formation of ball lightning, when there are drift movements of plasma as well as its tendency to move to the zone of weaker fields, we cannot exclude the circumstances, when more mobile electron spirals move to the zone of central circular axis of wide toroidal ion cylinder quicker than proton spirals. Magnetic filed in this cylinder is weaker than on periphery. As a result, mainly electron spirals will be concentrated along cylindrical axis of plasma toroid. Due to this, a radial electrical field forms by all length of closed plasma toroid. It is stated in [2, p.89] that in this process all plasma in (toroidal) cylinder should begin rotation around the line of cylindrical axis. It promotes a stable keeping of plasma by magnetic field. In this case energy of plasma cylinder can be considered as the energy of charged condenser or as kinetic energy of rotating plasma. Wholly rotating plasma destroys spiral movement of charged plasma particles, that's why own longitudinal magnetic field doesn't shrink toroid into oval. Therefore, ball lightning can be observed in the form of toroid.

To have an idea of electrical fields, which form as a result of separation of charges in plasma, let's use the calculation of field given in [2, p.22-23]. According to the laws of electrostatics, if there is a volume charged of q density on the length x, then it creates an electrical field $E = 4\pi q x$ in absolute units of CGS. If we measure the field in Volts per centimeter, then it will be expressed with a number, which is 300 times more. Let's in 1cm^3 there are Δn electrons above those, which really neutralize ion charge. Then the density of volume charge $q = e\Delta n$, where $e = 4,8 \cdot 10^{10}$ CGS units. From this an electrical field appeared as a result of separation of charges is equal to:

$$E = 1{,}8 \cdot 10^{6} \cdot \Delta n x \ \text{V/cm.}$$

Though plasma toroid forms in rarefied plasma of linear lightning, but when appears in atmosphere, it shrinks into oval. Shrunk into oval, ball lightning most often hovers in air. It speaks about the fact that its plasma as a result of compression gets a density approximately equal to the density of surrounding air. Let's plasma of ball lightning contains only monovalent ions of air, then (since number of atoms in air is $5 \cdot 10^{19}$ atom/cm^3) concentration of electrons in it will be:

$$n = 5 \cdot 10^{19} \ \text{electron/cm}^3.$$

Separation of charges in plasma toroid begins in the time when it is yet in the channel of linear lightning. the reason of separation of the charges is drift motions of proton and electron spirals in powerful magnetic field of linear lightning, which go vertically in the opposite sides inside wide ion spiral of nitrogen and oxygen. Let's imagine that as a result of separation of charges and

further compression of ball lightning in plasma it appeared that on the length 1 cm the concentration of electrons changed at: 1%.
Then: $\Delta n = 5 \cdot 10^{17}$ electron/cm^3, $x = 1$ cm, and an electrical field appears from this separation of charges:

$$E = 9 \cdot 10^{11} \ \text{V/cm.}$$

As we can see, with one-percent separation of charges electrical field appearing in plasma can be very big (if we consider that all atoms of plasma are ionized). But even if the separation of charges in ball lightning will constitute a milliard fraction of percent on the length of 1 cm, then even with such a negligible percent an electrical field of 900 V/cm appears in it. It seems, from this we can conclude that formation of electrical condenser of very big energy is possible in ball lightning. in ball lightning the difference of potentials can be formed not only between proton and electron spirals separated during drift, but also between the same electron spirals and lower half of nitrogen and oxygen ion spirals, which constitute the outer shell of ball lightning. but capacitance of these two multiple condensers are small and can constitute approximately from 1000 pF to 5000 pF. It depends on sizes of ball lightning.

If we suppose that condenser formed in lightning will stand the difference of potentials, for example, 10^6 Volt, then in this case its maximal energy will constitute 2500 J that is not so much.

$$W = 1/2 \ cu^2 = 1/2 \cdot 5 \cdot 10^{9} \text{F} \cdot (10^{6} \ \text{V})^2 = 1/2 \cdot 5 \cdot 10^{3} \text{J} = 2500 \text{J}$$

But condenser really is not able to stand such big and significantly small voltages. It is possible that ball lightnings explode due to electrical disruption of their condenser.

During explosion of ball lightning the observers noted great destruction made by it. Obviously, the case is that this destruction is made not by high energy, but by high momentary power of ball lightning, since its energy during explosion is released for a split second. (May be, many people saw how commandos momentary destroy a heap of bricks by edge of palm. But let's try to apply the energy, which is tens times more, to the hand and press to the bricks with its edge. Most likely, you will crush your hand, but bricks will remain whole).

Ball lightning sometimes kills animals and people. It is well-known that living organisms are good 'conductors of current. If explosion of ball lightning is a powerful electrical discharge, then it follows that significant vortical currents are induced in the closest conductors, which under unfavorable conditions can kill the living organism. The same occurs to metal conductors. If ball lightning explodes near conductor of tough it, then small part induced by currents can melt and big parts have flowed surfaces.

They say that small linear lightnings fly from exploding lightning. such observations prove electrical nature of

ball lightning. Evidently, during explosion people see a flash of electrical disruption of condenser; or right after explosion small linear lightnings really appears between atomized ion and electron clouds.

Few words about luminescence and color of ball lightning. Presence of excited molecules and atoms of air in plasma of lightning exerts the influence on luminescence of ball lightning. these molecules and atoms return to their main state and radiate discrete and recombination radiation. So, excited oxygen atoms while return into main state highlight green and red spectral locus. Excited nitrogen molecules highlight with dark red. And ionized nitrogen molecules during recombination highlight with blue and violet spectral locus. (Main colors are: red + green + blue form white color; blue + green form cyan; red + green form yellow; red + blue form purple) [1, p.161; 6, p.213].

Vortex-like model of ball lightning

There are no sharp boundary between plasma and gas (air). Plasma follows gas laws and often behaves as a gas. Plasma vortical rings in the form of toroid can form near the ends of linear lightning and without its circular magnetic field, i.e. the same way they form from air, if we push a small portion of smoke (colored for observation) from some cavity through small hole [7, p. 13-24]. Such vortical rings could be possibly observed by many people during explosive exhaust of used gas of automobiles or tractors. There was a project to though the smoke from plant high to the atmosphere by means of such vortical rings of a big size, because the highest tubes cannot provide it.

A common box is used to get and demonstrate air vortical rings. This box has a hole of 3-5 cm in diameter form the one side and a tight membrane made of leather or oilcloth from the opposite side. Some speed is imparted to the near air layer by sharp and short stroke to membrane. This layer when begins movement calls compression of neighboring layer, this layer will call the compression of the next layer and so on. When compression reaches the hole, an air-blast will burst from it. In moving air-blast the pressure is lower than in resting air, which is from the outside, directly behind the edges of the hole. Influx into the air-blast will occur from this hole. Simultaneously moving air-blast will set against the resting air along the front, compress it in some extent, and radially will spread extensively and further back to the edges of hole, into the formed rarefaction of air, which gone to the air-blast. Vorticity of air in the form of toroid takes place by such a way. Besides vorticity, toroid gets momentum to move forward and flies from the hole at tens meters. (We should note once again that stroke to membrane should be very short, otherwise air-blast will part the resting air ahead and we will fail to get toroid).

Something similar can happen during the discharge of linear lightning. at the edge of linear lightning, which set against the earth, the plasma ball is formed. With the following impulses of the same lightning discharge the conditions similar to conditions of air toroidal vortexes formation appear. Plasma pushed from the channel of the next lightning impulse meets a barrier from the direction of plasma ball and turns up in toroid. In the first moments the whole body of toroid consists of rotating rings of charged particles. Longitudinal magnetic field immediately appears around each of them, and therefore, longitudinal magnetic field appears around all the toroid. And those rings of charged particles, which appeared to be not strictly perpendicular to the filed, but on the angle, momentary unwrap in Larmor spirals. Collisions with other particles leads to the process, when soon the main mass of charged particles move along Larmor spirals. Transversal magnetic field appears following the longitudinal magnetic field. Both magnetic fields contract toroid in oval, delimit plasma from environment and ball lightning forms as a result of it. In this second variant of ball lightning formation oxygen and nitrogen ions move by spirals of a big radius, which forms an outer shell of lightning, and protons and electrons move along the spirals of small radius inside the wide ion spiral. Further, as a result of drift movements in the formed magnetic field a separation of charges and formation of electrical condenser can occur. I.e. formation of ball lightning in the second variant is the same as in the first one.

Ball lightning is a generator of oscillations

Telecommunications workers in age can remember that initial period of radio engineering development is connected with using of plasma in it. At the beginning of radio engineering the main element in radio transmitter was plasma. At that time plasma in the form of spark discharge and then in the form of arc discharge provided the work of sufficiently powerful (up to 1000 Watt) radio transmitters.

Current-voltage characteristics of electrical discharge in gases, where is an area, which gets incident character, is given in [3, p.864]. In this place the discharge in gas got the name of arc discharge. Arc discharge is characterized by the fact that with the increase of current passing through plasma voltage drop on its resistance doesn't increase, but decrease. *I.e. with the arc charge plasma has a "negative" resistance.* "Negative" resistance of arc discharge included in oscillatory circuit is summed up with the "positive" resistance of circuit, and as a result, total resistance of circuit appears to be equal to zero or slightly "negative". In this case oscillations in the circuit will be necessarily continuous and that provided the work of old radio transmitters.

Arc discharge burns good under the atmospheric pressure. In this connection an idea appears, if ball lightning is a generator of electromagnetic continuous oscillations, generated during some time according to the **above mentioned principle**. It really can be so that discharge of linear lightning to the Earth is an arc discharge. While ball lightnings pushed from arc incandescent plasma ball didn't cool down, they keep

the properties of arc discharge for some time. And according to the suggested idea, ball lightning is a toroidal plasmoid contracted to oval, in which condenser had already formed. Appearance of this condenser will lead to appearance of continuous electromagnetic oscillations, since oscillations don't meet any significant barrier. For some time stationary state of oscillations will be provided by mutual compensation of formation and losses (recombination) of charged particles in plasma. If oscillations excessively grow without energy consumption for overcoming of resistance, then ball lightning explodes due to disruption of condenser. In other cases it slowly dies away. But with this lifetime of ball lightning will be more theoretical, and the observers point out this fact.

