New Energy Technologies

Acad. Oleg Gritskevich's Hydro Magnetic Dynamo: 1500 KWt power without any fuel!

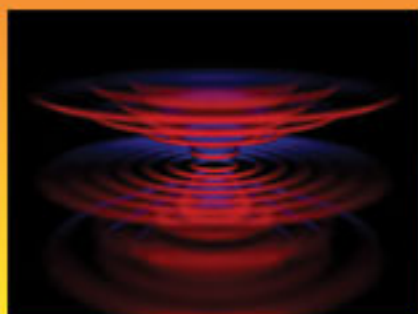### Also in this issue:

* The Centre of The Universe is discovered!
* Rythmodynamics by Yuri N. Ivanov
* Longitudinal waves by Dr. Butusov
* Magnetic monopoles, Dr. Shakhparonov
* Direct "heat - electricity" conversion

Photo from Raum und Zeit http://www.raum-und-zeit.com/

New energy source created in Germany!
Theory by Dr. Oleg M. Kalinin, St.Petersburg, Russia

Axion fields by Alexander Shpilman

Small converter by S. M. Godin and V. V.Rochtchin

Fig.2 Side view

Fig.3 Rotor and rollers

Fig.1 General view Rmx=59 mm
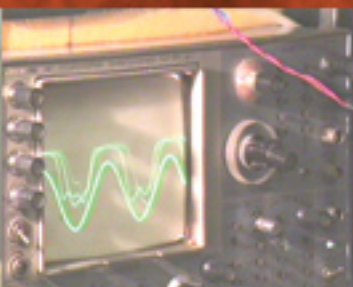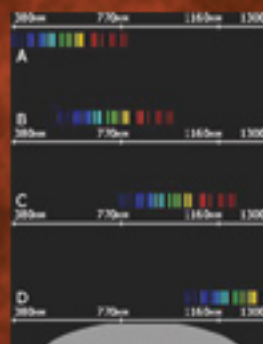
Fig.4 Lab setup

Fig.5 Optron sensor

Fig.6 Signal from the sensor

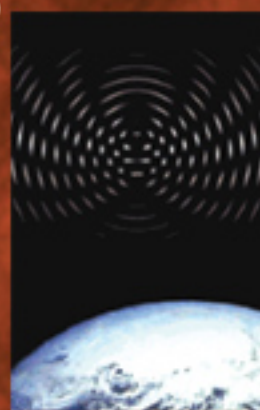# Rythmodynamics by Dr. Yu. N. Ivanov, Moscow

Moessbauer effects

Spectral lines of different systems.

Atoms are multidistant from the surface. Difference in frequencies leads to the apperance of so called "spider-effect", i.e. to the deformation of general interference field and to deformation of internal connections.

Spider-effect

Frequency space

Hypothetical example with two black holes. Observers D and D´ are invisible to A due to the big difference of their frequency characteristics.

Single-wire electric power systems

Prof. Strebkov published two articles on single-wire power transmission in previous issue. We'll continue this topic in our magazine.

You can contact with this research group:
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Email: energy@viesh.msk.su

Prof. Dmitry S. Strebkov

In the middle of two magnets with the opposite poles (situated in one plane) the total vectorial magnetic field is equal to zero, that is proved by the absence of magnetic interaction between magnets and the ferromagnetic material. This ferromagnetic material is placed to the space, where the usual magnetic field is equal to zero. However, in the space, where the total vectorial magnetic field of two magnets is equal to zero, the total value of scalar magnetic field of two magnets is maximal. In spite of the fact, that the scalar magnetic field between the magnets is maximal, this field do not interact with ferromagnetic materials. That is why the ferromagnetic material on the tray is not attracted to the magnets. However if we create electrical currents (or equivalent Amper's currents of this double magnet) in this space, where usual magnetic field is equal to zero, than under the action of longitudinal magnetic interaction of these currents with the total scalar magnetic field of the magnets the forces of attraction or repulsion appear.

Acad. Gennady Nikolaev
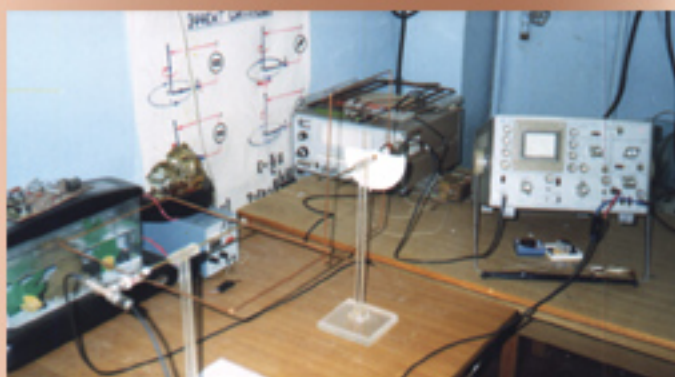**Tomsk, Russia**
nikolaev@mail.tomsknet.ru
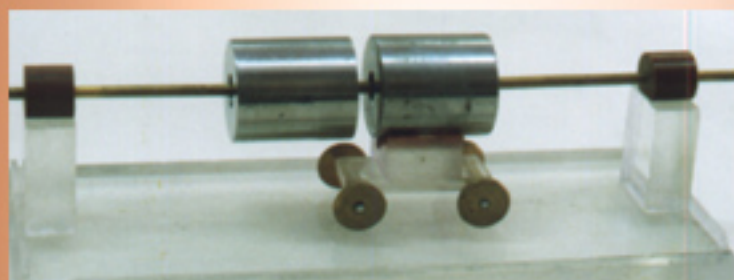
It is a device to demonstrate the interaction of scalar magnetic fields between each other. The constant current is created through the axis of two toroids made of ferromagnetic material (Armco). The whole usual magnetic field is concentrated only inside the toroids. That is why the toroids should not interact. However, there are the scalar magnetic fields unequal to zero outside the toroids. The toroids are attracted to each other under the action of these fields.

This device demonstrates forces of longitudinal magnetic interaction. Usual magnetic fields are compensated in the space between two flat magnets, while the scalar magnetic fields have the maximal value. The liquid conductor (bismuth-alloy) is placed in this space. There is an electric current. The longitudinal forces act on the current in the conductor. The level of liquid in vertical channels increases from one side and decreases from the other side under this action. With the change of direction of current the levels of liquid in the channels will change to the opposite one.

"Magnetic potential hole". There are forces of longitudinal magnetic repulsion between two magnets attracting to each other (or between two circuits with the current) as well as the forces of transverse magnetic attraction. According to well known theoretical notions about one magnetic field it is not possible to create a magnetic potential hole in the static magnetic fields. But using the properties of scalar magnetic field we will be able to realize the conditions of magnetic potential hole.

It is a device to demonstrate the existence of longitudinal electromagnetic waves. Two loop antennas are emitting the antipodal waves. That is why the total signal of transverse electromagnetic waves in the plane between the loops is equal to zero. However, the longitudinal electromagnetic waves have the maximal value in the plane between the loops. These waves are easily registered by the loop antennas, even in spite of the fact, that the plane of the loop antennas appears to be perpendicular to the plane of polarization vector of transverse electromagnetic waves. Any registration of transverse electromagnetic waves is impossible in this case.

One more experiment on the longitudinal waves

Spin field generators

Designed by Alexander Shpilman
Kazakhstan Republic

Powerful and portable axion (spin) field generator COMFORT - 7 for experiments in your laboratory. It is a new possibility to develop research in this amazing direction of science.

It is a unique method for changing of the usual properties of materials, for example, the hardness of metals. Effective control of the spin orientation in the materials is possible. New biological experiments can be produced since the field have an influence on "vital energy" of plants and seeds.

Research works with some animals demonstrated a real improvement of their immune system.

## EXPERIMENTS ON INFLUENCE OF AXION RADIATION ON HARDNESS OF METAL

The influence of axion radiation (AR) on the hardness (microhardness) of ferricarbonic alloys was studied in the given research. Measurement of hardness was made by means of the equipment PMT-3. The change of hardness values during the influence of AR in comparison with the initial state of iron took place practically in all cases. For steel 08J (C=0.08% of weight, annealed, sheet) the decrease of hardness was observed at - 6%, i.e. weakening of metal took place. For the high-carbon alloys (Steel U-8 C=0.8% of weight, cast iron) the increase of hardness took place at 27.0%. Experiment with the cast iron (C>2.5%) demonstrated the increase of hardness +31.0. Thus, it was discovered that Axion Field influences the atomic - crystalline state of ferricarbonic alloys mainly due to interaction with carbon, and it was proved by the change of hardness.

One more experiment was produced in laboratory of materials, Chemistry Metallurgy Institute of Academy of Science, Kazakhstan Republic.

№	Sort of cast iron	Hardness	change
1	Pearlitic phase before the radiation	416,0	
2	Pearlitic phase after the radiation	478,2	15%
3	Cementit congl. before the radiation	1524,1	
4	Cementit congl. after the radiation	1794,8	17,8%
5	Cementit plast. before the radiation	1711,6	
6	Cementit plast. after the radiation	1670,5	- 2,4%

Experiments on axion fields give the new possibilities to your business!
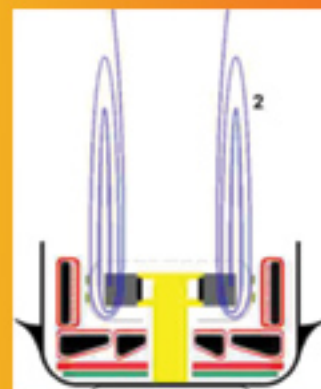
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The generator can be powered from 220/127 VAC or 12 VDC source

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KOZYREV-DIRAC EMANATION.

INTERACTION WITH MATTER and METHODS OF DETECTING

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In this paper the authors show the possibility of creation of a new kind of emanation. The magnetic monopole beam can be made in space as a result of focusing of some natural substance. Special devices based on the Moebius band elements make the given focusing. This emanation is able to magnetize graphite and organics, decrease the radioactivity, and influence the oncology diseases .The time reverse technology is realized in such devices.

Experimental data, which allow making a conclusion about existence of previously unknown emanation, are presented in this report. Here are descriptions of experiments and methods of measurement. The effects of interaction between new type of emanation and matter have been obtained.

Till the present moment theoretical physics didn't pay attention to the nonoriented configurations and spaces. The reason of this situation is the fact, that from the philosophic point of view it is not possible to determine and locate the area of the nonoriented topological structures in our world. We (eight scientific teams) joined our forces and we needed more than 30 years to solve this problem by an experimental approach.

The fundamental tenet of the casual mechanics developed by Kozyrev can be formulated as follows. There are two types of energy in the Universe. The positive or «right» energy acts as a factor of the entropy increase. The negative, or «left» energy tends to decrease the entropy, i.e. it acts as a factor, which regulates the entropy increase. The «right» energy is transformed to the «left» one and this fact may be interpreted as a course of time from the past to the future. When the energy is transformed from the «left» to the «right» form, time is reversed. Kozyrev supposed [1] that through revolving of a body together with a

coordinate system along a circumference the right coordinate system is transformed to the left one at the moment, when the body reaches the point situated at the opposite side of the diameter. For example, let us take a cylinder (a wall of the width h) and let us move

the right coordinate system presented by three vectors along the external surface of the cylinder. We can see that in the case of such a motion the mirror image cannot be obtained. (Fig. 1, left)
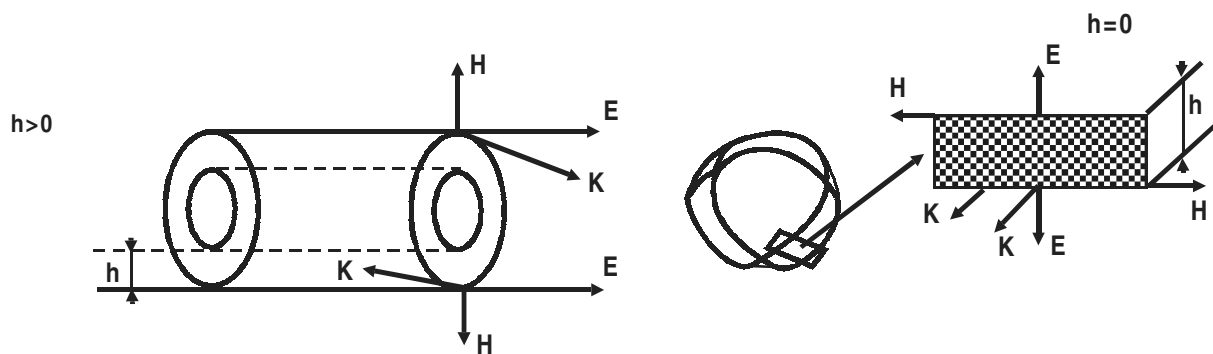

Fig.1

We can also proceed with the same operation after having bisected the cylinder and then rotate one of the edges of the obtained strip at the angle of 180° and splice it with the other end. The geometric figure obtained in such a manner is called the one-sided cylinder or the Moebius band (MB). In this case we have got the full inversion of the vectors E and H without having changed the direction of the propagation (Fig. 1, right). This property of the MB results in the fact, that in contrast with the oriented cylinder (whose

width $h > 0$) the width of the wall of the nonoriented cylinder is equal to zero (h = 0). The so called «short circuit» of the space is produced in such a manner. Due to this property one can observe the phenomenon of the super permeability, when one body can penetrate into another body without any interaction [2]. We can also expect, that the signal sent from a point to another point under the condition of $h = 0$ will immediately reach the receiver. Now let us give an explanation of such a property as the nonorientability (Fig. 2).
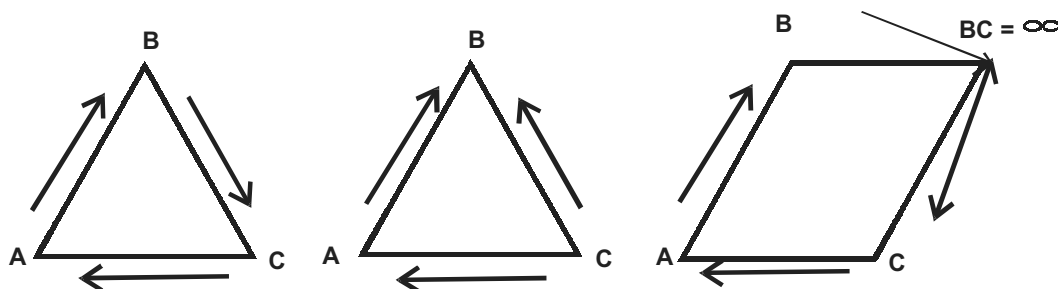
Fig. 2

Let us suppose that we move along the sides of a triangle ABC without changing the direction of motion. We can obtain a closed loop through such movement. This loop will be destroyed if we introduce the counter-motion (motion in the opposite direction), for example along the side CB. In this situation the loop can be restored by introducing of the motion B - C, that is equivalent to the increase of the spatial dimensionality.