Oscillating systems and resonance

Few words about appearance of ball lightnings or plasmoids on antenna wires, in sockets, telephones and so on.

Due to my work, I had to take part in setting-up and tuning (after mounting) of powerful transmitters with radiated power of 20 up to 100 kWt. The most difficult problem was to eliminate the so called parasitic oscillations found in output (terminal) power amplifiers. Their exposure was made by change of parameters of oscillatory circuit along all operating range. A common operating mode was set in power amplifier, but excitation signal from penultimate amplifier to the input of power one was not taken. Sometimes autoexcitation appeared with almost or fully short-circuited inductance coil and minimal capacitance in power amplifier. Autoexcitation was accompanied by appearance of oval plasmoid as large as walnut or bigger. It was white and blue. Plasmoid moved by short-circuited windings of the coil and jumped to metal supporting structures.

These observations suggested that appearance of power electromagnetic oscillations is possible during thunderstorm with huge electrical fields and potentials between cloud and the earth. These oscillations can call formation of plasmoids, which live for tens of seconds.

All conditions for the formation of parametrical oscillatory circuits are created in the atmosphere during thunderstorm. These parametrical oscillatory circuits can generate electromagnetic oscillations. There are can be many of them or only one but powerful. Lower surface of cloud and surface of the earth serves as capacitor plates in parametrical circuit. Distributed conductivity of the atmosphere plays the role of inductance. According to the data given in [1, p. 96-97] capacitance of atmospheric condenser can constitute up to 0,15 microFarad. Difference of potentials between the cloud and the earth can be about 10^9 V and energy stored in condenser can constitute $7,5 \cdot 10^{10}$ J. During thunderstorm its capacity is ever-changing along the height of lower surface of the cloud. Electronic layer also changes its height. Conductivity of the atmosphere also changes. Thus, during thunderstorm parameters in atmospheric oscillatory circuit (mainly in condenser) continuously change about some average values and it provides the build-up of oscillation in the circuit and maintenance of parametrical resonance in it [3, p. 520]. Parametrical resonance appears as a result of small initial disturbances, which are inevitable in any fluctuation system. A constituent with appropriate phase to the phase of parameter change always can be found among these fluctuations, that lead to autoexcitation of oscillations. In absence of energy losses autoexcitation begins with arbitrary small change of parameters. We can expect that energy losses in atmospheric parametrical oscillatory circuit are really small and its autoexcitation takes place with small changes of circuit parameters, i.e. energy pumping deliberately exceeds the losses in circuit. Obviously, discharges of linear lightnings play not the last part in autoexcitation of parametrical circuit. They call strong shaking of atmosphere and initially existing electromagnetic field, which occupies all space, and at last physical vacuum.

Thundercloud as a rule cannot be in the form of solid monolith. It consists of several parts of thunderclouds, that are why several parametrical circuits can form between the earth and these clouds during thunderstorm. Each of parametrical circuits is excited on its own frequency, because each has its own different parameters and they change about some average values according to their own spontaneous law. But parts of thundercloud and therefore, parametrical oscillatory circuits appear to be connected between each other through small capacities (condensers). Values of these capacities continuously change, since speed of motion of cloud's parts relatively to each other change continuously.

If, for example, two parametrical circuits formed during thunderstorm, then beating of frequencies will set due to capacitive connection between them. Electromagnetic oscillations with own resonance frequencies will exist in space as well their difference and heterodyne frequencies. The least appear as a result of the process, when their own oscillations in circuits have form distortion, but not sinusoidal form, since huge potentials are applied to the circuits and oscillations are generated in non-linear mode. If several parametrical circuits act during thunderstorm, then a wide spectrum of powerful electromagnetic oscillations will exist in space. It will be some kind of electromagnetic storm. In such conditions electric current conductors like antenna wires, telephone and electrical wires and other metal things occasionally felt within the zone of localization of parametrical oscillatory circuits, can be as if the parts of their working elements or serve as an operating load, or simply was near this process, then pointing of powerful high-frequency oscillations is possible. These oscillations call air ionization with plasmoid formation. Eye-witnesses of such ball lightnings or plasmoids inform that they slowly " flaring up" appear on antenna wires, from sockets, electrical holders, boards, telephones and their life is short. Most often they recombine quietly, apparently because

electromagnetic field, which created them, weakens and disappears. They appear from above mentioned devices, which are situated in closed rooms, due to high conductivity of electrical wires.

Temperature of ball lightning

In conclusion, let's speak about the temperature of ball lightning and about frequent cases of "superenergy", which can appear from nowhere.

Eye-witnesses of ball lightning, who observed it closely, informed that lightnings didn't radiate much heat.

According to the version suggested in this article, particles of plasma mainly move in order in the formed ball lightning. During this process their kinetic energy can be significant, but we cannot say any definite about plasma temperature. We can speak about high temperature of ball lightning in the initial stage of its formation still in confused chaotic distribution of velocities and big number of collisions between plasma particles. But the highest temperature of plasma evidently manifests in the moment of electrical disruption of plasma condenser and following powerful explosion of ball lightning. It happens because the energy of electrical discharge summing up with kinetic energy of moving plasma, turns ordered motions of its particles into chaotic motion, with numerous mutual collisions; especially since ball lightning formed from the powerful discharge of linear lightning.

It is known that there is a small percentage of heavy hydrogen in the atmosphere. In the atmosphere of the earth there are also slowed muons (mu-mesons) of both charges. "At the sea level muons form the main component (≈80%) of all particles of space radiation" [3, p. 442]. Possibly, plasma of ball lightning contains deuterons and muons in the same proportion. Let's note that negative muons can form muon atoms (mu- mesonic atoms) with protons and deuterons or can be covered by the same protons and deuterons. The newly formed formations are neutral like neutrons. With catalyzed participation of negative muons in nuclear reaction fusion of hydrogen isotope nuclei takes place in normal earth condition , i.e. super-high temperatures are not required for pushing of respondent nuclei [3, p.441]. therefore, we can suppose that sometimes there are some nuclear reactions in ball lightnings, i.e. some quantity of fusion acts of proton-deuteron or deuteron-deuteron particles to helium nuclei are realized. A correspondent energy is liberated during these reaction, and this energy makes these unexplained huge destruction.

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Future Energy Technologies

Thomas Valone M.A., P.E.

Integrity Research Institute, 1220 L St. NW #100-232, Washington, DC 20005
http://www.integrity-research.org
202-452-7674, 800-295-7674, Fax: 301-513-5728,
email: iri@erols.com
Proceedings of World Future Society 2000 Conference and *Proceedings of Energex 2000*

Abstract

Today 85% of our country's energy comes from the combustion of dead fossils, a dirty fuel that is forcing the world's atmosphere to overheat. However, new 21st century energy sources that produce no carbon emissions and do not contribute to global warming are now emerging. Beyond the realm of fuel cells and hydrogen is the non-conventional world of "future energy." Some of the best examples are new and exciting generators that release trapped potential energy from nature in ways never dreamed of before. Others innovatively apply clean fuels in conventional systems that are surprisingly simple and yet very efficient. Still others qualify as promising theoretical technologies that are a focus of attention for NASA and the USDOE. Most of them have one thing in common: they are very scientific but are relatively unknown to the general public. This presentation summarizes the latest breakthroughs in future energy. With scientific explanations of the input energy and output energy, the overunity efficiencies can be understood by average audience members. Included in the quantitative article are the inventions of Brown, Graneau, Jefimenko, Miley, Shoulders, Wallman, and others. The energy revolution is now beginning. It is time to understand the clean alternatives to dead, poisonous fuel.

<u>Keywords</u>: future energy, overunity, betavoltaic, biomass, atmospheric electricity, COFE

Introduction

In 1998, the U. S. Department of Energy (DOE) issued its *Comprehensive National Energy Strategy* (CNES)[1] that included as one of its five goals, the following aspiration:

Goal IV: Expand future energy choices – pursuing continued progress in science and technology to provide

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The Problem of Electron and Physical Properties of Time:
To the Electron Technologies of the 21st Century

V.P. Oleinik

*Department of General and Theoretical Physics,
National Technical University of Ukraine
"Kiev Polytechnic Institute",
Prospect Pobedy 37, Kiev, 03056, Ukraine **Institute of Semiconductor Physics, National Academy of Sciences,
Prospect Nauky 45, Kiev, 03028, Ukraine;
e-mail: yuri@arepjev.relc.com

"…it is necessary to periodically subject to the deepest revision the principles, which were recognized as final and were no longer discussed".
Louis de Broglie

Abstract

The results of an approach based on the synthesis of standard quantum electrodynamics and of the ideas of self-organization in physical systems are briefly outlined. The quantum model of electron as an open self-organizing system is constructed, with the physical mechanism of self-organization consisting in the back influence of the own field created by electron on the same electron. The own field is considered as a physical property of electron, intrinsically inherent in electrically charged matter, which is included in the definition of the particle from the very beginning. The own field of electron endows the particle with wave properties and represents a bearer of superluminal signals, which can be used for the creation of qualitatively new communication systems. Because of the inseparable link between space and time, the force in relativistic mechanics is the cause of change not only of the velocity of particle, but also of the course of time along the particle's trajectory. For this reason the flow of time in some area of space depends on the character of physical processes, occurring in it, and, therefore, time can be controlled by slowing down or accelerating its course with the help of material processes. The conclusions of the paper are not in conflict with the special theory of relativity (STR); they are a direct consequence of relativistic equations of motion and represent an

essential development of the generally accepted notions about space and time. At present all the necessary prerequisites are available, both theoretical and technical, for the practical mastering of the own fields of particles and of the physical properties of time.

1. Introduction. The Problem of Electron and Future Outlook

Electrodynamics, what is this? What is its value for man? Electrodynamics is the theory of electromagnetic interaction, one of four interactions existing in nature. Its role in the life of society is seen from the fact that the most part of natural phenomena, which we encounter at every step, is of electromagnetic origin: it is due to the interaction of electromagnetic field with electrically charged particles entering into atoms and molecules. It is fair to say that electromagnetism plays a crucial role in the life of mankind as it determines the ways of technical advance of society [1].

The key problem of quantum electrodynamics is the problem of electron, which can be formulated as follows: to construct from the first principles a non-contradictory model of electron, which takes into account experimental facts, i.e. to find the dynamical equation capable of describing the unique physical properties of electron, its internal structure, its behaviour when it interacts with electromagnetic field.

Electron was discovered a little more than 100 years ago, in 1897. With discovering the electron the revolution in physics began, which has resulted in unprecedented technical advance of society. The summit of development was reached in the middle of the 1950s and then the long period of evolutional development followed, when new physical principles were used to describe various physical processes and phenomena. The violent development of physics became slower in the 1970s and was replaced by stagnation in the subsequent years. The stagnation in electrodynamics continuing already over a period of several decades is gradually giving place now to a new ascent. The new scientific revolution is starting, which is associated with electron again, much as it happened hundred years ago. The reason is that electron is the most unique particle storing in itself the deepest mysteries of nature and the degree, to which they are disclosed, determines the

technological level of development of society. The gist of the processes taking place in science during the period, when the overwhelming majority of explorers sincerely trusts in the verity and finality of the generally accepted system of views about nature, is expressed well enough by the known historian L. Gumiljev in the following words: "The End and the Beginning again". Those views and conceptions that appear to the majority of specialists as the final truth, as the summit of development, prove to be merely a completion of some stage of development, the beginning of a new, difficult ascension leading to a radical change in the conventional views and conceptions.

An analysis of the newest development of quantum electrodynamics demonstrates that we are on the threshold of revolution in engineering. Already now, when one is at the very beginning of the new ascension, it is possible to indicate with certainty the following trends of development in engineering in the 21st century.

Firstly, there will be created the essentially new means and systems of communication working on superluminal signals whose bearers are the own fields of material bodies. By their physical characteristics – by the speed and range of information transfer, by the capacity to penetrate through obstacles, by their reliability in service - the new communications facilities will be much superior to the now existing ones. As is known, within almost hundred years superluminal signals were tabooed in physics and everyone was confident that such signals cannot exist in nature. The special theory of relativity (STR) imposes a prohibition on the motion of material bodies with the speed exceeding that of light in vacuum, but, as is shown in our papers, does not prohibit superluminal signals whose existence follows directly from the Maxwell equations. It appears, moreover, that superluminal signals are the most important element of structural organization of the world, which provides its stability. At present there are everything required for the practical mastering of the own fields of particles and for the creation of electronic devices and technologies using superluminal signals. The devices and the technologies indicated above will find various applications in many areas of science and engineering and, in particular, in medicine. With their creation the medicine will have an opportunity to investigate in detail the energetical body of a person (energetical shells, biofield, aura). It will give a potent impulse to the development of alternative (nontraditional) medicine as the most effective methods of medical treatment of men.

Secondly, the physical properties of time, whose existence was indicated by N. Kozyrev almost half a century ago, will be used for practical purposes. According to Kozyrev, time is of an active nature, the events not only exist in time, but also take place with its participation. We managed to show that the Kozyrev hypothesis is a direct consequence of relativistic mechanics. The existence of the physical properties of time is manifested in that the course of time in some

material system depends on the nature of physical processes going on in it. This means that the physical properties of time are of dynamical origin. This fact is of considerable importance since it indicates that it is possible, on the one hand, to control the course of time in some area of space with the help of electronic processes and, on the other, to influence the behaviour of a physical system by changing the course of time in it.

In this paper the results of investigations on the problem of electron are briefly outlined carried out by the author and his colleagues for the last years and published in the monograph [2].

2. Self-Organizing Electron

The standard formulation of QED proceeds from the assumption that electron is a structureless point particle. This assumption results in a serious difficulty – the divergence of the self-energy of electron. One more difficulty of the conventional approach is that quantum mechanics is unable to explain stability of the point-like electron. Really, the wave packets, which could have a claim on the role of the wave functions describing the behaviour of a free point-like electron, spread out in time, which contradicts the experimental fact of stability of the particle.

The difficulties mentioned above are very serious. According to Dirac, the difficulties of QED "in view of their fundamental character can be eliminated only by the radical change of the foundations of theory, probably, radical to the same extent as transition from the Bohr orbits theory to modern quantum mechanics" ([3], p.403). "Correct conclusion is that the basic equations are erroneous. They should be changed in such a way that divergences do not appear at all". As an analysis of the problem shows, one should abandon all attempts at using the notion of point-like electron and should take into account that the self-action of electron is the key to constructing a consistent quantum model of the particle.

One of the boldest ideas concerning the physical nature of electron belongs to E. Schrödinger who suggested the historically first physical interpretation of quantum mechanics. According to Schrödinger's hypothesis, the quantity $e\left|\Psi(r)\right|^2$ is the density of spatial distribution of electron's charge (e and $\Psi(r)$ are the charge and the wave function of electron, respectively) and thus the dimensions of electron are the same as those of atom [4,5]. However, the attempts to substantiate this interpretation failed and, for this reason, Schrödinger's idea was rejected by the majority of physicists [6].

The interest in Schrödinger's interpretation has been revived during the last few decades in connection with the new approaches to calculation of radiative corrections [7-9]. A. Barut and his collaborators formulated and developed the quantum theory of electromagnetic processes based entirely on the self-

energy picture (the Self-Field QED). As is pointed out by Barut [7], "the correct quantum equation of motion for the radiating electron is not the Dirac or the Schrödinger equation for a bare electron, but an equation containing an additional non-linear self-energy term".

New lines of approach to the problem of electron are proposed in [2,10-15]. The approach represents a synthesis of conventional quantum electrodynamics and the ideas of the theory of self-organization in physical systems [16]. The physical mechanism of self-organization consists in the back action of the own field created by charged particle upon the same particle. It is described by the model of open system with the wave function belonging to indefinite metric space.

The essence of the approach developed is that the own field of electron is considered as a physical property intrinsically inherent in the particle and, when formulating the theory, the own field is included in the definition of electron from the very beginning. This means that we adopt as zero approximation not a "bare" electron, but an electron capable to create the own field and to "feel" its back influence.

Mathematically, taking into account the back action of the own field created by particle upon the same particle results in the non-linearity of dynamical equation describing the behaviour of electron. Thus, electron becomes a self-organizing system, whose physical properties, geometrical shape, and linear dimensions may be determined in a self-consistent way from solutions of the basic dynamical equation. Electron is a quantum (elementary excitation) of the field of charged matter localized in a bounded region of space and subject to the Coulomb self-action.

Since electron represents a clot of electrically charged matter, creating the long-range Coulomb forces in surroundings, its environment turns into a medium, which can have a determining influence on physical properties of the particle. In view of the long-range character of the Coulomb field, electron becomes **an open system** inseparably bound with the environment. In a sense the whole universe takes part in the formation of electron as a physical system.

The own field responsible for transformation of electron to an open self-organizing physical system can be imagined as a web of electric lines of force emerging from the particle and of magnetic ones enclosing the particle. All the bodies in the Universe are shrouded in the web and as a result the surrounding space and the time as well are endowed with physical properties.

Obviously, to describe electron as an open system one should introduce into quantum mechanics a radically new point, namely: one should replace the model of isolated system described by harmonic oscillator, which is at the heart of modern physics, with the model of open system. It is pertinent to note here that the theory of quantum particles based on the use of the models of

isolated system is, strictly speaking, physically meaningless. Really, any observation conducted on a system represents a process of interaction of the system with the means of observation. In the case of microparticles (quantum particles) this interaction is not weak, and consequently it is inadmissible to neglect it, i.e. the microparticles should be necessarily considered as open systems.

As open system has the richer physical contents in comparison with isolated system, the essentially new mathematical ideas are needed for such a system to be described. To take into account that real electron, being considered as an open system, is inseparably linked with surrounding medium, we should first of all increase the number of dynamical variables describing it. Really, real electron can be imagined as a system consisting of two components: one of them should correspond, in a sense, to the particle alone (to the "bare" particle) and the other to the surrounding medium, in which the particle moves. Therefore, in the simplest model of open system one should double the number of dynamical variables. To each dynamical variable of the "bare" particle there should correspond two dynamical variables, which should be considered as components of the wave function describing the quantum state of particle. Besides, the system under study should be subordinated to a condition for openness expressing the fact that real electron is indissolubly bound to environment and its interaction with environment cannot be weak. The condition for openness can be formulated as follows: the open system should make sense only in the event that there are simultaneously both components – the particle alone and the environment, and these components should be equivalent.

From the action principle, the basic dynamical equation is derived taking into account the relativity principle and describing the self-acting electron as an open self-organizing system [11-15]. By its appearance this equation coincides with the usual Dirac equation for a charged particle in an external field described by 4-potential. However, in reality, it differs essentially from Dirac's equation. The distinction consists in that the equation derived is non-linear and non-local, with the non-locality being of spatial and temporal character.

It should be noted that the potential and vortex components of the 4-potential entering into the dynamical equation differ from each other by their physical nature: the first describes the own field and is expressed in terms of the wave function components of electron, and the second describes the vortex electromagnetic field and is uniquely determined by the electromagnetic field variables. From the formal point of view, the content of the QED formulation developed here is that these two essentially different quantities are integrated into a single 4-vector.

As a detailed analysis shows, solutions to the basic dynamical equation of electron describe the clots of self-acting electrically charged matter, localized in space,

i.e. electron is a soliton. The self-acting electron can be in different quantum states characterized by internal energy, dimensions, and geometric shape. The internal energy spectrum of electron is discrete with an infinitely large number of levels. To each value of internal energy there correspond certain linear dimensions and geometric shape of the region of localization of electron's charge. Dimensions and the number of extrema of wave function increase with increasing the value of internal energy.