Taking this fact into account, we can conclude that nonoriented figures may be considered as intermediary ones between 2, 3 or 4- space dimensions, depending on the dimensionality of the initial nonoreinted figure. The entrance in the 4th dimension automatically means the disturbance of the space metric and it should result in the appearance of a gravitational field. In order to make the idea clear let us proceed with the consideration of the MB step by step (Fig. 3)
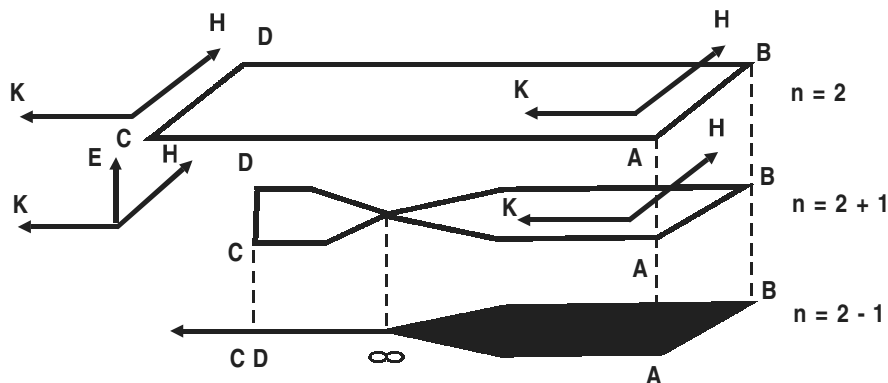
Fig. 3

At the beginning we have the initial strip ABCD. Let us turn CD around AB at the angle of 90° and then make a projection of it on the surface. The rotation of the edge of this strip automatically transforms the figure so that it enters the dimension 2 + 1. The projection of the transformed figure has the dimension 2 - 1. Besides, the «density» of the straight line is considerably increased. If we proceed with the rotation of the strip, so we'll obtain a twisted figure. By projecting this twisted figure on the surface (Fig. 4) we'll demonstrate the complete inversion of a pair of vectors. Having splices the edges of the twisted figure we'll obtain the MB.

Fig. 4

Having considered this design we can conclude, that for real MB models the electromagnetic fields, which have negative energy, will appear. Exactly in this case, when the synthesis of the magn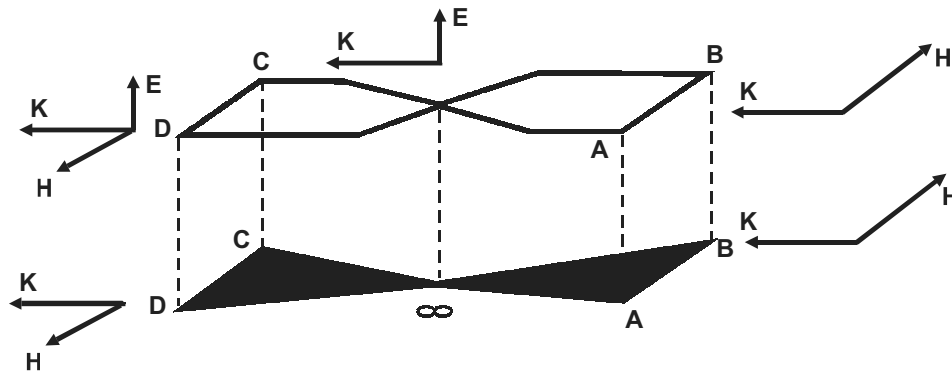etic monopole (Mon) is possible, it will be the antipode of the electric monopole (electron) in our «positive» space. By contrast with spiral (helicoidal) movement along the surface of the cylinder, for the case of nonoriented figures such trajectories are transformed into closed knotted curves. The topology of such a field is presented on the Fig. 5 [3]. If the field is a magnetic one (that inevitably occurs, when the electric current exists in the surface layer of a conductive MB model) the obtained topological construction demonstrates the magnetic monopole structure. Really, it is similar to a dandelion flower with a dense central stem. That is why the MB can generate two types of such formations: luminous («positive» energy) and black («negative» energy).

a projective plane is created by the matching of the opposite points of spherical surfaces. This property can be explained if we suppose that the nonoriented fields are primary and the oriented ones are secondary.

EXPERIMENT

The previous experiment with conductive MB models [4] was aimed on obtaining of plasma formation, which can be considered as the model of natural ball lightning. In the work [5] the strategy of experiment, the technologies of production of the MB and some results are given. The profiles of the image of a natural ball lightning and profiles of the formations obtained in laboratory are shown on the top of Fig. 6.

trajectory of electron

Fig. 5

Because of the fact that the nonoriented figures are formed by the mutual (in pairs) cruciform conjunction of the opposite points, we can notice, for example, that the one-sided torus (the Klein bottle) is formed from a half of an oriented torus; the formation of the models of

Fig. 6

The recent works were focused on the discovering of the factors, which cause the formation of such objects. As a result of this investigation a radiation of a new type was discovered. Because one MB device generates a small amount of negative energy, we continued our research with the construction of assemblies made of several MBs. At present time we created industrial

prototypes of powerful emitters of negative energy by means of the developed nanotechnologies. Fig. 7 shows the scheme of the MB assembly.

Connection of generator to MB
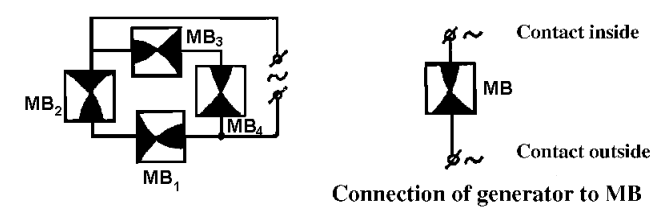
Fig. 7

In order to keep the nonorientability of the assembly as a whole, one of the elements must be produced with a reversed twist or it should be connected in series to the circuit in opposition to the other elements. Because it was expected that the assembly can generate a powerful gravitational wave, in the first experiments a single thermostatic quartz resistor shielded from electric and magnetic fields was used as a detector. Due to this quartz detector the wave, which have an unknown nature, was discovered. In this situation the acoustic wave could be mistakenly detected as a gravitational one. To determinate the nature of this wave we made 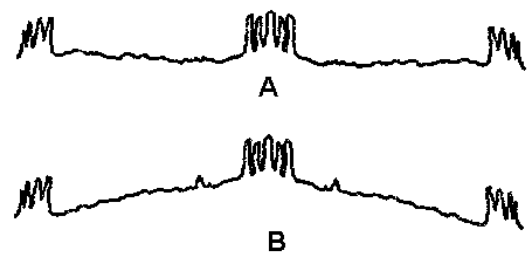an experiment on determination of its speed. It is well known, that the speed of an acoustic wave in the air is equal to 0.3 km/sec., depending on the density of the substance. The scheme of the experimental equipment is shown on the Fig.8. Two quartz detectors are situated at the distance of 1 meter from each other. The signals were transmitted from the detectors to the input of a double-gun storage oscillograph. The measurements were made for the base of 5 meters. The results of the measurements are shown in Table 1.

Derivation of gravitation wave

TABLE 1

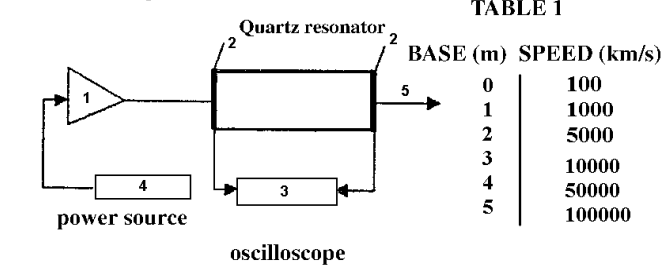| BASE (m)	SPEED (km/s)
0	100
1	1000
2	5000
3	10000
4	50000
5	100000

Fig. 8

The value of the speed of this wave allows concluding that this wave has gravitational nature. It is rather surprising, that the wave moves in the direction away from the source with some acceleration. Such a behavior can be explained by the generation of a flow of very heavy particles, which cause the distortion of space. However, the big speed of this wave cannot be considered as an absolute proof of its gravitational nature. It is desirable to make such an experiment,

which can unambiguously determine the nature of the wave and its characteristics. In theory it is known as a phenomenon of the alteration of the frequency of light wave. When the light wave approaches the gravitational field, a photon accelerates or «becomes a little more blue», but when it is moving away from a gravitational field, a photon «becomes a little more red». Such an effect can be used as a general principle for the proposed experiment. An important point is to avoid using of the complex composite optical systems, because they can possibly cause side effects and it is difficult to take them into account. That is the reason, why all the measurements should be made on the ray path. If we are able to provide the «frequency-amplitude» conversion in the optic frequency band, the problem can be solved. We can use a light filter with a sharp characteristic curve, which is compatible with the wave length of the light source as such an element (Fig. 9).
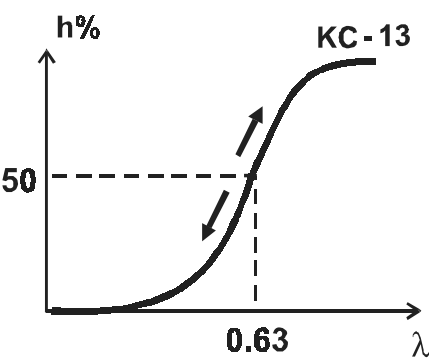
Fig. 9

The scheme of the experiment is shown on the Fig. 10. If we consider the characteristic to be the function of the distance between the light filter and the light source and the frequency of "pumping" of the MB assembly, then we can determine not only the gravitational potential, but also the value of the gravitational disturbance caused by the magnetic monopole beam. A simple calculation shows [6], that the space disturbance is equivalent to the one caused by a body of the mass of 10^{32} g, i.e. a mass only 10 times smaller, than the mass of the Sun. The experimental curves, which allow making such a conclusion, are shown on Fig. 11.

1. Laser
2. Mechanical grid
3. Translucent glass
4. Light filter
5. Blok feeder
6. Magnet Monopole Radiation
7. Oscilloscope

Distansce PB-PW = 500cm Distance between translucent glass and PB = 10cm

Fig. 10

This experiment also discovered the effect of overlight speed in vacuum (Fig. 12). The speed was measured by comparison of location of the fronts of both the working pulse and the basic (reference) pulse
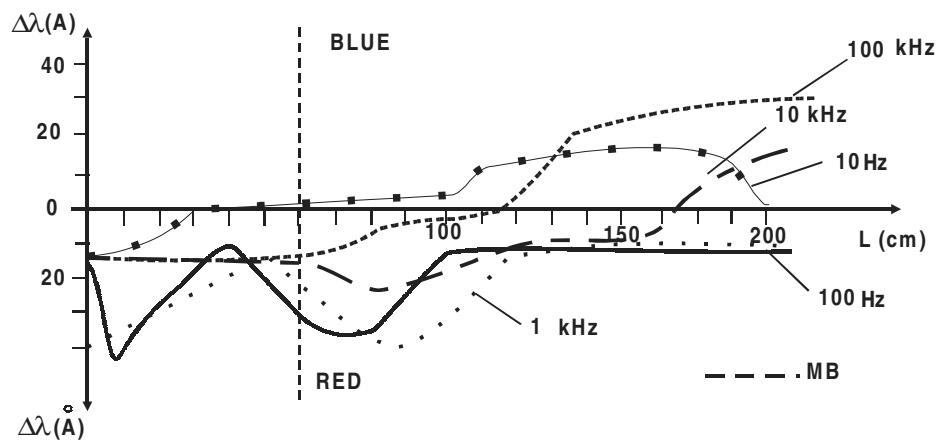
Fig. 11