The distribution of electric charge of electron in the ground state consists of the range of basic localization with the linear dimensions of the order of Bohr radius a_0 $(a_0 \sim 10^{-10} m)$ and of the tail stretching up to infinity. Owing to the non-linearity of the dynamical equation of electron, the wave function does not obey the superposition principle. In virtue of this electron acquires the properties of absolutely rigid body: the perturbation acting on electron at an instant t in the range of basic localization becomes known at the next instant $t + \varepsilon$ $(\varepsilon \rightarrow +0)$ at any distance from it.

3. The Own Field of Charged Particle

According to the generally accepted point of view, the velocity of light in vacuum is the greatest possible velocity of transfer of a signal existing in nature. This conclusion was formulated by A. Einstein as a consequence of the special theory of relativity (STR) as follows: "... There is no way of sending the signals which would propagate faster than light in vacuum " (see [17], p. 157). At the same time the astronomical observations conducted by N.A. Kozyrev and others [18-20] have shown that there exists in nature some mechanism of action-at-a-distance of one body on the other resulting in the superluminal transfer of a signal.

An attempt to find in electrodynamics the physical mechanism of superluminal transfer of information is undertaken in [21]. It is noted here that the physical bearer of superluminal signals is the own field of an electrically charged particle. This field is of a dual nature: on the one hand, the own field is governed by the Maxwell equations and consequently it is an electromagnetic field and, on the other, it is created by a charged particle and cannot exist when the particle is absent, i.e. it represents in some sense a constituent part of the particle. It is not surprising that the own field of particle considerably differs by its physical properties from the field of electromagnetic waves: it is of a purely classical character and cannot be reduced to the set of photons. The own field seems to be responsible for the wave properties of particle, which are manifested in experiments on diffraction of electrons. The function of the own field of a charged particle is to transform the environmental space to a physical medium with the properties of an absolutely solid body. One of the physical properties of this medium is that it is capable of transferring a signal, connected with a perturbation occurring at some point of space, instantaneously to arbitrarily large distances.

According to [21,22], the transverse vortex electromagnetic field consists of two components significantly different from each other by their physical characteristics - the electromagnetic waves and the own field of charged particles. To these components of electromagnetic field there correspond two mechanisms of transferring a signal (information): (1) the instantaneous transfer of a signal via the own field of charged particles, representing the standing waves of matter rigidly linked with particles and going from them to infinity or to other particles, the own field being capable of transferring a perturbation both with the speed of light and instantaneously; and (2) the transfer of a signal with the speed of light by means of electromagnetic waves, which are emitted by particles when they move with acceleration and then separate from the particles. It should be stressed that both mechanisms of transferring information mentioned above work simultaneously as though duplicating each other.

The existence of instantaneous signals necessarily follows from both the laws of electrodynamics and the most general considerations. As the own field of electron is inseparable from the particle, electron and its own field should be considered as a single physical system. In view of the long-range character of the own field, this system fills in the whole space. In order for such a system to be stable, a physical mechanism should exist combining its parts into a unit. The instantaneous transfer of information via the potential and vortex components of the own field of electron is, apparently, such a mechanism. By other words, the instantaneous signals are indissolubly related to the processes of self-organization, resulting in formation of the internal structure of charged particles.

To specify the physical mechanism of superluminal transfer of information, let us turn to the quantum theory taking into account self-action. According to [11-15], electron represents a soliton - a clot of electrically charged matter having the physical properties of absolutely solid body (because of the violation of superposition principle). It is a complicated dynamical system consisting of a region of basic localization, with the sizes being of the order of Bohr radius for the ground state of particle, of a tail, extending up to infinity, and of the own field.

The presence of the tail manifests itself in that the charge density of the self-acting electron proves to be distinct from zero (though rather small in magnitude) far outside the region of basic localization of particle. The oscillations of the charge density, occurring in this region, are instantaneously transferred along the tail via the own field of particle to any distances and excite the oscillations of electric and magnetic fields at each point of space. This process ensures that information about a physical event occurring at some point of space can be gained immediately from a measurement conducted at any place of the universe. It should be noted that the effect is absent for a point-like particle.

As is known, the presence of an environment capable of transferring an oscillation from one point of space to the other is a necessary condition for the existence of waves. For electromagnetic waves, such an environment is, apparently, the own field of particle. The latter is similar to the elastic strings that bind electric charges to the environmental medium and endow it with properties of an absolutely solid body. These strings are inseparable from the charged particle, they are not of photon structure and consequently they cannot be destroyed without destroying the particle, with which they are connected. When a charged particle moves with acceleration, a photon field is split out of its own field, the vortex own field of the particle being deformed and losing its axial symmetry.

Generally, the own field of particle contains four components according to the four now known types of interaction - electromagnetic, weak, strong, and gravitational. Each of these components is a classical field linking the particle to the surrounding world via superluminal signals.

The inference about the possibility of superluminal transfer of a signal with the help of self-field of charged particles is in the obvious contradiction with the standard point of view, which for the first time was formulated by A. Einstein as a consequence of the special theory of relativity [17]. A detailed analysis of the problem shows, however, that our conclusion is in agreement with STR. The standard point of view is true only at first sight; it cannot be proved within the framework of STR. As is obvious from the analysis of the superluminal excitation transfer through the own field of particle [21,22], the statement that the transfer of signals with faster-than-light speed is impossible is in essence an additional postulate contradicting Maxwell's equations.

The generally accepted standard proof that superluminal signals cannot exist in nature is erroneous. The fallacy in the proof consists in that the causal relationship between two events is analyzed within the framework of kinematics without using the equations of motion. The causality problem is, however, a problem of dynamics, because the case in point is the transfer of interaction from one event to the other. Hence, it can be solved only by the analysis of solutions of dynamical equations subordinated to proper boundary conditions. Remaining in the framework of kinematics, it is impossible in principle to solve the causality problem. In the generally accepted reasoning relating to superluminal signals, dynamics is not considered at all and consequently the conclusion about impossibility of superluminal signals is not justified.

In [22] the phenomenon of relativity of physical processes caused by superluminal signals is predicted. The heart of the phenomenon is that the points of view of two observers situated in the different inertial frames of reference on an event, occurring at some space-time point, can be essentially different. The effect is a result of peculiarities of the space-time geometry, which are manifested in the presence of superluminal signals. The phenomenon has its origin in the fact that some space-time barriers can be formed in the 4-dimensional space, which are capable to hide for a while a part of information on physical process.

4. Physical Properties of Time

Time is among the most common concepts, which are used permanently both in science and in everyday life. This is because all events and processes in the world happen in space and develop in time and, hence, the laws that govern space-time connections are the most general and hold for all forms of matter. From the point of view of common sense, time characterizes the duration of events and processes and indicates their natural sequence, at which the present, going away to the past, is replaced by the future.

I. Newton gave a clear-cut characteristic of the concept of time, to which the majority of physicists adheres: "The absolute, true, and mathematical time in itself and by virtue of its nature flows uniformly and regardless to any other object …". Though, according to Newton, time flows equally and uniformly and does not depend on the processes, occurring in the world, the daily experience favours the opinion that the course of time is not uniform. Depending on circumstances in our history, it seems to us that time either flies swiftly or hangs heavy on our hands; sometimes it even changes by leaps. There are a lot of poetic images indicative of the non-uniform, uneven flowing of time: "the minutes fatal" (A. Pushkin), "the instants of life" (V. Brjusov), and "starry hours of mankind" (S. Zweig). The minutes of inspiration familiar to the people engaged in creative work may also serve as an example of a sudden change in the course of time when the problems, which did not yield to solution for a long time, are suddenly solved in a flash. These are the rare moments of truth exciting and unforgettable. In connection with these speculations the question arises: Whether the subjective sensations of non-uniformity in the course of time familiar to everyone have an objective basis?

In Newtonian mechanics time is of an absolute character, it does not change as one passes from one inertial reference frame to another and represents merely a parameter, the change of which at the will of explorer results in the change of state of a mechanical system in accordance with the equation of motion.

In relativistic mechanics time remains a parameter describing the development of system. Now, however, time and space are intimately linked with each other to form a single whole – the 4-dimensional space-time. In going from one inertial frame of reference to another, time gets entangled with spatial coordinates, so that time in one reference frame represents a "mixture" of time and coordinates in the other. Time ceases to be universal, the same in all inertial reference frames; it takes on a relative character. This circumstance, combined with the conception of physical field, results in the fact that time now gains a new quality, which

was not available in classical mechanics: it becomes a bearer of physical properties. This point, in view of its fundamental importance, deserves some more discussion.

According to the conception of physical field, which was called by Einstein the most important discovery in physics after the times of Newton, if a body generates in surrounding space a force field, the space turns into a physical medium, which is capable to interact directly with other bodies and gains, thus, physical properties, becoming an active participant of physical processes. In view of the fact that space and time are indissolubly related to each other, the presence of a force field in space must necessarily result in the appearance of physical properties of time caused by the motion of a body in this field.

Thus, from the synthesis of the notion of space-time and of the idea of physical field it follows with necessity that the course of time in a given area of space should depend on physical processes in this area, i.e. time, as well as space, should have physical properties.

It should be emphasized that in STR time and spatial coordinates are independent and formally equal in rights quantities, which determine the position of elementary events in space-time. On the other hand, time stands out in relation to spatial coordinates. The special role of time is due, from the viewpoint of geometry, to the pseudoeuclidity of geometry of the 4-dimensional space. From the physical point of view, it is associated with the dynamical principle (causality principle), according to which the state of motion of a physical system at an instant of time t uniquely defines its behaviour at the following instant of time $t + 0$. The significance of dynamical principle lies in the fact that it relates the temporal evolution of system to the physical processes caused by force fields and in doing so it allows one to determine the course of time in the system, its possible dependence upon the character of physical processes, and not just the sequence of events and their duration.

The idea about the existence of the physical properties of time belongs to N. Kozyrev [18]. By introducing into mechanics an additional parameter taking into account the directivity of the course of time, Kozyrev has formulated the causal (asymmetrical) mechanics, from which it follows that time has physical properties. According to the results of theoretical and experimental investigations conducted by Kozyrev and his followers [18-20,23,24], events can proceed both in time and with the help of time, information being transmitted not only through force fields, but also via a temporal channel. Note that in [23,24] the problem is stated of direct experimental research of the physical properties of time with the purpose to ascertain the relations of a new type between phenomena and discover new methods of changing the state of substance.