(Fig. 12, A), as well as by 50% modulation of each of the pulses (Fig.12, right top). From the comparison of the lengths of the measuring base and the reference base the conclusion that the pulse front propagates faster than light can be made, which is in a good agreement with the theory [7]. Besides this, when the pulse was wholly biased relatively to the reference pulse, there was no modulation of this pulse any longer, and the pulse has changed its form (Fig.12, C) also in good agreement with the theory. When the average power of pumping of the MB assembly was increased up to 3 kW, this observation made it possible to determine, that the gravitational wave is a scalar type wave [8]. As it was mentioned above, we supposed the hypothesis that the gravitational wave is not formed by itself, but it is caused by the interaction between space and the magnetic monopole beam. It was suggested, that [9] the interaction of magnetic monopole with matter causes considerable ionization losses of energy of the magnetic monopole. Also by virtue of the fact that magnetic monopole accelerates even in weak magnetic fields it cannot reveal itself in thick layers of matter.
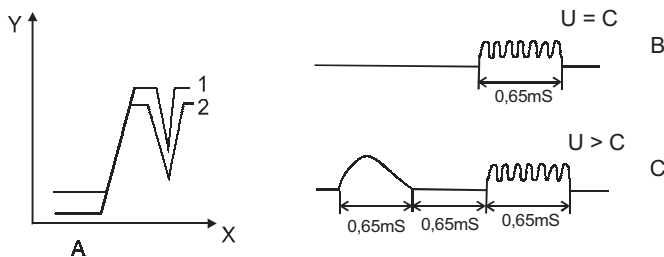
Fig. 12

In order to identify the magnetic nature of the flux of particles we used a trajectory tracking device based on the interaction with iron. The principle of magnetic monopole detecting a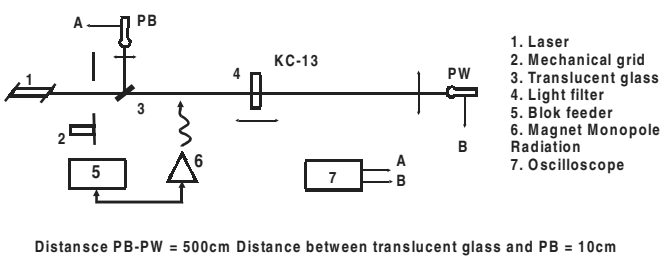nd recording of its trajectory consists of the following. It is necessary to record the harmonic signal of the frequency of 1000 Hz on a magnetic tape. Then we should expose the reel to the magnetic monopole beam and then insert it in the tape recorder. The output of the read head is connected to the input of the stored oscillograph and on the screen of oscillograph we can see the information about any changes of 1000 Hz signal. In the place, where the beam passed, distortion of the recorded signal was observed,

which proves the existence of intensive magnetic field in the place of interaction (Fig. 13). We found that the depth of the damages varies in the range from 15 mm to 150 cm. An estimated energy of the magnetic monopole beam amounted to 18-1800 GeV or even more.
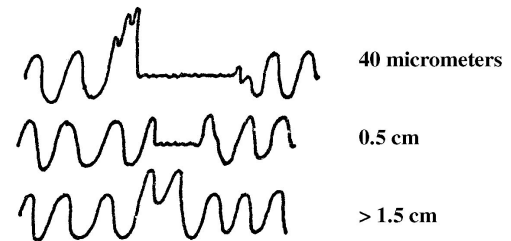
Fig. 13

The magnetic monopole beam produces some effect on different substances and radio components. In particular, when a measuring resistor was used as a detector of emanation, both the increase and decrease of its resistance were recorded. The increase of the resistance corresponded to the cooling of resistor, and the decrease corresponded to its heating. The shielding of the detector by means of a thick iron layer resulted in cooling. Changes in its resistance have a long period and they are interesting mainly for the purpose of their demonstration. And for quick measurement of the parameters of magnetic monopole beam we have made a thermocouple detector. Design of the detector and the experimental curves are shown on the Fig. 14.
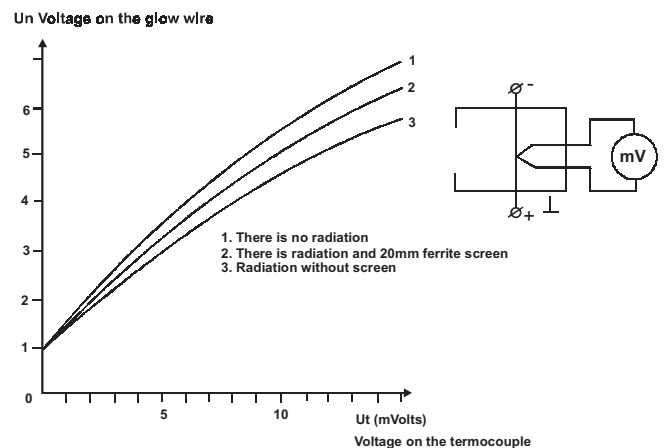
Fig 14.

Curve 2 demonstrates the cooling effect, when the beam passed through an iron screen of 20 mm width.

APPLIED RESEARCH

Also applied research was made from 1991 in parallel with fundamental research. It became possible due to the fact, that powerful and reliable magnetic monopole generators were created. It was found out, that the magnetic monopole beam passing through an organic substance transforms this substance in such a manner, that it shows paramagnetic properties in external magnetic fields of 1-1.5 Tesla intensity. The new property can be kept for a long time [5]. We succeeded

in establishing the fact, that the element responsible for the appearance of these new properties is carbon. The effect of the magnetic monopole beam both on carbon (Fig. 15) and diamond samples gave us the fact, that these samples show new properties slightly different from each other. The carbon clearly showed a soft magnetic characteristic, and the diamond showed magnetic properties only when it was attracted by a steel needle in the magnetic field (Fig. 16)
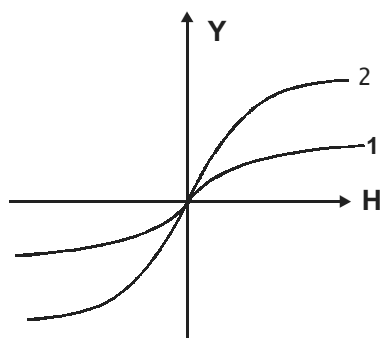
Magnetization of carbon

Adaptation 15 min

Fig. 15

1.Sm-Co magnet
2.Support
3.Balance arm
4.Diamond
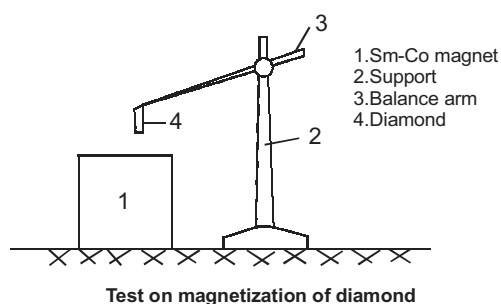
Test on magnetization of diamond

Fig. 16

At the first moment after the magnetizing of the diamond we observed the own residual magnetism of the diamond, but this property wanes and disappears in several days and the diamond remains paramagnetic. From the practical point of view it is quite interesting to identify chemical reactions taking place both in the

field of the beam and in its surroundings. We could considerably improve the quality of both juices and alcohol drinks (wine, cognac, brandy, liqueur, vodka, etc.). At the same time the new properties of the processed alcohol drinks are kept for an indefinitely long time, the production expenses are very small. Considerable success was also achieved in medicine. Research made in Oncological Center at the Academy of Medical Sciences of the Russian Federation showed, that the magnetic monopole beam is absolutely harmless for living organisms and at the same time this emanation produce positive effect during the medical treating of blood diseases. Oncological diseases may be also treated either directly by the magnetic monopole beam or accompanied by other well known means of influence. Attempts were also made [5] in order to develop methods of control on the radio nuclide decay.

CONCLUSION

Taking into account the following experimental data: phenomenon of super permeability, generation of gravitational waves, magnetizing of objects processed by the magnetic monopole beam, considerable penetration capability of the beam, phenomenon of magnetic cooling of matter by its interaction with the beam, we think, that the existence of the magnetic monopole may be considered to be the proven fact. At the same time taking into account the relation between the energies of the obtained particles and the energy spent to obtain them (300 eV) we should conclude, that our generator does not create the magnetic monopole beam, but it only produce focusing of some natural emanation.

Taking into account, that N.A. Kozyrev was the first, who observed magnetic monopole emanation in nature, and the existence of magnetic monopole was theoretically predicted by Dirac, we gave the following name to the new discovered emanation: Kozyrev-Dirac emanation.

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for one second. Thereby, on the Earth this light bulb will be on only for an instant. But if the same capacitor with light bulb is placed in rocket and dispersed around the Earth at the velocity, closed to velocity of light, time on the board of rocket will be so slowed that the light bulb on rocket will be glowing infinitely long for an observer from the Earth. It means, that in any case it is the same energy quantity, but in one case it's action is sprawling for a second, and in another one it is sprawling for eternity! It is possible to say, that in my system I have created the condition corresponding to this hypothetic rocket".

The system for accumulation of electric energy could be charged by ordinary wall plug 220 VAC. Time period of charging is different and depends on the certain scheme of the system. By the way, sea electric slopes are the certain natural analogues of such capacitor. Some elements of internal device of these sea creations reminds the "pump" elements for placing of electric energy into "temporal jar".

Finally, the third Gaponov's invention is the system for transmitting of energy without wires. As well as in two previous cases, there is an experimental device. Anatoly Gaponov speaks that he has succeeded in getting the essence of experiments for transmitting of energy, which were conducted by Tesla.

It is clear, that the main advantage of this method is an absence of wires and losses of electric energy. The electricity could be transmitted directly into any point, where receiving equipment placed, let say from Kaluga to Sahara. However, this is not so interesting for anybody, since for the present day Anatoly Gaponov's inventions don't have demand.

" The first system was created twenty years ago", - says Mr. Gaponov. – "Now I am fifty five, but things have not budged an inch". He adds dreamily: "Eh, if only I had a laboratory and some money...".

Gritskevitch's Hydro-Magnetic Dynamo

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Editorial: The article presents construction and operation of Oleg V. Gritskevitch's hydro-magnetic dynamo, which is an example of very powerful new energy system. The prototype in Armenia has been produced over 1500 KWtts power during several years.

The author was born on 14 August 1936 and grew up in Vladivostok, Russia. He is married and has a son Boris. Gritskevitch is a physicist by education. He worked in the Far - East branch of the USSR Academy of Sciences. Since 1985 he has been working independently as an inventor. He has more than 70 patents on inventions ranging from household engineering up to high technologies, which he has been trying to apply in our country and met big difficulties. After numerous attempts to receive the patents the author was convinced that outflow of the information occurred. Therefore he has received the state certificates as on know-how (on a French way of patenting), for all his inventions.

Introduction

During the Institute for New Energy 1999 Symposium, I lectured on my hydro-magnetic dynamo. This paper is my attempt to explain the construction and operation of my dynamo.

To fool investigators of my secrets, I have an occasion provided misleading information. For example, the drawing accompanying the Russian patent referenced below shows a cylinder across the toroid to fool readers. The real dynamo only has the toroid without the cylinder. Even its name "hydro-magnetic dynamo" is somewhat deliberately misleading.

I have some familiarity with the new energy field. Nearly all purported new energy devices are fairly small electrical generators. The dynamo may be the only new electrical generator which most nearly meets all the requirements of an ideal large-scaled electrical generator. My dynamo really is the single most valuable invention the world has ever known.

Alexander V. Frolov of St. Petersburg recommended me to contact with Dr. Patrick Bailey, Institute for New Energy since Pat has lots of contacts who could possibly help me with patenting my invention of a new source of energy in USA.

I conducted the work on the theory and creation of the electrostatic generator-converter «Hydro-magnetic dynamo» about 20 years. (See dynamo history below.) The first primitive equipment was created when I worked in Academy of Sciences. During that time various changes were introduced in the generator and in the theory of its work. It is now possible to manufacture, install, and apply it in industry.

For the first time I made the public report on this work in 1991 on a symposium in Volgodonsk city. The report received the positive replies and reviews of the experts of a nuclear industry in USSR. The same year I was accepted in International Nuclear Society. In these years I offered development of this technology to different state bodies and private enterprises. But there was the only answer: "It is very interesting and perspective project, but there is no money for it".

At the end of 80 years I tried to transfer this technology in USA through the embassy in Moscow. The former ambassador of USSR the Dr. J.Matlock knows about it. He wanted to meet me, but in that time there were forces which have not given to carry out my plans. Thus, I came to the conclusion to look out other possible investors. I am ready to consider any offers on cooperation: joint patenting, sale of know-how(s), creation of joint venture etc. I have 70 Russian patents including the following:

· Engine for marine courts and torpedoes without any mechanics.
· Reactors-converters of chemical elements.
· Rocket – torpedo without any mechanics.
· Weapon systems without firing pin.
· Metal powders made electrodes.
· Oil separation method. Separation of any fraction (liquid, rigid).
· Electrostatic disintegrator.
· Rigid elements based plasmatron. New heat sources.
· Steam boiler based on Runk effect.
· New truck and pin for caterpillar machines.
· Refrigerators based on electrohydraulic effect.
· Springless shock absorber.
· Energy roof for apartment houses and other patents.

Dynamo History

The beginning for this project came as a conclusion from one popular Russian magazine article (Tehnika Molodiozhi (Youth's Technique), 1972, #8, August issue, by A. Kaldamasov, entitled "Sharovaya Molniya v Zhidkosti" (Spheroidal Lightning in a Liquid)). This article came to the attention of Michail Razovsky and me in 1974. My group of volunteers and enthusiasts was looking for a new source of energy. This article served as a start-up point for the understanding of chemical-physical processes occurring in water. In 1976-1978, in the Vladivostok city hospital, in the radiological lab, me and others (Vladilen Bulgakov, radiology physician, and Michail Razovsky, theoretician in the plasma physics field) spent one year assembling a device, which was supposed to separate water into oxygen and hydrogen more efficiently. During the experiments, instead of expected results, it produced electricity very efficiently! The input power during the experiment was 800 watt water pump. The output was 1400 watts. This device was assembled using plastic pipes connected with hoses, where the water was circulating in a loop. Further this led to the idea of creating the second device as generator-toroid.

The second generator was assembled in the workshop of the Ocean Research Institute (Director Academician Viktor Ilichov) in Vladivostok, and it was transported in the summer of 1990 to the testing station of the Ministry of Electronics Industry in Vladivostok. This lab was well-equipped with all necessary sets of instruments. At the same time patent papers were filed in the USSR State Committee of Inventions. In the spring of 1991 the State Commission, led by Yurii Lebedev, chairman of the Innovation Council at the Chairman of the Russian Federation Council of Ministers arrived in Vladivostok. This commission arrived to the town for two reasons: To recommend a financial request for manufacturing the dynamo; and to classify this energy source as a "Discovery" (document #14-451).

After the next change in Russian government the financing for the project was terminated. The first article on the dynamo was published in the Russian magazine ("Tehnika Molodyozhi", 1990, #3, March issue, Page 17, entitled: "Idyei Innovatora" (Innovator's Ideas)).

Several Armenian physicists, after reading the aforementioned March 1990 article, sent me a letter requesting to meet with me in Vladivostok for negotiations about the dynamo. They arrived in March 1991 and made observations of the second generator, which was in working condition at that time. I flew to Armenia, and the work on the third generator started at the end of 1991. It was completed at the end of 1992. It was working and was producing energy until January of 1997, when it was destroyed during the war. Some people were also killed and other people further moved to USA. This version of dynamo created an output averaged 6,800 amperes at 220 volts DC. Its input power was only approximately 1% of the output power.

Then I was an invited speaker of the Meeting of the Alternative Energy Institute (Dr. Hal Fox) in Salt Lake City, August 1999. I want to note that the official announcement about my speech had several mistakes (for example, the name of Armenia was changed to Romania).

Dynamo Theory

My hydro-magnetic dynamo is a large-scaled emission-free electrical generator, which does not require external fueling. The dynamo is capable to power larger transportation vehicles such as buses, trucks, ships, locomotives, and airplanes. Doubt remains about making dynamos compact enough to power automobiles.

While three experimental prototypes have been built with Russian and Armenian expertise and equipment, a fourth demonstration prototype needs to be built with more modern Western engineering expertise and equipment to verify dynamo performance claims and to further explore the dynamo's potential capabilities. Performance claims are as follows: Dynamos are scaleable from 100 kilowatts to 1,000 megawatts. One 1000-megawatt dynamo is about the size of a two-car garage. For comparison, Hoover Dam's 17 generators have a total capacity of 2,000 megawatts. A dynamo can reliably run continuously for 25 years or more with little or no maintenance, no external fuel source, and no pollution. If a dynamo's output is 1,000,000 watts, its total input power is approximately 10,000 watts. So therefore the dynamo's energy efficiency is about 10,000%.

The source of the dynamo's huge electrical output is a nuclear reaction, which is not generally known to mainstream science. However, it is known that the dynamo produces alpha particles, which are helium

nuclei, made from fused deuterium, an isotope of hydrogen with one proton and one neutron. The electrons missing from the helium nuclei are what seem to provide a copious "sink" of electricity, and which happens to be the secret to the dynamo's ability to generate an exceptionally large amount of electricity. It is also known that the dynamo uses high-density charge clusters. High-density charge clusters are thought by some theorists to be the basis of plasma-injected transmutation of elements and also neutralization of radioactive materials. Unlike hot fusion and fission reactors, the dynamo does not accumulate any radioactive components.

The result of the dynamo's processes is conversion of electrostatic fields to direct current. I should note, that the clear understanding of the terms like "Coulomb's conversion" and also "liquid Van de Graaf generator" is very important.

Schematically, the dynamo is an electrostatic transformer, or in other words an electrostatic voltage multiplier. One version of the dynamo is designed, which uses lasers for start. There were three dynamo prototypes built. The first two small experimental prototypes were built in Vladivostok, Russia. The third and last prototype continuously generated electricity, except when turned off to incorporate improvements, from 1992 to January 1997 in Armenia.

It was mentioned above that the Armenian prototype generated a direct current of 6,800 amperes at 220 volts that is about 1.5 megawatts. Minimum power output has been 500,000 watts, and maximum power output has been 2,500,000 watts during winter experiments due to better cooling. The Armenian prototype dynamo's toroid weighed 900 kilograms and had a diameter of approximately 2 meters. Cooling water is circulated through copper pipes wrapped around the toroid. The heat is expelled from the cooling water with a heat exchanger. The working temperature was typically 36 degrees.

After a dynamo is assembled, the water is literally "jump-started" (by discharging a large bank of capacitors) to moving around the toroid. The start impulse pressure is as high as 400 atmospheres. The dynamo's controls are temporarily set to generating enough of a modest amount of electricity to sustain itself, possibly even while being transported from the factory to the place of its future operation. The control circuits are simple as only sensors and a control computer are used. We do not need any technical maintenance personnel.

For the Armenian prototype dynamo, two 10-Farad capacitor batteries were used to provide the initial water motion (acceleration and excitation of water). The capacitors were 20 kilograms each, with diameters of 50 centimeters, and were supplied from Russian military radar stations. Using a total of 20,000 Joules, 100,000 Volts with 0.05 Amperes of current were applied to the Armenian dynamo for 3 - 5 minutes to ionize and polarize

the water, which then started the generation of electricity.

The reason for the very high voltage provided by the large Russian radar capacitors, when starting the generator, appears to be to polarize the crystals of barium titanate. One comparison is with the electronic ignition on a gas stove. Once the barium titanate crystals are polarized, the generator is running.

After these capacitors had been used to "jump-start" the Armenian prototype dynamo, a battery of buffer batteries sustained continuous operation when water motion and ionizing began. This battery bank contained 8 powerful 12-volt, 150-ampere lead batteries. The Armenian dynamo's sustaining input power was 14,400 watts. The nominal maximum output power was about 1,500,000 watts. Once, the output current was accidentally increased to 40,000 amperes for almost a minute. Fortunately, the power was reduced to a safe level before the water started to boil. Internal coils (windings) provide the control of water velocity and therefore control dynamo power. The faster the water is moving, the more electricity the dynamo generates. Once the water stops circulating around the toroid, the dynamo must be "jump-started" again to a minimum power level before it can sustain its electricity generation with its own output power.

The following is a condensed summary, with some editing and additional commentary, of the "Description" of the dynamo's Russian patent IPC H 02 K 44/00 "Method of deriving of electrical energy and realization of Gritskevich's MHD-generator ".

The dynamo is a sealed polystyrene toroid filled with ultra-pure distilled water with heavy water (deuterium oxide) added. Movement of water inside the closed loop and use of unique properties of water as a polar liquid cause a release of electrical energy as an outcome of a rupture of hydrogen connections. Additional electrical energy is drawn from nuclear reactions and micro-cavity processes. The liquid is ionized, polarized, and moving around the toroid at start-up time by a running magnetic field with the help of stimulating electromagnetic windings.

Electrostatic generator-transformer "Hydro-magnetic dynamo" (GT HMD) works due to the process of amplification and maintenance of stationary (oscillating in particular) electromagnetic field by hydrodynamic movements of the conductive medium. The stator (i.e. the toroid) is made of materials with a high dielectric permittivity. Liquid rotor is a recombined water ("pure" water with high-molecular compounds), which moves due to the high-voltage discharges and running electromagnetic field.

The main processes in GT HMD are:

- ***A principle of Van-der-Graaf's electrostatic generator, where the solid insulating tape was changed to the liquid one.***

- **A perpetual washout of the surface electrons from the spacer layer takes place;**
- **The Colomb's transformations take place;**
- **A single-turn low-frequency generator works as a coaxial turn with 4 resonance points and energy carrying substance inside it that has very high resonance properties;**
- **The electrostatic breakdowns of cavitation-vacuum structures in water take place.**

The polar liquid (pure water) consists of dipoles only, i.e. strictly oriented charged molecules. During the interaction of ionized pure water with the layer $BaTiO_3$ the electrostatic field of above 10 millions volts/cm is formed. During this process the breakdown of physical vacuum takes place.

Electrostatic field coupled with action of $BaTiO_3$ layer (if we apply electrical filed to $BaTiO_3$, then this layer creates the sound vibrations of about 25000 Hz, this vibrations help to destroy the molecules of water) facilitate to the further destruction of molecular-atomic structures of water. And due to the perpetual electrostatic discharges the breakdowns in cavitation-vacuum structures occur and the reaction of cold nuclear fusion proceeds. With this fusion the energy of 500kJ/mole is liberated in vacuum and the energy of 6kJ/mole is liberated in water. Thus, new hydrogen bindings form in vacuum with the energy liberation of about 20 kJ/mole. Due to this process the acceleration of ionization of polar liquid takes place. In addition the constant "washing out" of the incomplete electron bindings from the layer of barium titanate occur, i. e. free electrons form. Due to this process the polar liquid transforms to the ordered flow of electrons and negative ions, which can be called very simply as an ionic-electric current.

Works on creation of the experimental generator were began in September 1991 in Armenia and came to an end in March 1992. The active working weight of the prototype of dynamo (torus +water) was about 900 kg. The diameter of torus was about 2 meters. Torus was made of the impact-resistance optic polysterol. This torus consisted of two halves, which were turned on the merry-go-round machine.

The monocrystallic barium titanate $BaTiO_3$ was sprayed on the internal surface of torus, its dielectric permittivity was 6000. The thickness of the layer was about 1 micron. The water was purified to the specific resistance of 18 000 000 Ohm/cm.

(Editor's: Let's remind to the reader that it is exactly a distilled water is a good dielectric with permittivity of about 81. The usual water is not a dielectric).

As we mentioned above, to start the dynamo 2 condenser jars of 10 Farad each were used. The energy of a starting battery constituted 20000 Joules, the voltage was 100,000 Volts and the current was 0.05 Ampere to provide the initial movement of water (acceleration and disturbance).

(Editor's: Let's note that such a small current can be explained by the good dielectric properties of water. Thus, it provides a high effectiveness of the system).

The electrodes were made of metal tubes with diameter of about 5 mm. The dynamo " ignites " by these electrodes. 32 electrodes were installed uniformly along the torus of generator.

The cooling system of the body of generator was a closed circuit with circulatory purified water. The cooper tubes were used in this system, which were covered with glass insulation. They also were the turns of load winding. The temperature of toroid was maintained not higher than 50 Celsius degrees.

An average output power with the load was 220 volts x 6,800 ampere = 1,490 kWatt. The current was direct. Periodically the power increased up to 2,500 kWatt, when the sufficient cooling of generator was provided.

The additional power was received from four resonance windings. This alternating current after the rectifier was used to charge the back-up battery. Thus, the total output power constituted more than 1.500.000 Watt.

The low-frequency voltage was obtained from the load windings and the direct current was obtained from the stabilization chamber.

Let's note that the high-voltage discharges of 32 electrodes ionize the partially pre-ionized water further. By means of the stimulation windings, a running magnetic field is created which moves the water in one direction inside the toroid. An electromotive force is created by the electromagnetic induction in a separate set of windings.
As we already mentioned, during the movement of the water stream, free electrons are created, and an additional energy gets emitted because of the water's friction (viscosity) against the layer coated on the inside surface of the toroid, because of electrostatic breakdowns of cavity-vacuum structures, and because of the ongoing nuclear reaction.

> **If a dynamo's output is 1,000,000 watts, its total input power is approximately 10,000 watts. So therefore the dynamo's energy efficiency is about 10,000%.**

In addition to the barium titanate deposited on the teflon-coated inner surface of the polystyrene toroid, the water itself also contains tiny barium titanate crystals which is suspended in the water. Ultrasound at 25,000 cycles per second is propagated through the water to form micro-bubbles on the surfaces of the suspended barium titanate crystals. Again due to the barium titanate's piezoelectric action, very high electrostatic fields are also developed within the micro-bubbles at the surface of the crystals. The electrons from the nuclear reaction are added to the electrons generated at the toroid's interior surface. The total amount of mono-

crystalline barium titanate in the Armenian dynamo was nearly 1000 grams.

Dynamo Economics

The dynamo's production cost is estimated at $500 per kilowatt which is competitive to nuclear power's capital costs of $5,000 per kilowatt, windmill capital costs of $4,000 per kilowatt, etc. A well-run nuclear power plant can generate power for 1.5 cents per kilowatt-hour, coal 1.8 cents, natural gas 3.4 cents, and oil 4.1 cents, on the average. The dynamo's operating cost would be approximately 0.1 cent per kilowatt-hour with no external fuel needed and without pollution.

Dynamos could replace all nuclear power plants, solar installations, wood-burning furnaces, hydro-electric dams, windmills, fossil-fueled power plants, etc. Satellites, locomotives, heavy trucks, airplanes, and ships are obvious transportation applications.

A recent IEEE Spectrum article stated that world demands for electricity increases approximately on 500 megawatts every day. To put this in perspective, the equivalent of another Hoover Dam would have to be built every four days to keep up with world electricity increased demand. Or, a dynamo manufacturing company would have to build another 500-megawatt dynamo every single day to keep up with world electricity increased demand in addition to replace all existing generators fueled by hydro, nuclear, and fossil fuels.