With the aim of constructing a rigorous and consistent theory taking into account the possible appearance of the physical properties of time, one should turn to

dynamics. As was noted above, it is the dynamical principle that relates the evolution of a system in time to the action of the force fields. As A.A. Logunov underlines, "if for some form of matter we have the laws of its motion in the form of differential equations, then these equations contain information on the structure of space and time" [25]. Obviously, dynamical equations should contain information not only about geometrical properties of space-time as a whole, but also about physical properties of space and time, taken separately [2,26,27].

According to [26,28], the conclusion that there exist the physical properties of time strictly follows from relativistic mechanics, without introducing any additional hypotheses. The physical properties of time are of purely dynamical nature: their existence is a direct consequence of dynamical principle (principle of causality).

The theory given in [28], which holds only for a point-like particle, can be generalized to arbitrary physical systems, both classical and quantum. One can demonstrate with specific examples that information on the physical properties of time is contained in dynamical equations, with the help of which the course of time in one inertial reference frame can be uniquely determined from the course of time in the other. The spatially-extended systems – the scalar field described by the Klein-Gorgon equation, the electron-positron field described by Dirac's equation, and electromagnetic field interacting with electric currents and charges - are investigated in detail [29].

Our main results concerning the physical properties of time can be formulated as follows. The course of time in any physical system considered from the point of view of the inertial reference frames moving relative to each other depends on the nature of material processes taking place in the system. The relation connecting the course of time in one inertial frame to the course of time in the other can be derived from relativistic equations of motion for any kind of matter. One can easily derive also the relation connecting the course of time between different points of space, lying on the trajectory of motion of particle and considered in the same inertial reference frame. Note that the case in point is the local time, i.e. the instants relating to the separate points of three-dimensional space.

As is seen from the results obtained, the notion of time as of an entity given from above, which is independent of natural processes, established in the minds of the majority of explorers, is erroneous. Time plays an active role in physical processes. Its flow depends on the state of motion of physical system. The change in the course of time along the trajectory of motion of particle is conditioned by the force acting on particle in a physical field. Apparently, the change in the course of time, in its turn, by virtue of dynamical equations, exerts back influence on the particle's behaviour. The basic difference of relativistic mechanics from Newtonian mechanics consists not only in that time in Newtonian

mechanics is of an absolute nature, whereas time in STR flows differently in different inertial frames. In relativistic mechanics the force is not only the cause of acceleration of particle in an inertial reference frame, but also the cause of change in the course of time along trajectory. It should be pointed out that the connection between the force and the course of time is due to the existence of the inseparable link between space and time.

Any material system is capable to influence the course of time in that region of space, where it is placed. The ability to change the course of time during the process of motion represents one of the most fundamental properties of physical system, which can be referred to as "the feeling of time". Apparently, "the feeling of time", internally inherent in any form of matter (both particles and fields) by the very nature of things underlies the specific time structure of the material world, whose existence is discussed in [18,23,24].

Thus, the space-time arena, in which physical processes proceed, undergoes continuous changes and deformations as a result of interaction between fields and particles. These deformations, in their turn, can exert some influence on the physical properties of a system. Space and time cease to be passive and become active participants of physical events. The course of time in a certain region of space depends on the character of physical processes occurring in it. The results obtained indicate that the physical properties of time are not preset a priori, they are inevitably created by material systems owing to their movement under the influence of the force fields.

5. Conclusion

The results of the investigations briefly outlined here allow one to gain a more penetrating insight into the true nature of those factors, which operate the world. As electron, the elementary brick of the microworld, is an open self-organizing system, which via the long-range own field is indissolubly related to the whole universe, it is natural to make a conclusion that there works in nature an universal dynamical principle - The Principle of Self-Organization, which can be formulated as follows: any material object represents an open self-organizing system whose internal structures are formed with the participation of the whole universe. Apparently, the Principle of Self-Organization, incorporated in nature as one of the integral properties of matter, is nothing more nor less than a spirit (or absolute idea, or creator) which operates the world and creates all its variety. It seems to be physically meaningless, however, to tear the property mentioned above away from matter and to ascribe to it a self-dependent existence independent of matter: it exists only to the extent to which the matter does.

As is seen from the results received, any physical process with the participation of charged particles is accompanied by emission in the environmental space of superluminal signals, which transfer information about these processes to the surroundings. Apparently, such an information interchange between material objects provides a possibility of their stable coexistence and is, thus, the most important element of self-organization in the universe.

The ability of electron for self-organization and for information interchange with the surrounding bodies, no matter how far they are spaced, point to the fact that electron is an elementary microsystem possessing the rudiments of reason and all those properties which as a result of the evolution of matter lead to the beginnings of life.

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The Principle of Self-Organization, which can be formulated as follows: any material object represents an open self-organizing system whose internal structures are formed with the participation of the whole universe. Apparently, the Principle of Self-Organization, incorporated in nature as one of the integral properties of matter, is nothing more nor less than a spirit (or absolute idea, or creator) which operates the world and creates all its variety.

Physical Mechanism of Nuclear Reactions at Low Energies

V.P. Oleinik* and Yu.D. Arepjev

*Tell me what the electron is,
and I shall explain to you everything else.*
W. Thomson

Abstract

The physical mechanism of nuclear reactions at low energies caused by spatial extension of electron is considered. Nuclear reactions of this type represent intra-electronic processes, more precisely, the processes occurring inside the area of basic localization of electron. Distinctive characteristics of these processes are defined by interaction of the own field produced by electrically charged matter of electron with free nuclei. Heavy nucleus, appearing inside the area of basic localization of electron, is inevitably deformed because of interaction of protons with the adjoining layers of electronic cloud, which may cause nuclear fission. If two or more light nuclei occur "inside" electron, an attractive force will appear between the nuclei that may result in the fusion of nuclei. The intra-electronic mechanism of nuclear reactions is of a universal character. For its realization it is necessary to have merely a sufficiently intensive stream of free electrons, i.e. heavy electric current, and as long as sufficiently a great number of free nuclei. This mechanism may operate only at small energies of translational motion of the centers of mass of nuclei and electron. Because of the existence of simple mechanism of nuclear reactions at low energies, nuclear reactor turns out to be an atomic delayed-action bomb, which may blow up by virtue of casual reasons, as it has taken place, apparently, in Chernobyl. **The use of cold nuclear reactions for production of energy will provide mankind with cheap, practically inexhaustible, and non-polluting energy sources.**

Introduction

Nuclear reactions at low energies, occurring in physical and biological systems, and, in particular, the cold fusion (CF) of nuclei, attract ever increasing attention (see review articles [1,2]). This is explained by the fact that research on CF (in what follows, by cold fusion we shall understand any nuclear reactions at low energies) opens up the way to the solution of the problem which was set more than 50 years ago in the field of controlled thermonuclear reactions (CTR) and which has not been solved that is the problem to provide mankind with cheap fuel. An important point is that CF allows to create not only cheap, but also non-polluting energy sources, as nuclear reactions at low energies are not accompanied by radiations dangerous to health (γ-radiations, streams of fast neutrons and other particles). Note that the energetic problem facing mankind is presently of special interest in connection with the fact that, according to expert evaluations, the oil-and-gas resources in the world will suffice only for some decades. For this reason the study of CF is among the most important problems of physics.

Parametrical Generation of Alternating Currents

Nikolay D. Papaleksi

Russian Academy of Sciences
(Published in short version, comments by
Alexander V. Frolov, Editor)

As we know, the problem to transform mechanical energy into electrical energy can be decided by two methods: by means of movement of electrical currents in magnetic field and by means of movement of electrical charges in electrical field. Both these ways are used on practice in electromagnetic and electrostatic devices. The role of electromagnetic devices in techniques is much more important, because electrostatic devices were still rather an equipment of physical laboratories than a technical devices.

In first mechanical generators of electrical energy magnetic field was permanent, and this circumstance has an influence on further development of electric machine industry.

Principle of autoexcitation of dynamos, the so called Siemens "dynamo-electrical" principle, which entirely determined the development of modern electrical devices both of direct and alternating current with extraneous excitation, creates the magnetic field of excitation, which is constant in time. Generation of direct and alternating currents by means of constant magnetic field is very simple and comfortable. Due to the historical reason mentioned above, electric machine industry had been developing almost in the way of using constant in time magnetic fields for excitation. We should note that in electrostatic devices of autoexcitation , for example of Terpler – Wimsherst type, we also deal with the field of excitation, which is constant in time.

May be it is possible to also use alternating magnetic fields to solve the problem of mechanical generation of electrical currents. But this matter is not so simple like in the case of constant fields, because we need a synchronicity between movement of conductors with current (or charge) and change of the field to follow the laws of induction and mechanical forces. If realization of such synchronicity with extraneous excitation is not so simple (not only synchronicity, but in-phase operation is also necessary) then it is a more complex matter to provide autoexcitation of alternating current circuit.

Some scientists were interested in this problem long ago and suggested a wide range of schemes of autoexcitation of alternating-current circuits (Rudenberg [1], Barkghausen [2], Shuleykin M.V. [3]). But in all these schemes the authors avoid the main complexity of how to realize in-phase operation by means of commutation (collectors), i.e. by transformation of alternating current into direct current.

In principle, we can formulate the problem of autoexcitation of alternating-current circuit just as it is as the following. We have an alternating-current circuit (Fig 1) and there are no obvious sources of EMF, i.e. magnetic or electrical fields.
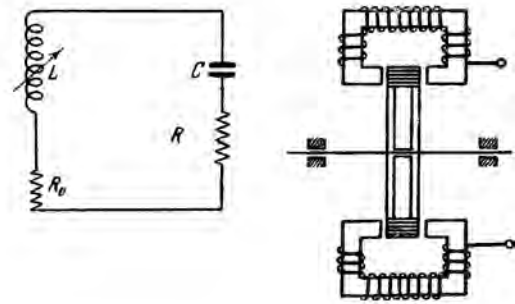

Fig. 1. Scheme of parametrical inductive generator

The question is: can we excite electrical currents in this circuit by only changing of mutual superposition of the parts in this circuit, its self-induction or capacitance. It is clear that we should exclude commutation, i.e. change of ohm resistance (or in other words, transformation of alternating current into direct current).