International patent WO 01/15305 A1 by Oleg Gritskevitch and Boris Gritskevitch
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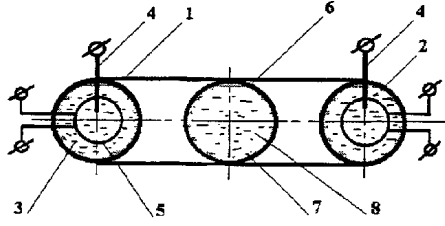
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В отношении двухбуквенных кодов, кодов языков и других сокращений см. «Пояснения к кодам и сокращениям», публикуемые в начале каждого очередного выпуска Бюллетеня РСТ.

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(54) Название изобретения: СПОСОБ ПОЛУЧЕНИЯ ЭЛЕКТРИЧЕСКОЙ ЭНЕРГИИ И МГД-ГЕНЕРАТОР ДЛЯ ЕГО ОСУЩЕСТВЛЕНИЯ

(57) Abstract: The invention is directed at increasing output, reliability and environmental safety of MHD generators as well as at simplifying the design of said generators. The inventive method for the production of energy comprises the following steps: a polar liquid (8) is circulated in a predetermined direction along a hermetically sealed toroidal channel (1) by means of a travelling magnetic field, and electric power is collected by means of electromagnetic winding. The liquid is ionized at least at the stage of launching, by means of electrodes (4), for example. The internal walls (2) of the channel have a dielectric constant which is higher than the dielectric constant of said liquid.

WO 01/15305 A1

New Compact Generator (Results of Testing)

V. V. Roshchin and S. M. Godin

The authors go further in the research of possibility to receive free energy by means of rotating constant magnets (Searl's effect).

The aim of generator compact model (GCM) testing was studying of possibility to produce a small and maximum cheap model, which uses the ceramic magnets. Laboratory research of this model of generator was aimed on the discovery of self-generation effects and effects of weight change, which were already received on the full-size generator [1].

A general view of GCM is shown on the Fig. 1. The generator represented a mechanical system consisted of general construct as a cylinder made of stainless steel divided by its height on approximately two equal parts. The motor of direct current with collector was situated in the lower part, windings of stator and rotor were connected in series.

Fig.1.
General view R_{mx}=59mm

In the upper part of the construction on the axis of motor the rotor is situated as a cylindrical ceramic magnet with a central hole made on the base of cobalt-samarium mix. The magnet is magnetized vertically and inserted into the steel fixture, which preserves the magnet from destruction during the quick rotation. Small magnetic rollers also made of ceramic magnets and magnetized along the axis of rotation were placed around the rotor. All 12 rollers were placed into the aluminum cylinders, which preserve their brittle ceramics from mechanical impact during the work in emergency state. The main idea of such construction consists in the fact that in initial state the rollers were attracted by the magnet of rotor to the side face. Due to the repulsion of the rollers from each other, the distance between them appeared automatically. With this distance they uniformly distributed along the entire perimeter of the rotor. During acceleration of the rotor the rollers diverge from the rotor step by step and begin to run in the outside cylindrical fixture, which is placed around the rotor at

the distance of 1,5 mm from the external surface of rollers in the initial states. The height of the rotor magnet is 24 mm, the diameter of the inside hole is 40 mm. All other geometrical size s and ratios are given on the Fig. 2.
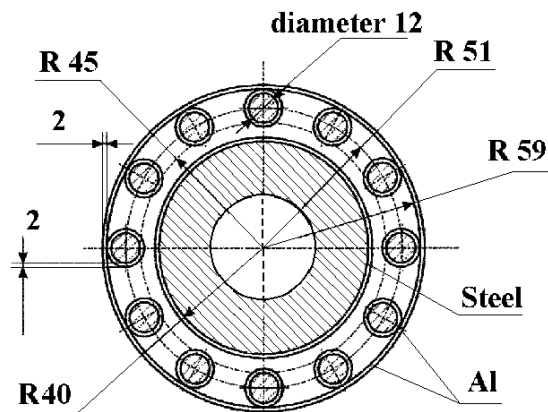
Fig.2

It was supposed that with the certain acceleration of rotation the rollers would begin to rotate inside the outside fixture with self-acceleration and would carry metal surface of rotor device. This mode will be easy to discover due to the possible decrease of the current consumed by the electric motor. Thus, the aim of GCM testing was an attempt to find the features of energy transformation of environment, which lies in the self-acceleration of the rotor device or other characteristic effects (concentric magnetic walls around the device and fall of temperature) discovered already. The program of device testing included registration of dependence of rotational speed of the rollers along the outside fixture from rotation speed of the motor.

Appearance of GCM is shown on the Fig.3, when this device is ready to test in laboratory conditions. GCM was placed on the massive grounded steel plate. The power supply made in the form of controlled transformer, isolating transformer, bridge diode rectifier and capacitive filter were placed to the right. Besides, the generator of reference frequency G3-112 and frequency meter C3-54 were placed here.
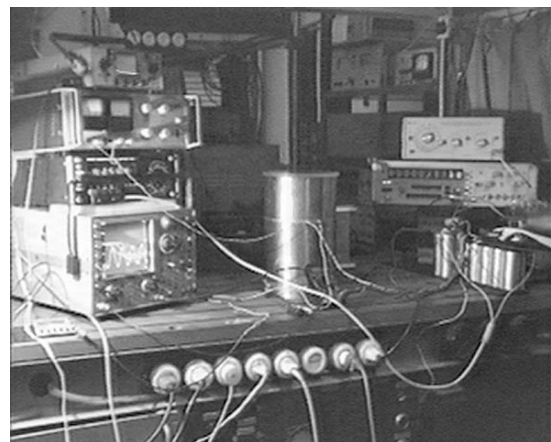
Fig.3.
Lab setup

The 2-channel oscilloscope C1-99, digital combined unit TSH300 applied for the measurement of consumption current and power supply TEC-88 (0-30 V, 0-2,5 A) applied for power supply of the optoelectronic sensor of device rotation were placed to the left. The measurement of rotation speed of the rollers was made with the induction-type sensor, which was placed at the height of the rollers, on the reverse side of the aluminum fixture. The rollers after they separated from the rotor, rolled along this fixture. During the passing of every roller by the induction-type sensor, the impulse of voltage with the amplitude of about 1 V was produced. This voltage was supplied to one of the inputs of 2-channel oscilloscope for the direct observation on the screen. A signal from the reference generator connected with the frequency meter was supplied to the second input of oscilloscope.

Synchronization of scanning of the oscilloscope was provided from the same reference signal. The frequency of the signal on the reference generator was set to provide the most stable immovable pattern on the both channels of the oscilloscope. An accurate measurement was made according to the data from frequency meter. Such method of measurement was chosen because the applied collector motor of direct current had permanent deviations of rotation rate due to the change of voltage in mains, heating of bearings, collector and other reasons. All this hampered the reception of an accurate value of average rotation rate directly from the readings of frequency meter in the case of direct connection of induction-type sensor to the input of frequency meter. In suggested method the integration was made visually by the movement of signal patterns on the screen of oscilloscope. The signal from the stable reference generator was provided to the input of frequency meter. It was necessary to divide the readings of frequency meter on 12 to receive the real value of rotation rate in rates per second (rate of running around the fixture) of the rollers.

Measurement of rotation rate of the rotor was made in analogous way, but as a sensor we used the self-made sensor on the base of optic pair IR emitter-receiver with an open optic channel. The sensor was assembled on the textolite baseplate and attached to the upper plexiglass head of GCM by means of usual plasticine. Using this sensor we could quickly and effectively adjust the necessary operating gap between the surface of optoelectronic couple and surface of special metal disk with 25 dark and 25 light sectors applied on it. Thus, during one rotation period rotor the photon-coupled sensor gave 25 implses of voltage, which were transferred to the oscilloscope for immediate observation. The appearance of photon-coupled sensor of rotations attached to the upper plexiglass head of the GCM unit is shown on the Fig.4.

On the Fig.5 you can see the oscillograms of signal from the photon-coupled sensor of rotation (upper beam) and harmonic signal from the reference generator in the moment of coincidence of frequencies with a one phase accuracy. The real rotation rate of the rotor was
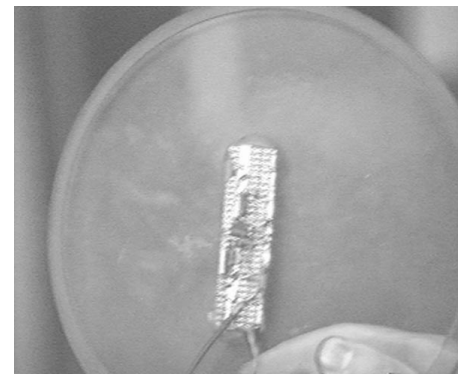
Fig.4.
Optron sensor

determined as a measured frequency (rate) of generator divided on 25 (number of dark and light sectors on the disk of rate controller).

To receive reliable information on the characteristics of electromechanical system "motor-permanent magnet of the rotor" there were made several bare measurements without installation of the rollers. Measurements were made with the placing of magnet north pole up and vice versa.
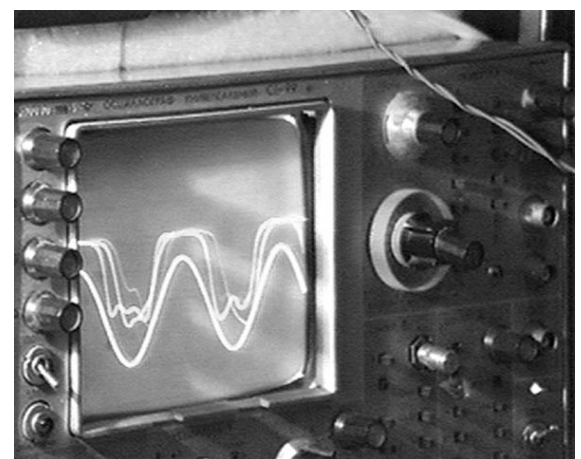
Fig.5.
Signal from the sensor

As we can see from the diagrams of dependence of the motor consumption current from the applied voltage of power supply, the strength of consumption current increases with the voltage of power supply and reaches its maximum at 0,31 A with the minimal possible rotation rate of the rotor. The strength of consumption current does not depend on the polarity of installation of the magnet in the limits of experiment accuracy. For the given motor there is an area of minimal consumption current, which lies in the diapason from 40 to 80 Wt.

We got similar curves of rotation speed for the cases of different location of magnet of the rotor, which means the independence of rotation speed from the polarity of the magnet of the rotor.

The results of measurements of rotation speeds of the rotor and rollers (given separately) are presented as Table1

Table 1

#	U (V)	N- pole up I mA	freg. rot	rps	freg. rol	rps	S - pole up I mA	freg. rot.	rps	freg. rol.	rps
1	120	196	943	37.72	102.5	8.54	199	941	37.64	102	8.50
2	110	181	900	36	102.5	8.54	183	901	36.04	102	8.50
3	100	170	857	34.28	102.5	8.54	172	858	34.32	102	8.50
4	90	160	818	32.72	102.5	8.54	162	818	32.72	102	8.50
5	80	157	778	31.12	102.5	8.54	155	778	31.12	102	8.50
6	70	149	738	29.52	102.5	8.54	150	738	29.52	102	8.50
7	60	147	694	27.76	102.5	8.54	146	694	27.76	102	8.50
8	50	148	650	26	102.5	8.54	148	650	26	102	8.50
9	40	154	599	23.96	102.5	8.54	154	599	23.96	102	8.50
10	30	170	530	21.2	101	8.42	169	533	21.32	100.5	8.38
11	25	183	480	19.2	97	8.08	180	484	19.36	97	8.08
12	23	199	454	18.16	93	7.75	193	457	18.28	93.5	7.79
13	21	210	418	16.72	81	6.75	218	426	17.04	79.5	6.63
14	19	219	394	15.76	79	6.58	234	381	15.24	77	6.42
15	17	239	351	14.04	72.5	6.04	255	339	13.56	68.5	5.71
16	15	265	295	11.8	70.5	5.88	280	266	10.64	67	5.58
17	13	290	212	4.48	67	5.58	300	200	8	65	5.42
18	12	330	56	2.24	61.5	5.13	300	153	6.12	48	4.00

Here, like in the previous example, two cases are considered. They are the case, when the magnet was installed its north pole up and an opposite case. The poles of the rollers change accordingly. We should note that with the slow change of power supply voltage, we practically always observed the instability of the trajectories of the rollers and their tailing from the operating surface, which led to the adhesion of one or some pairs of the rollers together.

This fact distorted the pattern of measurements, and we had to introduce correction factors during the calculation of rotation speed of the rollers. These factors depend on the number of fallen down or adhered rollers in pairs. This table was made taking into account these correction factors and it is an average one according to the results of five tests. As we can see from the table, no self-acceleration of the rollers was found. After the speed reaches a particular value of 8,5 rps, the speed of the rollers stabilizes and does not increase in spite of the growth of rotation speed of the rotor magnet.

Also we can see from the Table 1 that the rollers always have a tendency to retard and after the full separation with the voltage of 20-23 V.

Concerning the polarity of magnet location we can say that it does not influence the rotation speed of the rotor and rollers in the limits of miscalculation in determination of speed and voltage in the given experiment. Some differences in speed are defined only by mechanical characteristics of the rollers and surface of the fixture, which was used for revolving around. We should say that the outside surfaces of the rollers and the surface were made of the same material (aluminum) that's why they have a tendency of attrition even during one experiment. (10 minutes). Due to this reason we couldn't get the full reiteration, but the accuracy of measurements was sufficient to establish the fact of full absence of the self-acceleration effects and some differences between polarities of installation the rotor magnet and rollers.

Unfortunately, we couldn't find any anomalies in the temperature distribution and distribution of magnetic field around the converter. "Magnetic and heat walls" discovered in experiments with a big converter were almost absent around the small device.

Conclusion

These experiments proved the point of view that during the device operation the nonlinearity of the wave processes, which take place in quantum medium (ether) plays the main role. It is evidently, that there is some critical value of parameters in the magnetic system of the converter (mass, induction of magnetic field), and only in the case of excess of these parameters the appearance of above-mentioned effects is possible.

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Photo: Sergei M.Godin (left) and Alexander V. Frolov (right), St.Petersburg, August 2001

Alexander V. Frolov: I have to say about my personal opinion on this experimental work. It is a very strange project. I am not sure if these are 100% true experimental results due to absence of real prototype at the present time (Only the description of 7KWt system was published. It was built in 1992, according to S. M. Godin). From the other hand, the theory of this energy converter and its description by S. M. Godin and V. V. Roshchin is in good correlation with other theories on inner structure of physical vacuum. Faraday Lab Ltd will develop this research direction and we hope to present our own experimental results in future.

Some Practical Results From the Theory of Medium, where Matter Exists

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In this article the author develops a discussion about the theoretical basis of the Searl's effect. The descriptions of experiments made by Roschin and Godin are presented in this book.Small converter is also discussed.

Abstract

Medium, where matter exists is an objective reality of Nature. It has a structure which consists of electrical mass-less dipoles. This medium is responsible for gravitation, inertia and propagation of light. We can influence this medium and thus control gravitation and forces of inertia that can be used for the movement without inertia and transformation of elastic energy of this medium to the energy of matter.

Void is only void and nothing more. Void cannot have any physical properties. For example, vacuum has physical parameters, i.e. dielectric and magnetic penetrability. That's why vacuum cannot be void or empty space of the Universe. Let's consider the problem of medium (vacuum) in details. At first let's remove a

blunder of physics presented by Coulomb's formula. It lies in the fact that permittivities of medium were put to the denominator of formulas for electric and magnetic forces. Let's introduce their inverse values:

$$v = \frac{1}{\mu} = 1.0000000028 \cdot 10^7 \left[a^2 kg^{-1} m^{-1} s^2 \right].$$

It is a magnetic constant of vacuum equal to inverse value of magnetic permittivity.

$$\xi = \frac{1}{\varepsilon} = 8.98755179 \cdot 10^9 \left[a^{-2} m^3 kg s^{-4} \right]$$ is a dielectric

constant of vacuum equal to inverse value of dielectric permittivity. Newton's and Coulomb's formulas get an identical view. Speed of light gets more logical idea

$c = \sqrt{\xi v}$. While writing this formula it is obvious that numerical expression of speed of light is defined by the square root from the numerical value of dielectric constant of medium. Order of values of electrical and magnetic constants of medium defines its absolute value. According to Maxwell's formulas charges are the carries of electricity and there are no carries of magnetism in spite of ideas by Dirac and his followers in theoretical physics. According to Maxwell only electrical currents produce all magnetic phenomena. In medium Maxwell's displacement currents define them. Thus, with the propagation of light (ElectroMagnetic Waves) in medium the main carrier of energy is an elementary electrical charge. Movement of this charge creates the displacement current. Displacement current in its turn creates a magnetic intensity, which creates the decrement of currents in the magnetic "field" and thus limits speed of light.

Experimental physics presents necessary data for the studying of medium. We mean data on photoeffects in medium, on nuclei and nucleons [1]. Let's remind the values of energies of gamma-quanta: 1 MeV, 137 MeV, 1836 MeV, 3672 MeV ($2m_e c^2$, $137 \cdot 2m_e \cdot c^2$, $1836 \cdot 2m_e \cdot c^2$, $1836 \cdot 4m_e \cdot c^2$). This series of energy gives valuable

information for the physical ideas about the structure of medium and matter [2].

Quantum of radiation of ν frequency deforms the structure of cosmic medium. Being within the size of r_e between its elements, quantum of radiation creates a deformation Δr_e. With this the energy of deformation will be $e_0 E \Delta r_e$, where e_0 is a charge of electron, positron, E is an electrical intensity of the structure. Energy of quantum of radiation is equal to the energy of deformation:

$$h\nu = e_0 E \Delta r_e, \qquad (1)$$

where h is a Plank's constant. Deformation depends on time. Quantum of radiation is an electromagnetic phenomenon with the variable amplitude $r_e \sin \omega t$:

$$dr = d[r_e \sin\omega t] = \omega r_e dt \cos\omega t. \qquad (2)$$

Let's define the intensity of electrical field, where N is some coefficient of proportionality:

$$E = N\xi \frac{e_0}{r_e^2}. \qquad (3)$$

Let's put the obtained expressions, amplitude from (2) and intensity from (3) to (1):

$$h = 2\pi N e_0^2 \xi \frac{1}{r_e / dt} \qquad (4)$$

We can assume that $r_e/dt = c$ is a speed of light. Let's find an unknown quantity:

$$N = \frac{h}{2\pi e_0^2 r_q} = 137,036 = \alpha^{-1}, \qquad (5)$$

where $r_q = \sqrt{\xi/\nu}$. As a result we have a number of inverse fine structure constant.

We have got a known formula for Plank's constant from (5):

$$h = 2\pi e_0^2 r_q \alpha^{-1}. \qquad (6)$$

The number N is connected with an elementary charge by the formula (3). It points out the possibility of its interpretation as a number of elementary charges in some cluster of medium, which interacts with the radiation.

> *Is it possible to get Free Energy from vacuum? How is it possible? Dr. Rykov has the answer: "If we compensate a value of inertial deformation, we can "eliminate" inertia or give "negative" properties to it." But it is clear that this "negative inertia" will accelerate any motion or any rotor!*
> *Alexander V. Frolov*

There are important conclusions that speed of light, electrical and magnetic constants of vacuum describe the structure of medium, Plank's constant is a characteristic of medium. Let's find the elements of medium structure from a well-known experimental fact.

Gamma-quantum of energy $w \geq 1 MeV = 1.6 \cdot 10^{-13}$ J interacting with medium changes a "virtual" electron-positron pair to the real electron-positron pair. There is an equation of quantum energy for the "red boundary" $h\nu_{rb}$ and energy of pair:

$$w = \xi \frac{e_0^2}{r} = 2\pi\alpha^{-1} e_0^2 r_q \nu_{rb} = 1,6493 \cdot 10^{-13} \text{ J, } \quad (7)$$

From (7) we find a size of structural element:

$$r_e = \frac{\alpha^{-1}\xi}{2\pi r_q \nu_{rb}} = 1,398688 \cdot 10^{-15} \text{ m.} \qquad (8)$$

Let's define a marginal value of deformation of medium dipole. With this value gamma-quantum creates a real electron-positron pair. The marginal deformation of dipole, which is the "red boundary" of its "destruction" (for photoeffect) is calculated from the wave process $r_e \sin\omega_{rb}(t - r_e/c)$ and from amplitude of its static deformation as $\Delta r_e = 2\pi\nu_{rb}r_e^2 c^{-1}$. The last formula and $h = 2\pi e_0^2 \varepsilon^{-1} c^{-1} \alpha^{-1}$ taking into account the adopted designation of dielectric and magnetic constants give:

$$\Delta r_{rb} = \frac{h\nu_{rb} r^2 \alpha}{e_0^2 \xi} = 1,020672 \cdot 10^{-17} \text{ m} \qquad (9)$$

Deformation of dipole lower than the given value has an electroelastic character and with a higher value of deformation the destruction of dipole occurs and creation of electron-positron pair appears. The required quantity of energy is the evidence that it is mainly spent for the creation of mass of particles: $2m_e c^2 = 1.6374 \cdot 10^{-13}$ J, full energy of photoeffect
$w = 1.6493 \cdot 10^{-13} = 1.6374 \cdot 10^{-13} + 1.1949 \cdot 10^{-15}$ J, energy of $1.1949 \cdot 10^{-15}$ J is consumed to the break of dipole. That's why it is reasonable to consider that medium was formed by the massless charges. A remarkable consequence from the formula (9) determining the limit of dipole strength is

$$\Delta r_{rb} = 1,020672 \cdot 10^{-17} = \alpha \cdot r_e. \qquad (10)$$

Following a classic approach to the structure, let's notice that the force of electrical elastic deformation and coefficient of elasticity b is defined from:

$$f = b\Delta r_{rb} = \xi \frac{e_0^2}{r_e^2},$$

$$b = \xi \frac{e_0^2}{\Delta r_{rb} r_e^2} = 1,155406 \cdot 10^{19} \text{ [kg/s}^2\text{]}. \qquad (11)$$

Gravitational, inertial, electrical and magnetic interactions with the cosmic medium lead to its deformation. Gravity acceleration gives deformation:

$$\Delta r_g = \sqrt{\frac{g}{4\pi E_\sigma S}} = 1.2703 \cdot 10^{-22} \ [m], \quad (12)$$

where $E_\sigma = \sqrt{\lambda\xi} = 0.7744 \left[a^{-1} m^3 c^{-3} \right]$,

$$S = \alpha^{-2} \frac{e_0}{4\pi r^4} \ ; \ S = 6.255854 \cdot 10^{43} [km^{-4}].$$

We have already put a value of acceleration of gravity for the Earth $g = 9.82$ into the formula (12). The obtained value of deformation gives an idea of its real values. Acceleration of any mass leads to the deformation of medium:

$$f = ma = 16\pi\alpha^{-1} b \cdot \Delta r_a. \quad (13)$$

Thus, the force of inertia is defined as an elastic resistance of medium for any acceleration of the mass of the body. The medium of substance gives such fundamental properties of substance like gravitation and inertia. It is difficult to overestimate the practical significance of the obtained ratios (12) and (13).

Consequences:

1. Changing the value of deformation we can change the acting force of gravity.
2. If we compensate a value of inertial deformation, we can "eliminate" inertia or give "negative" properties to it.

It gives chances to develop the technology of antigravitation, i.e. movement without inertia and new sources of unlimited energy…

Technology of influence on medium opens the way to the ways of movement without inertia in medium and converting of elastic energy of medium to the energy of matter. Means of influence on the structure of medium are well known. For example, the Moon creates a deformation of medium in the area of libration. This deformation is equal by its value and opposite by direction of deformation produced by the Earth in medium. There is a deformational background only from other planets and Sun in this area. An attraction of bodies by the Moon and the Earth is absent. Electrical intensity created in medium also influences its deformation. Electrostatic intensity is able to compensate gravity. For example, electrical intensity in medium equal to $1{,}1402 \cdot 10^{10}$ V/m is able to compensate gravity of the Earth. This method of influence on medium is practically unreal.

A wishful result was obtained in the experiment [3,4], which used the alternating magnetic tension in medium during the rotation. According to Maxwell's formula $E_z = l dB_x/dt$, i.e. the derivative by time for the magnetic

induction gives an electrical intensity in medium, which is able to compensate the deformation of medium and control the gravity of experimental mass. To be simple in evaluation calculations we can take a formula $E_z = V \cdot B_x = V \cdot v \cdot H$, where V is a linear speed of rotation of rotor in the converter [3,4]. This electrical intensity causes a deformation $\Delta r_e = e_0 E_z/b = (e_0 v H/b) V$ (m). If we subtract the given deformation from the gravitational deformation of medium $\Delta r_{new} = \Delta r_g - \Delta r_E$, then the attraction force to the Earth will decrease. This effect was observed during the work of energy converter [3,4]. As the magnets situated discretely were rotated in the rotor, than the average effect of decrease of the gravity force of about 35% was observed. Really, in different moments of time the influence of variable magnetic induction on the concrete area of medium vary. Maximal influence leads to the appearance of real electrons and positrons from vacuum. Zero influence corresponds to the normal gravity of the Earth. On average we get 35% gravity change. Annihilation of electrons and positrons appearing with the break of dipoles creates an observed ellipsoid of ionization around the rotor.

At the same time with the given effects of lighting and change of gravity the decrease of inertia of the rotor occurs. In the closed system of magnetic intensity an accelerating component can be found, which can act to compensate the deformation of medium (13). Decrease of inertia will cause the effect of accelerated rotation of the rotor independently from the applied external rotating momentum (like a figure skater, clasping his hands to the body, begins to rotate quicker). This phenomenon was observed with rotation of the rotor more than 550 rpm. Experimenters allowed the rotation of the rotor and efficiency of the electric energy output to the goal of external consumer for the period up to 15 minutes and power of 6 KWatt. Time was limited wittingly for the purpose of safety measures, terms of these measures are unknown yet. Startings were made up to 80 times and every time all effects of the work of converter repeated. From the point of view of "physics of void", existence of such perpetual motion machine is a nonsense according to the law of conservation of energy. Presence of medium, where matter exists, guarantees the fulfillment of this law. Elastic energy of structure of medium transforms into energy of matter strictly following the law of conservation of energy.

Introduction to the consideration of medium, which evenly exists in Nature is able to solve the problems of cognition of Nature as well as It gives chances to develop the technology of antigravitation, i.e. movement without inertia and new sources of unlimited energy.

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they are "black holes" visually for each other. Interaction of these worlds is weak, that's why it is called perceptible, informational interaction [9], which can be conceived in the intuitive level [10].