As Poincare [4] theoretically showed already in 1907, it is not possible to autoexcitate electrical currents in systems without capacitance, in which the only thing that changes is inductance, if there is no commutation. However, such autoexcitation can be possible in some particular cases in the presence of capacitance, when self-oscillations of the system are used and periodical changes of inductance (or capacities) are made in accordance with them. Relay [5] indicated this possibility formerly in connection with analogous phenomena in acoustics. Though electric engineers knew the cases of autoexcitation of alternating-current circuit before (for example, autoexcitation of inductive generator under its breaking-in according to the fitted capacitance), which were considered rather as side phenomena, but until recently the question of autoexcitation of alternating-current circuit had no systematical consideration and seemed to be unclear at least.

Physical aspect of phenomena, taking place under the autoexcitation of alternating-current circuit can be easily understood from the following reasoning. Let's electrical circuit consists of some capacitance C, inductance L and ohm resistance R (Fig. 1). Let's self-inductor is designed in such a way that it allows periodical change of inductance and let's some negligible current passes in some moment of time. At

that we should note that in this case the sign of the current is not significant in contrast to the case of dynamo-electrical autoexcitation.

Let's suppose that in that moment some external force will change the inductance of the circuit. A work should be spent to this process. And if with the change of inductance we put more energy to the system, than it was consumed for recharge of condenser, then energy content in the system will grow and, therefore, current strength and charge in condenser will increase with every new cycle.

Thus, oscillations in the system will keep increasing and it will be autoexcitate process. A simple mechanical analogy to the process under consideration can be the well-known phenomenon of swing.

Thus, **if we change inductance with a frequency about two times more than the self-frequency of the system, t**hen in the case, when relative value of inductance change will be more than a certain value, which depends on damping of self-oscillations in the system, **an alternating current should appear and increase there. Frequency of this current should be equal approximately to the self-frequency of the system, i.e. it is close to the half-frequency of inductance change.** It is easy to note that the same reasoning can be applied to the case of circuit capacitance change.

From the above mentioned simple reasoning we can see that under periodical change of one of the parameters in the oscillating circuit (capacitance or inductance) and compliance with certain conditions, more and more increase of the currents should appear in this circuit, i.e. the circuit should autoexcitate. If parameters of the system remain independent from currents or voltages during this process, in other words, if the system remains to be linear, then the **increase of the current or charge will continue infinitum** until isolation of the system will be disrupted or power of engine rotating the alternating self-induction (or capacity) will be not enough. As we know, there cannot be a stationary mode in such "linear system" and, therefore, it cannot be a generator of current. To do it, we should introduce some factors to the system. These factors should depend on amount of current and they will limit its further growth. Only then we can get a stationary mode and realize an alternator of alternating current. In this respect we have a full analogy with dynamos of usual autoexcitation, in which stationary mode also is stipulated by "non-linearity" of iron magnetization curve.

Since the autoexcitation here is stipulated by the change of system parameter, it was called "parametrical" excitation. Generation based on this excitation was called parametrical generation. We should specially note that the frequency of generated current is equal to the half-frequency of the change of parameter, so we deal with synchronous electrical device.

The given problem was systematically developed in theory and in experiments at the Scientific Research Institute #1 of Moscow State University, in Central Wireless Laboratory and Leningrad Electrophysical Institute and then in Leningrad Research Institute by a number of our colleagues under general direction by Acad. L.I. Mandelshtam and the author of this article. In the result of these works [10-15] there were received the effects of parametrical autoexcitation of alternating-current circuit under periodical mechanical change of both inductance [10] and capacitance [11] in the absence of any explicit sources of electrical or magnetic fields (exciters, accumulators, constant magnets and so on). Also there was given a theory of existent processes (conditions of autoexcitation, stationary amplitude value and so on).

Therefore, to reduce own losses there is a necessity to use some special designs, which give us a possibility to realize high values of m (Editor's: modulation factor) during parametric generation to produce high efficiencies.

According to these two possible ways of parametric generation, namely by means of periodical change of inductance or capacitance, two different new types of electrical devices are possible. We will distinguish them as 1) "inductive" parametrical alternator and 2) " capacitance" parametrical alternator.

In the first case we deal with electrical synchronous device. In outward appearance it has a little difference from devices of normal collector-less (inductor) type. The only difference is that there are no energizing coils (its an important circumstance concerning design) and some capacity is required. That's why there is no doubt that it is possible to receive the power of the same order from "inductive" parametrical alternator like from ordinary alternators. The main interest of the works with inductive parametrical alternator was to find out, in what extent and in what conditions the features of new principle of parametrical excitation can be effective and practically used. Parametrical excitation makes unnecessary the energizing coils, but it is connected with a condition that the circuit should be oscillating and it should be adjusted approximately in resonance on the half-frequency of inductance change, i.e. presence of certain capacitance is necessary.

These circumstances forced to obtain high peripheral velocities (of rotation) since the cost and sizes of condensers, which were necessary to adjust in resonance, decrease with increase of frequency. A design of experimental model of generator of 1 kWt power under the shaft velocity of 3000 rpm was developed with participation of engineer M.M. Verbitsky. This generator was perfectly produced in the workshops of Leningrad Engineering Institute.

Using parametrical principle of autoexcitation gives us design advantages, which are determined by absence of energizing coils. Also it is not necessary to use the magnetic field exciter. This circumstance plays a little role in normal synchronous devices of a high power, but it can be very effective for devices of small power in

weight, sizes and cost, particularly in the cases when the problems of weight loss have a great significance. We should note that the question of condenser with generation of small power could be solved mush easier.

The second possible method of parametrical generation of alternating current is made in the so-called " capacitive" parametrical alternator. Here we deal with electrical synchronous device. In this device the transformation of mechanical work into electrical energy is obtained by periodical change of capacitance included in cyclic circuit, which is adjusted approximately at a half-frequency of capacitance change. The main part of this alternator is alternating capacitance, which can be made like rotating condensers of alternating capacitance applied in radio engineering, as a set of stator and rotor plates of corresponding shape. **These plates are estimated in such a way that with rotation of the rotor with a necessary velocity, capacity changes as much as possible.**

Capacitive parametrical alternator is so much different from usual electrical devices that electricians could have the main question if it is possible to generate power, which could be interesting for electrical engineering, according to this method.

The more frequency, modulation depth m of the capacitance and energy in condenser, the more generated power can be received. Thus, the task to generate considerable power turns on to the possibility of enough energy storage in alternating condenser. Since it is almost impossible to design such a condenser, which can have more capacitance and allows very quickly change within high limits, then the only possible way to solve this problem leads to the increase of voltage.

(Editorial: The given conclusion made by the author seemed to be well grounded in 1932. But modern electrical engineering applies ceramic dielectrics with permeability of several tens thousands, up to 100,000! Use of such dielectrical materials allows to change capacitance within the high limits with small sizes of the system. The power can be 100,000 times more!)

However, the dielectric rigidity of air in normal conditions (30000 v/cm) is far from being enough to produce any perceptible power. For example, let's calculate the power, which can be received from the experimental model of capacitive parametrical alternator described above.

For example, stator of alternating condenser, which is the main element of alternator, consists of 26 disks of 28,5 cm in diameter. Every disk is divided into 16 sectors, whereas rotor of this condenser has 25 similar disks. The distance between adjacent disks is equal to 2 mm. The frequency of capacitance change is equal to 5000 under 3000 rpm. Assuming the permissible voltage to be 5000 V, we receive the power of 22,4 Watt, i.e. technically negligible value. The only way out to increase power is the increase of permissible voltage, i.e. the increase of dielectric rigidity of medium. There are two ways to do it.
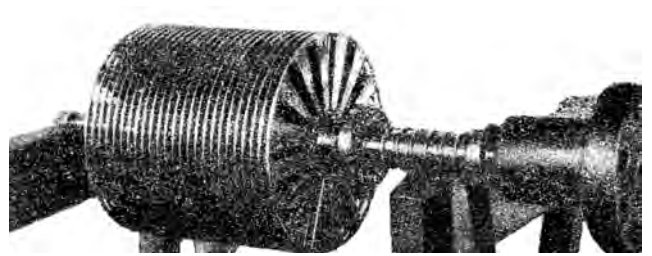

Fig. 2. Rotor of capacitive parametrical generator.

(Editorial: We had already mentioned that it is possible to use modern high permittivity ceramic dielectrics to modulate the capacitance. Estimated output power increase in tens thousands times, i.e. it can be about 100 kWatt with the same sizes.)

At first we will consider one of them, which is the placement of alternating condenser into the gas medium with increased pressure. Since disruptive voltage of gases, in the limits of adequacy of Pashen's law, increases with the increase of pressure, then in our case it is possible to increase working voltage significantly by increase of pressure. So, for example, if we increase pressure up to 20 atm., then disruptive voltage will increase up to 16 times [17], and therefore power (with the same safety factor) will increase in 250 times. **This will give us about 5,6 KWatt for the model of capacitance alternator considered here, i.e. it is a value, which can be interesting for techniques.** With further increase of pressure we can allow the higher voltages. According to the last data by P.M. Goldman [21], it is possible to provide the gradients of voltage up to 10^6 v/cm in gases under the pressure of 70-80 kg/cm^2. **It would allow to receive the power of about 22 kWt from the given model of parametrical alternator.** If we take these data as a basis, then the calculation shows that it is possible to make capacitive parametrical alternators of higher power (tens thousands kWatt) with the sizes, which not exceed the sizes of usual powerful alternators.