Conclusions

- There is non-linearity of distribution of frequency-amplitude characteristics (potentials, conditions) in the rythmodynamic space, which creates an illusion of curvature.
- "Frequency pulling" is a reason of gravitational red shift, deceleration of rate of the atomic clock, dismatch of frequencies.
- Dismatch of frequencies of the object leads to the vectorial deformation of the interference field. Reaction on the deformation is the movement (free fall).
- A massive body becomes invisible due to the shift of its frequency characteristics to the infrared (black hole) or ultraviolet (white hole) area. In such an interpretation the "collapse" is a quick process of shift of the frequency characteristics of the object.
- A notion of "Shvarzshild's sphere" is changed by the frequency horizon. An object got beyond this horizon becomes invisible.
- Electromagnetic waves pass through the Shvarzshild's sphere free in both directions.

If the uncompromising classical (diffusion) and "neoclassic" (buracanian) hypotheses were in contradiction concerning the question of black holes up to the present time, then with appearance of this article a new point of view (rythmodynamic) came out. This point of view states:

- There are no curvature of space, there are no black holes in a common sense, but there is an illusion that the bodies become invisible due to the shift of their frequency characteristics to the infrared or ultraviolet area.
- Our Universe is bounded from the both sides by the frequency horizon. That why it is non-observable for the external worlds, i.e. it is a "black hole"!
- As the mass of black hole increase, its frequency increase too and the moment can appear, when the further increasing of frequency will lead to the weakening of gravitational properties at first, then to the leaving of black hole to another frequency interval of space. For the habitant of another frequency scale this process can be observed as a birth of a new star or new elementary particle.

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Hydrogen-Helium Energy on the Base of Laminated Silicates and Tectosilicates

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In October 31, 2000 an opening of Research Institute on Cosmic Energy (RICE) took place in Munich. The opening of a branch Institute in Saint Petersburg is planned to be done in a year. Official materials were published in the magazine "Raum und Zeit" ("Space and Time") #109 and #110, 2001. Internet address is www.raum-und-zeit.com. A gravielectrical transformer of cosmic energy was shown on the presentation of the Institute.

Transformation of energy is a central notion in universal (analitical) electrodynamics by Maxwell-Zubov. Acad. Vladimir I. Zubov studied the unification of electromagnetic and gravitational interactions. Eighler's rotatory mechanics with three Eighler's angles (precession, nutation and proper rotation) is opposed to Newtonian translational mechanics. Proper rotation is usually called as rotation, twisting or torsion.

In 1995 Dr. Oleg M. Kalinin successfully defended his doctoral thesis on the topic "Mathematical biology and quantification". But Higher Certifying Commission of Russia organized a blockade of this thesis. The main opponent was the biophysical cathedra of Moscow State University. Research Institute of Cosmic Energy was established for the development of this theme. The main report on the topic of the thesis lasted more than one hour. Director of RICE Dr. Hartmut Mueller demonstrated a gravitational electric unit made of minerals of serpentine (negative potential "minus", laminated silicate) and quartz (positive potential "plus", tectosilicate). This so called Munich jar is a real perpetual energy source: according our calculations a small 3 Wt lamp will work about 3×10^6 years. In this energy source the transformational process of hydrogen into helium takes place and the catalysis of this process is silicon $^{28}_{14}Si$.

The informational equations of 1972 lie in the base of this theory. [Kalinin O.M., 1972, Problems of cybernetics, part 25, page 107-117]. In 1982 Dr. Hartmut Mueller found general solutions of informational equations. It was the constant of strong interactions, reverse constant of electromagnetic interactions and reverse constant of gravitational interactions. The Munich jar is a real example of electromagnetic and gravitational unification.

Gravitation and electric source of energy (Munich jar) also can work as a mean of telecommunication. The Munich jar transforms the energy of gravity waves to the electric energy. A reverse process is possible, i.e. the modulation of gravity waves and transfer of information by means of them. This communication already works between Munich and Erfurt. It is planned to make communications between Munich and Saint Petersburg in October, 2001.

Miniature Munich jars having the size of 6x8 mm are applied in a new medical device, which protects a man from the negative effect of low-frequency electromagnetic fields of technical origin in of 1-100 Hz band.

Another miniature Munich jars having the size of 12x16 mm also are applied in a new medical device, which makes the healing of wounds 2-3 times quicker.

More information you can find at www.raum-und-zeit.com. This information was also published in the magazine "Raum und Zeit", #109/2001, page 70, 66-73 and 105/2000, page 5-10.

### *Some notes from Faraday Lab Ltd.*

We have been acquainted with Acad. Zubov from 1989 up to his death. Besides the interesting discussions (particularly on the topic of inertialess non-reactive motion) I should mention his kind willingness to give an organizational support to the struggle for new ideas in science.

Concerning the above-mentioned Munich jar, I think this effect is a demonstration of electro-gravitational phenomena described by T.T. Brown in his patents of 1927-1965. Certain materials including complex silicates, laminators and clays and certain rare earth elements decrease its weight due to tribo-excitation. "The result is not only real loss of weight, but such materials suffer a retardation in gravitational acceleration (value "g")", writes T.T. Brown in his article "Method for Producing Gravitationally - Anomalous Materials". The method of excitation is a mechanical friction only (it is called "tribo-excitation").

The Minich jar, about which we wrote above, involves special materials mentioned in the Brown's articles to the process of electro-gravitational energy exchange.

We are interested in the development of this research topic, if there will be adequate investments from the customer. Commercial application of this technology is possible in telecommunication, energetics, aerospace and medicine.

Alexander V. Frolov
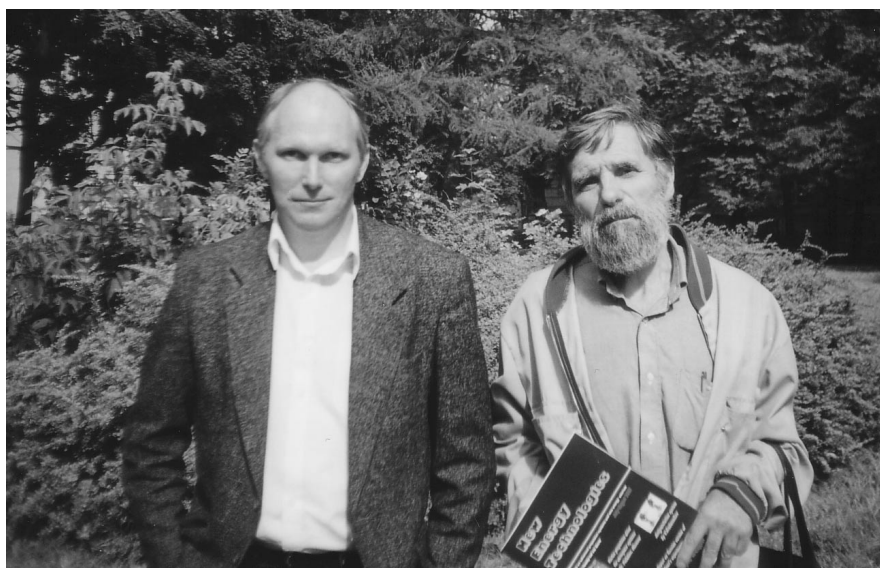
Alexander V. Frolov and Dr. Oleg M. Kalinin St.Petersburg, August 2001

NEW CONCEPTS OF THE PHYSICAL WORLD

Gennady V. Nikolaev

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New concepts of physical world and new consistent electromagnetic theory of physical vacuum, which includes two kinds of magnetic fields and magnetic interactions, are proposed by Dr. Nikolaev, Tomsk. These concepts were made by the author on the basis of general theoretical analysis of principles of modern fundamental physics. Existence of scalar magnetic field, which was unknown before and phenomenon of longitudinal magnetic interaction was established by theoretical and experimental research. The result of the obtained system of differential equations of electrodynamics is the possibility of existence of longitudinal electromagnetic waves. The reality of their existence was proved experimentally. New physical phenomena and effects of electrodynamics of physical vacuum can have a wide applied significance for various fields of science and techniques. Wide perspectives are opened for the creation of energy systems on the principally new basis as well as new type of nonreactive principles of motion, methods of communication using the longitudinal waves and dynamic effects of electromagnetic medium of physical vacuum.

Illustrating the importance of the role of the laws of electromagnetism in the life of Humankind, Richard Feynman wrote: **"From a long view of the history of mankind - seen from say, ten thousand years from now - there can be little doubt that the most significant event of the 19th century will be judged as Maxwell's discovery of the laws of electrodynamics. The American Civil War will pale into provincial insignificance in comparison with this important scientific event of the same decade".** [1]

Nowadays, the areas of application of the laws of electromagnetism by mankind are so tremendous that any reasonable estimation of their significance has become impossible. Maxwell's electrodynamics equations were formulated more than a century ago (in 1873). Their tremendous importance is emphasized by the fact that the general form of Maxwell's equations has remained practically unchanged up to the present day.

However, during this long period of mastering the laws of electromagnetism, electrodynamics has accumulated a huge number of unexplained, strange, paradoxical, often surprising, and in some cases frightening electromagnetic phenomena, whose nature remains for us, mysterious and in many respects unclear. As a result a person will realize her/his complete powerlessness before the laws of Nature when, as is described below, she/he experiences this phenomenon on her/his body.

What are these strange natural phenomena? Certainly, the person who was "lucky" enough, to observe any such natural phenomenon, retains a memory of the event for the rest of her/his life. The person not only retains this memory, but is constantly reminded that in Nature there exists some terrible unbridled force, before which all living beings on the Earth are absolutely powerless. We are able to discuss these phenomena at length due to the fact that the author has been engaged in the special study of such phenomena for a very long time. One example, of such strange electromagnetic phenomena is described below in magazine ***Engineering-Youth*, No. 1, 1982:**

"1978 (August). Mountains of Western Caucasus. A group of five persons coming down a mountain, stopped for the night at a height of 3,900 m. All were already asleep in a tent, when a bright yellow ball approximately the size of a tennis ball appeared in the tent. The ball had killed one of the five persons, most likely because his sleeping bag was laid on a rubber mattress and was isolated from the ground. The "BL" had no effect on the radio set, carbines, or alpine sticks. The size of input holes in the sleeping bags did not exceed that of a tennis ball, but the wounds measured 15-18 cm.

What was this phenomenon? An ordinary ball lightning we have heard of and discussed often. However, the behavior of this Ball Lightning was purposeful and too rational and logical in order for it to be natural.

This phenomenon was studied in detail by the Moscow AF Group, and the sweater of an eyewitness victim of these tragic events was shown to me when I had a meeting with V.N. Fomenko, a member of this Group. The sweater was woolen, and a hole with a diameter of 5-6 cm was burned in it near the waist. The hole was obviously burned out, because a thermal effect on the sweater material was seen on its edges, but that effect was surprisingly tiny. To imitate this phenomenon, researchers burned out other holes by different well-known methods (using a gas or a plasma burner, laser beam, etc.), but they failed to obtain anything similar. In all cases, the woolen material swelled under the

effect of heat on the sweater. The researchers failed to produce such a tiny burned edge. The nature of this phenomenon is still unknown to us. We do not know what fields produced this effect, and we do not know the nature of the luminous ball itself.

Thus, on the one hand, we have "the greatest achievement of the humankind" - the famous Maxwell's electrodynamics equations, and on the other hand, we are absolutely helpless when confronted by strange electromagnetic phenomena of the above-mentioned nature.

What is the problem here? What other very important factors we do not know about the laws of electromagnetism? Why do these natural electromagnetic phenomena seem so mysterious to us? If our knowledge of the laws of electromagnetism is actually far from being complete, what are the principal points in our knowledge of these laws, which have been overlooked? Meanwhile, the present day version of Maxwell's electrodynamics, according to official academic science, is considered to be the basis for all modern physics.

However, if we have actually overlooked something in our modern picture of the laws of electromagnetism, this omission was obviously made in the days of Maxwell and perhaps by Maxwell himself!

But is it really reasonable to reproach Maxwell if he himself in his time explicitly recognized **that the system of electrodynamics equations that he developed was incomplete?** [2]

It is most likely that at the present time only a few scientists know that after having written down his famous electrodynamics equations, Maxwell discovered that something was missing in his equations. He wrote (which means that he warned scientists!) **that the system of his equations is incomplete, and that, more specifically, they would be inapplicable, in the case of non closed (open) currents, for current elements (segments of current), and especially for single individual charges.** Ball Lightning, for example, whose nature is still unknown to us, are supposed to consist of isolated moving electric charges or a charged cluster. Hence, our understanding of the laws of electromagnetism was and still today remains incomplete and therefore highly limited. For that exact reason, many manifestations of BL and other natural electromagnetic phenomena seem strange, mysterious, and even terrifying to us.

Maxwell's equations were based on the Faraday's concepts that presume that there exists a magnetic field of a moving electric charge and that lines of magnetic force and that magnetic interactions between currents (more specifically, the phenomena of transverse magnetic interactions) exist as well. **The experimental evidence available in the days of Faraday was obviously not sufficient, because something was missing in Maxwell's equations.**

However, other experimental facts and approaches were known in the days of Maxwell. In particular, Ampere, put forward the **opposite concept,** based on the experimental data available at that time - **that magnetic fields and magnetic lines of force do not exist in Nature, but instead that in addition to transverse interaction forces, longitudinal interaction forces do exist.** Ampere's concept obviously could not be integrated into Maxwell's mathematical framework, which consists of equations describing electric, and magnetic fields. It was for this very reason that Maxwell could not understand the essence of Ampere's suggestions. At the same time the suggestions of Ampere contained a deeper understanding than that of Maxwell, which unravels the actual reasons for the limitations of Maxwell's system of equations of electrodynamics. **At that early time Ampere expressed a surprisingly sharp and visionary statement that: "If one does not abandon the concept of the magnetic field in electrodynamics, it will result in a tremendous confusion in future theory. "** And in the present day, based on a general analysis of the available theoretical and experimental evidence, we are able to see for ourselves the real truth of Ampere's visionary statement. In addition, we now know that only the electric field of a stationary charge exists, and no special **"magnetic field"** appears when one considers the moving electric charge. Instead there is only the same electric field of the electric charge, but slightly deformed, altered (the well-known effects of retarded potentials!) due to its motion in the medium of the physical vacuum. Thus, the erroneous fundamental assumptions (of Faraday) provided the basis for the fundamental physical premises of Maxwell's electrodynamics. In brief, Maxwell was misleading by incorrect or incomplete concepts of the laws of electromagnetism previously established by others.