But we should keep in mind that the given quantitative data relating disruptive voltage under the higher pressure concern experiments with gases in the rest state, whereas at the capacitive parametrical generation the question is about disruptive voltage in gas medium, which is in very quick chaotic motion. Besides, it is a case of nonuniform electrical field, which can be significant for the value of permissible voltages according to the data in literature [22].

To find out in experiment, how all these circumstances influenced the dependence of working voltage on pressure and in what extent the increase of pressure can be used to increase the power of capacitive parametrical alternator, **we have designed an experimental model of alternating condenser**. This condenser rotates in the medium with variable pressure, which could be changes at value. As it was noted above, the stator of condenser is a system of fixed condenser plates, whereas rotor is the system of its moving plates. Since stator and rotor plates have 16 openings each, which are symmetrically located by periphery, then with

3000 rpm the frequency of capacitance change will be 800 Hz and frequency of generated current will be 400 Hz.

Condenser is placed in the steel casing. A gas, perfectly dried before, can be delivered to this casing from compressors or from compressed-gas flasks.

To follow conditions of autoexcitation, we connected a reaction-type coil to the alternating condenser. Inductance of this coil is 27,4 Henry and it was selected in such a way that the circuit, which consists of condenser, coil and load resistance, was tuned up to the frequency of about 400 Hz. A general scheme of generator is shown on the Fig. 3.
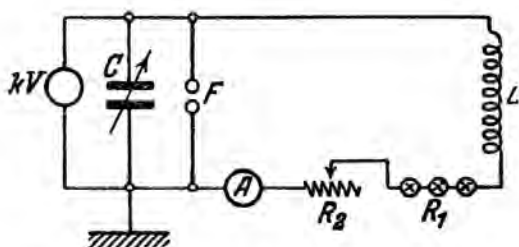

Fig. 3.

On the Fig. 3 *C* is an alternating condenser described above, *F* is a ball discharger connected in parallel to the condenser, *L* is a reaction-type coil to tune the circuit in resonance at the required frequency, *R* is a lamp rheostat and P is a smooth rheostat of Rustrate type. Results of some measurements made by Rzyankin L.G. and Martynov A.M. showed that disruptive voltage in alternating condenser with rotation of the rotor of 300 rpm increases continuously and smoothly with increase of gas pressure (air pressure). According to this process, the working voltage of generator also grows as well as its power. Due to the insufficient compression in the place where rotor shaft goes out from casing, it was impossible to increase pressure more than 12-13 kg/cm^3. The insufficient precision of condenser plates making and assembling significantly decreased the disruptive voltage.

The useful power obtained with the pressure of 12,5 kg/cm^3 was about 560 Watt with the voltage of 21 kV. Electrical efficiency was more than 92%.

Another possible way to increase the power of capacitive generator by means of increase of permissible voltage is to use vacuum as an isolator. Vacuum as an isolator is ideal in many respects, that's why technicians and physicists have been seeking for the way to solve this attractive and promising wonders problem for a long time. They tried to do it both in our country (academician N.N. Semyonov) and abroad (Metro-Wikkers laboratory and others). However, to present day this problem was not already solved. Particularly complex practical problem was to provide sufficiently high stable vacuum in the medium, in which there are big metal masses and especially (as it is in electrical devices) when them move with a high velocity. Results of the recent works on using of vacuum as an isolator (Van-de-Graaf [19], Tramp [20]) allow to consider

that this question moved from the field of laboratory developments to the field of technical conversion.

Electrostatic generator on vacuum at 100 kV (it is about 2 kWatt power) designed by Tramp and working on the principle of usual electrostatic device, shows that there are grounds to speak about a possibility to create capacitive parametrical generator of significant power with vacuum as an isolator.

If we proceed from the gradients of voltage in vacuum already received by Tramp [20], then it seems to be possible to realize capacitive parametrical alternator, which in its power can be compared well with usual alternators. There are high profits from using vacuum as an isolator. There are no losses in dielectric, **there are no mechanical losses in the process of rotation,** and there is no necessity in heat removal. **All this undoubtedly increases the efficiency** and is also profitable in design.

A very profitable aspect of capacitive generator is a possibility to provide very or almost limit efficiency (more than 99%).

(Editorial: It is evident that the author keeps back here, but it was impossible to make a conclusion on possible more than 100% efficiency in 1932 during his official work in Academy of Sciences. In reality, the motor (drive) consumes the power only to rotate, and this power is not connected with the value of output power. With high-quality design making of generator and increase of its size, the output power can be much more than the power consumed by the motor. Transformation of environmental heat into electricity is a source of excessive power).

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anomalous effects for such Bose condensates as superconductors. In my opinion it is a particular case of discussed above technology of longitudinal waves in aether due to possibility of transformation of transverse electromagnetic waves in longitudinal waves in the superconductors. This transformation in plasma is a well known physical mechanism.

More facts to prove this idea: by Woodward [9] there is a special requirement, i.e. the frequency of mechanical vibrations should be twice the frequency of electrical oscillations in the capacitor, which demonstrates the weight anomalies. But from the other hand it is a common rule for creation of longitudinal weaves in plasma! Also it is a necessary condition for generation of parametrical oscillations! So, we can assume that basis of the effects in [1] and [9] is a generation of longitudinal wave in aether.

Conclusion

Any element of matter can be considered as resonance process of aether oscillations, which are longitudinal waves. There is an analogy with description of these longitudinal waves and well-known matter waves by de Broighl. Experimenting on the longitudinal waves generation and especially experiments on standing waves to get gradient of aether pressure allows to develop gravity control technology.

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Gerlovin's Theory of Activation

Alexander V. Frolov

It is a review of the famous book by Ilia L. Gerlovin "Basis of unified theory of all interactions in matter" published in 1990, St.Petersburg, Russia. We hope this article let you discover some new aspects of physical vacuum structure to develop more new experimental methods. Comments made by Alexander V. Frolov, Editor.

In [1] the author wrote about different methods to activate water solutions: mechanical, thermal, acoustic, magnetic and electrical. One of the known methods is an activation by means of electrohydraulic method. There is also some information about activation of other mediums, mainly liquids, but also some gases and solid bodies.

There are no theoretical explanations of these facts to explain all aspects of these phenomena. Furthermore, complexity of interpretation of these phenomena in frames of common physical notions induced some scientists to announce these phenomena as non-existing and "illegal".

Ilia L. Gerlovin formulated the physical principles of theory of activation of mediums on the basis of new physical theory, the Theory of Fundamental Field (TFF).

These principles are based on his two important conclusions from the TFF:

a) "Space around us is not empty, physical vacuum consists of material physical objects, i.e. elementary particles of vacuum (EPV). These particles are responsible for main activation processes;

b) Force interactions between atoms in molecule, between molecules in crystals has not spherical symmetry in the crystals of solid bodies, but an axial symmetry and the interactions are changing in time with very high frequency of about 10^{18} Hz. This feature of force interactions also makes its own contribution to the activation of mediums." [1, p. 314]

So, it was assumed that the phenomenon of activation of mediums can be defined as anisotropy of force interactions, which leads to **"meta-stable state, which can be called *structurally activated state of the given structure"*.**

Here is some difference in principle between chemical term "activation", which characterizes a transformation of molecule or atom in some active state with an increased energy, which is sufficient to provide a chemical reaction. It is *energy activation.* **Gerlovin described new notion, a *structural activation:* "This phenomenon can be classified as some change of structure of activation object. With this, energy of molecule can have no changes, and *active properties***

of molecule are determined only by the change of its inner structure" **[1]**.

According to the Gerlovin's TFF, only in nuclear matter and may be in neutron stars there are no EPV since they were displaced: "There are a lot of particles of vacuum in atom between nucleus and electrons of the shell. Besides, if in free vacuum there are about one particle to 800 of spontaneously disturbed EPV, then in atom there are much more particles due to the influence of nucleus. For example, there are about 10^7 EPV in the atom of hydrogen. Of course, they play a big role in atom. Particularly, a continuos process of interaction between electrons of atomic orbits and EPV leads to the main quantum properties of electron in atom, for example, it reduces its classical trajectory." Editor's: In some articles, for example in the research by Alexander Chernetsky, the name "virtual particles of vacuum" is used instead of EPV.

It is clear, that there are also a lot of EPV between atoms of molecule and in crystals. By Gerlovin, the concentration of EPV in electron-positron vacuum has an order of 10^{29} particles in $1cm^3$, and the concentration of particles in proton-antiproton vacuum has an order of 10^{39} particles in $1cm^3$. Of course, it is concentration, but not density. It is important note, since **EPV in atom, molecules and crystals do not increase the density of substance.** It happens because the non-disturbed (un-appeared) EPV are massless by Gerlovin: "EPV appears as a result of interactions between particles and antiparticles, for example, positron and electron. With this, the defect of mass is equal to the total mass of initial particles. That's why after the interaction between particles all mass is consumed for binding energy, and EPV formed by this reaction has no mass. Before the TFF this reaction was called an *annihilation,* and they considered that particles disappeared and called two photons in vacuum. According to the TFF, they formed EPV and called a disturbance in surrounding vacuum, which is spread in vacuum as photons." *Editor's note: This aspect (new understanding of annihilation) can be developed in conception of multipolarity [2].*

Of course, we cannot understand many properties of elementary particles and matter, which was formed by them, without taking EPV into consideration. Many properties of physical vacuum were greatly guessed by Einstein, Shredinger, Dirac and other founders of modern physics. But these properties were not enough to solve all questions. It was necessary to understand the mechanism, which leads to the main laws of quantum and relativist theories. **The author of TFF did it mainly due to the introduction of two new notions of structured physical vacuum and structure of EPV. The least creates an anisotropy of the properties of force field. By means of this field all EPV interact between each other.**

The TFF is a theory of two physical objects, EPV and EP (elementary particle). But anisotropy of the force field of elementary particles manifests not only in the nucleus of atom and atom itself, but also in molecules, crystals and condensed mediums (liquids and solid bodies). It is shown by the author, for example, that **anisotropy of force field of an electron is responsible for the fact of crystal formation**, and the same anisotropy and particular properties of EPV are responsible for many properties of solid bodies.

*Editor's note: **It is possible to say that this anisotropy of force fields is a structure of space itself [2].***

Thus, the property of main "bricks" of our Universe, EP and EPV, to keep and manifest many properties in the systems, which consist of huge number of these particles, put on the agenda the possibility of direct use of the TFF results to study nuclei of atoms, atoms, molecules, crystals, liquid and solid bodies (this property was firstly discovered in the frames of the TFF theory). Such possibility exists even in the case, when formation of the theory of phenomenon involved is still not finished. Phenomenon of medium activation is just this case and we can use TTF for new experimental methodic.

Since all atomic shells consist of electrons, then force fields of these electrons with the assistance of disturbed EPV create wide range of forces, which are considered in chemistry and physical chemistry. These forces are: forces of chemical affinity, inter-atomic forces in molecules, forces, which create and enforce crystals, adhesion forces and so on. That's why it is not surprising that structural activation occasionally found by many researches.

The author calculated following quantity of EPV in spontaneous free disturbed state (on average):

$$n_v = \frac{\alpha}{\pi} n_w \qquad (1)$$

where n_w is the total quantity of EPV in the unit of volume; α is dimensionless constant, which is called the constant of fine structure and numerically equal to $7{,}29735 \cdot 10^{-3}$ or $1/137$.

*Editor's note: From this formula (1) we can assume that the fine structure constant **α** is a factor, which related with activity of EPV. In N. Kozyrev's theory of time [3] this constant **α** is a connection between speed of light **c** and velocity of the "time course" **v_2** , i.e. with real rate of processes:*

$$v_2 = c/137 \qquad (2)$$

*Kozyrev's notion of the "density of time" can be correlated here with the ratio between numbers of activated (disturbed) EPV n_v and total quantity of EPV n_w in some volume of space. Then the notion of "density of ether" [4] can be used to solve some practical tasks. **So, Gerlovin's TFF allow us to obtain more clear physical sense of the fine structure constant and its connection with notions of time and ether!***

The author [1] lets us some examples of experimenting: Qualitatively, the phenomenon of activation of pure liquid, particularly water, is a phenomenon of the following kind. As it was mentioned above, there are a lot of EPV in water together with molecules of water itself.
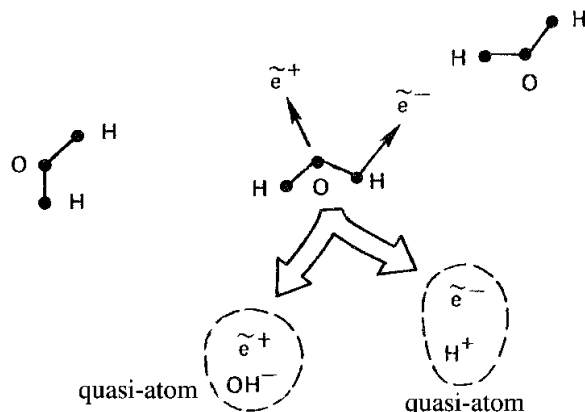

Fig.1. Scheme of water dissociation

The strongest influence from dipole of EPV will be made to the bound between two oppositely charged atoms H and O, that's why molecule of water H_2O will be broken by disturbed EPV on two ions, OH^- and H^+.

The authors wrote: "Of course, ions join to the virtual electron and positron and form quasi-molecules $H^+_e{}^-$ and $OH^-_e{}^+$. It is interesting that these quasi-molecules should have acidic $H^+_e{}^-$ and alkaline $OH^-_e{}^+$ properties, and at the same time not to be acid or alkali by their chemical composition. If we neglect the existence of disturbed EPV, then dissociated water will be usual water H_2O, but it will be partially dissociated on ions." [1, p. 320]

As we can see, the mechanism of water dissociation described above significantly differs from the prevailing notion about electrolytic dissociation as a process of bond splitting as a result of interaction between the dissociating substance with molecules of medium. In chemistry the process of dissociation of pure mediums usually is called the process spontaneous decay of substance on ions under the action of solvation forces (interaction with the medium). The forces, which influence on this process, usually are not taken into consideration. So, Gerlovin is the first author who described this special mechanism of water dissociation.
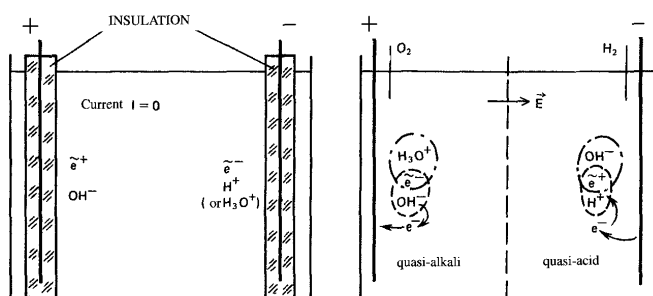

Fig.2 Left side: current is equal to zero.
Right side: current is not equal to zero.

All said above will help to understand the essence of current-less activation of water and its solutions better.

The authors [1, p.321] noted that modification of the method of current-less activation, in which one electrode is isolated from water and another one is not isolated, significantly changes the course of activation process, though **in this case current does not pass between the electrodes and the process is current-less.** In this case the influence of the electrode, which directly contacts with water, on the process of activation and on extent of water activation near non-insulated electrode will be much more. In this case all water will be strongly activated by some certain property: it will be a *quasi-acid* with non-insulated negative electrode and a *quasi-alkali* with non-insulated positive electrode. The authors noted: "if we do not eliminate water, which contacts with non-insulated electrode, in some proper time, then diffusions will lead to the case that activation will disappear comparably soon" [1, p.322].

Another important aspect: "The role of semi-permeable membrane is reduced to the inhibition of diffusion process for the formed fractions. This role can be successfully performed by very high voltage electrodes, which are insulated in depth. These are some kind of grids, which play the same role as grids in lamp triodes." [1, p. 323]

To prove his theory, the author [1, p. 333] considered some questions of physical nature of structural water activation by the example of electrochemical water activation. It is known that the most widespread method of activation is a method of ***catalysis.*** **The author believes that this method is one of special cases of structural activation.** From this point of view, catalysis is a method of structural activation by means of fields, which were formed by molecules of activator (catalyst), of chemical reagent molecules, which takes part in reaction. Such approach to the nature of catalysis explains all its peculiarities. It becomes clear, why molecules of activator should take part in reaction and why activator shouldn't spend its energy for activation process.

Editor's: Why is it important to consider the structural activation in details? Main aspect is energy aspect. ***It is not necessary to spent energy (in ideal design) to produce the structural activation, but then it is possible to use these changes as free energy source.***

In conclusion, let's note some other known methods of structural activation by Gerlovin:

1. Activation by electrical and magnetic direct, alternating and impulse fields;

2. Activation by mechanical splitting, centrifugation or processing by disintegrator;

3. Activation by electrohydraulic impact;

4. Activation by ultrasound;

5. Laser activation;

6.   Activation by nuclear magnetic resonance;

7.   Activation by electronic paramagnetic resonance;

8.   Activation by electrochemical force.

All these methods can be used as possible way to high efficient energy systems. Gerlovin wrote: "Usually 1, 6 and 7-th methods of structural activation are realized in catalysis simultaneously. Besides, catalysis differs from macroscopic methods because it has the most minimal distances from the sources of activator fields to the activated molecules. And finally, an active participation of force fields created by nuclei of atoms and significantly more active participation of disturbed EPV is possible in catalysis. That's why catalysis is the most effective method of structural activation. The detailed account of this method exceeds the limits of this article and we can only annotate it." [1, p.333]

Information stated above is only a small part of the questions appeared under consideration in Gerlovin's theory of fundamental field (TFF). Other important questions should be considered with a new experimental data.

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Antigravitation Force and Antigravitation of Matter. Methods of its Creation

Anatoly K. Gaponov

Sadovaya Str. 195, Novosibirsk, 630009, Russia

Part I

For a long time there is an opinion in physics about antimatter as a possible source of antigravitation, but the researches on this subject came into a dead end. The existent presentations and formulas forbade the conclusion about antigravitation, but our conducted investigations brought us to the possibility to get antigravitation of substance and to the paradoxical conclusions concerning the next:

1. Two types of space exist:
  a) The Absolute space
  b) The Relative space

2.a The Gravitation Field is the relative space, which has accelerated motion, directed to the center of a planet.

2.b The Antigravitation Field is the relative space, which has accelerated motion, directed from the center of a planet.

3. Gravity force does not depend on mass of a body! The mass can be presented in three versions:

a) m_k –mass as amount of atoms.

b) $W_{m_A^e}$ - electronic-atomic energy in mass.

c) $W_{m_G^m}$ – mechano-gravitational energy in mass.

On the basis of the stated notions we offer to revise the essence of force not only in Coulomb's formula, but in Newton's formula too.

$$F = K \frac{q_1 \cdot q_2}{R^2} \qquad F = P \frac{m_1 \cdot m_2}{R^2}$$

It is well known, that mechanical energy can be bringing in electrostatic charge, where mechanical energy runs (turns) into energy of electric field, where

(mechanical energy) $F \cdot R \rightarrow \dfrac{E_2 \cdot V_{m^3}}{2}$ (electrical energy)

Similarly it is also possible to insert mechanical energy into mass of a body. As the result, the mechanical energy will turn into energy of gravitational field, where

(mechanical energy) $V \cdot F \cdot t \rightarrow \dfrac{g^2 \cdot V_{m^3}}{2}$ (gravitational energy)

Since the volume of the Earth is constant, the acceleration of gravitational field will be increased.

It should be logical to expect, that when removing the mechanical energy from mass the inverse process will occur, that is to say acceleration reduction of gravitation field will occur.

In his works I. Newton affirmed about existence of two spaces:

The Absolute space - is an immovable non-rotatable space, which represents a limited cube, with our planet in the center.

The Relative space – is a movable space. It can move with acceleration in the absolute space.

Editor's note: In aether conception this means two parts of aether: some part is involved into the motion with the mass, but another part of aether is immovable.

The main mistake in search of aether consisted in the following: Maikelson's experiments were aimed on