However, actual practical demands often require that physicists solve problem of the elements of open currents and problem of single moving electric charge. **In the history of mathematics, it is well known that the creators of the theory attempt to fix any shortcomings of the physical theories (uncertainty and inaccuracy in the initial fundamental premises) through us of the means of mathematical formalism. The modern mathematical methods of Maxwell electrodynamics is a perfect example of this approach, since being modified in this way Maxwell's theory has become intrinsically inconsistent and full of paradoxes.** Physicists using purely formal methods of mathematical substitutions of all kinds, imposing additional arbitrary normalization conditions, using gauge theories, introducing primed coordinates and special d-functions, etc., have succeeded in "stretching" Maxwell's equations and adjusting them to certain classes of problems and in this manner obtained results that outwardly appear to be in agreement with the experimental observations.

For example, let us assume that we must solve the simplest problem - to determine the magnetic field strength created by a single moving charge at a given observation point - using the system of Maxwell's equations. This problem is the simplest possible one. However, Maxwell's equations are inapplicable for solving this problem (this was pointed out by Maxwell himself!), because div**A** in this case cannot be taken to be equal to zero. In order to "stretch" Maxwell's equations and to make them applicable in this region of inapplicability using solely mathematical formal methods, this elementary problem must *a priori* be made purposefully (or deliberately!) complicated. It turns out that in accordance with the formal requirements, we must assume that the problem to be solved is not elementary: not a single moving charge, but a system of moving charges which constitute closed currents (or current loops). Now since Maxwell's equations are applicable in the case of the introduced closed currents (or current loops) one can impose additional formal restriction div **A** = 0. By doing this, the system of Maxwell's equations can easily be reduced to the Poisson equation for the vector potential **A**, which can be solved (with the use of the formalisms of primed coordinates and δ-functions). Once the solution for the vector potential **A** is found, one can calculate the expression for the magnetic field **H** at the observation point by taking a partial derivative in the form of rot **A**. The expression obtained thus far is in agreement with the experimental data. As a result one comes to the conclusion that the correct solution was found by following this system of equations.

The correctness of a solution of any equation can be verified by simple substitution of the solution obtained into the original equation. However, upon substituting the result obtained through solving this system of equations into the original Maxwell's equations, one will find out that the right side of the equation is not equal to its left side. This simple verification effactually shows that the solutions of the system of Maxwell's equations obtained with the use of these formal methods are incorrect. This is the consequence of using of purely formal-mathematical methods in order to overcome the intrinsic limitations imposed by the system of Maxwell's equations itself.

Moreover, if one takes the solution of the Poisson equation to be the field of the vector potential **A** thus obtained and then takes another spatial derivative of this vector potential div**A** (recall that in **the additional conditions** one did specify div**A** = 0!!!), one will find out unexpectedly that div**A** is nonzero: div**A** ≠ 0, that is, one has obtained a result which is in contradiction with an *a priori* **additional condition** artificially introduced at the beginning of the analyses.

Furthermore, another outstanding discovery of Maxwell was the introduction, into the right hand side of his equations, strange "displacement currents" in addition to the usual convection currents, whose physical meaning is argued by physicists even up to the present day. Maxwell believed that displacement currents really

do exist, that is, they represent real displacement currents in ether. Unfortunately, after the triumph of Einstein's concept of "empty space," (no ether) the displacement currents introduced by Maxwell completely lost their physical meaning.

According to modern concepts of electrodynamics, on the one hand, it is accepted that **displacement currents are physically real, since without them it is impossible to understand the functioning of an elementary capacitor**. On the other hand, **the displacement currents are a mathematical formalism, which has no physical meaning. At the same time, with their help it appears possible to make Maxwell's equations symmetrical [see E. Parcel and V. G. Levich]**. On the one hand, **the magnetic properties of the displacement currents are accepted as being equivalent to those of the convective currents, because "these currents identically enter into the right side of Maxwell's equations [see I. E. Tamm]."** On the other hand, **the magnetic fields of moving charges are determined, for an unknown reason, by taking into account only convective currents and completely neglect displacement currents as if they do not exist**. At the same time it appears absolutely impossible to write down Maxwell's equations without utilizing the concept of displacement currents.

In the present day, it seems that the physical existence of displacement currents is revived (resurrected again) due to the common recognition of the central role, which the physical vacuum plays in all electromagnetic phenomena. Nevertheless, Maxwell's equations have not yet been solved (**based on the physical principle of local action**) in terms of the displacement currents in physics and the magnetic fields are expressed solely through convective currents (**based on the non-physical action at a distance principle**).
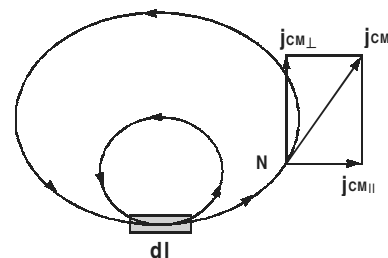
Fig. 1.

It is well known that displacement currents in the vicinity of a moving charge (or an element of linear current) are closed by convection currents (See Fig. 1). Moreover, the direction of the vector of the displacement-current density $\mathbf{J}_d(\mathbf{r})$ at an arbitrary point in space, in general, does not coincide with that of the charge motion. **Thus, at this point in space it is reasonable to assume that at any point one can determine both the magnetic field strength H(r) and the corresponding displacement current J_d(r).** Despite the fact that the concept of the displacement current has been in use in electrodynamics for a long time, in practice, the magnetic fields at the observation point

are still determined in terms of the convection currents utilizing only the nonphysical "action at a distance" principle.

The very first attempt to express the magnetic field in terms of the displacement currents gave a rather unexpected result. **It was established [3] that the axial component of the vector of the displacement current density $J_{\parallel d}(r)$ determines completely (previously well known in science) the vector magnetic field $H_\perp$ at the observation point:**

$$H_\perp(r) = 2J_{\parallel d}(r)/r_0$$

while, the radial component of the displacement current density $J_{\perp cm}(r)$ generates an additional (previously unknown in science) scalar magnetic field $H_\parallel$ at the same observation point:

$$H_\parallel(r) = 2J_{\perp d}(\pmb{r}) / x_o.$$

Hence, contrary to the assumptions of Maxwell and Faraday, there are two, rather than one, type of magnetic field at any point in space in the vicinity of the moving electric charge. At this point the reason for the limitations imposed by the system of Maxwell's equations becomes clarified.

Moreover, the same conclusion about the existence of two types of magnetic field in space in the vicinity of a moving electric charge can be derived immediately using the formalism of the vector potential field known in electrodynamics. It is well known that the vector potential field $\mathbf{A(r)}$ is induced in space in the vicinity of the moving electric charge and that the magnitude of this vector potential is a **spherically symmetric function**. If one takes the first spatial derivative of the vector potential field rot$\mathbf{A}$, one will find the vector magnetic field $\mathbf{H}_\perp$ that is well known in science. This vector magnetic field has a radial distribution in the vicinity of the charge (Fig. 2).
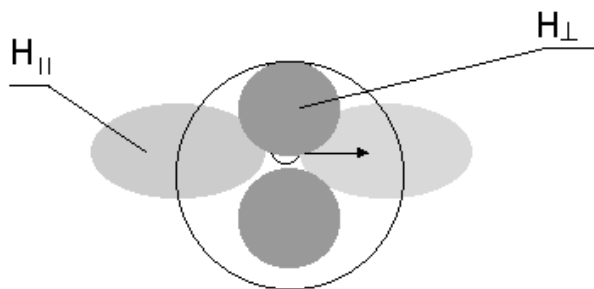

Fig. 2.

However, vector magnetic field $\mathbf{H}_\perp$ vanishes both in the direction of motion of the charge and in the opposite direction, even though the magnitude of the vector potential in these directions remains non zero. **But in mathematics, it is well known that the only spatial derivative rotA does not completely determine the vector A, until the additional derivative of this vector, namely, divA, is specified.** It appears that the second

derivative **divA** of the vector potential **A** for any moving charge (and also for any current element or any open current - that is, in the cases that Maxwell warned us about!), as is known [4], is also nonzero: div$\mathbf{A}$ = $H_\parallel \neq 0$. Moreover, it is measured in physical units of Oersted and defines an additional, previously unknown, scalar magnetic field $H_\parallel$ in the vicinity of the moving charge. This scalar magnetic field in the vicinity of the moving charge is concentrated mostly in the direction of motion of the charge and in the opposite direction (see Fig. 2), where there are no conventional vector magnetic fields. Only the superposition of two fields: vector and scalar magnetic fields give a complete pattern of the resultant magnetic properties of any moving electric charge. Once the basic concepts of the complete magnetic properties of a moving electric charge have been established, practically all presently known theoretical and experimental contradictions and paradoxes in modern electrodynamics can be resolved.

Finally, **the well-known physical paradox in electrodynamics of the violation of the third law of Newton's mechanics in the case of the interaction of two electric charges moving in two orthogonal directions (or the interaction between two orthogonal current elements) can be resolved,** once the magnetic field of the second type is taken into consideration. Physicists have been faced with this paradoxical situation for a long time; however, the problem has not yet been resolved. At the moment when the test electric charge is crossing the trajectory of the first charge, no magnetic force acts on the test charge, because the conventional vector magnetic field vanishes in the direction of motion of the first charge. Meanwhile, the nonzero transverse Lorentz force, created by the test charge, acts upon the first charge. **But it is exactly the direction of motion of the first charge, in which direction the second scalar magnetic field $H_\parallel$ acts, and whose action upon the first electric charge creates an equal and opposite longitudinal response force, that force has its maximum value in complete correspondence with the third law of Newton mechanics (action and reaction).**

A large number of real electromagnetic systems, working models and devices, whose functioning is explained on the basis of the assumption of possible violation of the third law of mechanics in the magnetic interactions of current-carrying elements, have now been accumulated in electrodynamics. Several hundred working devices which clearly demonstrate violation of the third law of Newton's mechanics were made by R. I. Sigalov, a physicist from Fergana and described in [5]. However, a non-contradictory explanation of all these experiments becomes possible under the assumption of the existence of an additional magnetic field corresponding to an additional longitudinal magnetic interaction.

Taking into account the existence of a scalar magnetic field of a moving charge **it is possible to resolve the paradox of the kinetic energy of the moving electron charge, which has been known in physics for a long**

time. The essence of this paradox is that the work $A = Ue$, spent in accelerating the electron to the velocity V is equal to the kinetic energy $W_K = mV^2/2$ acquired by the electron. However, the electron moving with the velocity V in addition to kinetic energy also acquires the magnetic field energy $W_H = (2/3)W_K$ upon which apparently no work has been spent. **Physicists once again were faced with a paradoxical situation and were required to seek for a way out from it.**

In order to resolve this paradox, physicists usually assume that the energy of the magnetic field of electron W_H is included in the electron kinetic energy W_K. Attempts were undertaken by physicists to change the charge density distribution over the volume of the electron; however, physicists failed to obtain conservation of energy. In addition, the above-indicated assumption violated the integrity of the theoretical model of the electron, because it was necessary to assume that 1/3 of the electron mass has a purely mechanical origin, while 2/3 of electron mass has a purely electromagnetic nature. To find a way out from this paradoxical situation, the great physicist Ya. I. Frenkel [6] suggested that the total electron mass (rather than a portion of it) should have purely electromagnetic origin. However, the exact equality has not yet been found within the framework of the existing concepts. **Meanwhile, taking into consideration the energy of the scalar magnetic field of the moving charge of the same electron, this quantity turns out to be equal to the energy $W_H = (1/3)W_K$, and the required identity $W_H \equiv W_K$ is easily obtained.** This identity is very important for basic physics. **The electron mass turns out to be of purely electromagnetic origin, as Feynman assumed.** Unfortunately, the more fundamental conclusion following from the above conclusion: **the principle of equivalence of mechanical and inertial masses** is actually not valid in nature.

It should be noted that after introducing into physics the concept of electromagnetic inertial mass, the violation of the equivalence principle (between electromagnetic inertial and mechanical inertial masses) has become obvious from the physical viewpoint. The point is that the total gravitational mass and inertial mass are linear functions of the number of particles, whereas the inertial electromagnetic mass is not a linear function of the number of particles. Instead, for the high velocities it behaves as a quadratic function of a number of particles. (**For example, ten particles of mass m_o have a total mass of $10m_o$, whereas ten electromagnetic masses m_{el} of the same 10 particles have the total inertial electromagnetic mass $M_{el} >> 10m_{el}$, namely, on the order of $100m_{el}$).**

In real natural solid-state materials, having a much larger density of charged particles, their electromagnetic inertial masses can differ from the mechanical gravitational mass by more then ten orders of magnitude. **For example, the inertial electromagnetic mass of a single conductivity electron in the crystal lattice of a conductor is equal to the gravitational mass of about 10^7-10^8 protons, that is, it can exceed by more than 10^{14} times the mechanical mass m_o of this electron [7].**

The difference between the mechanical and electromagnetic masses of electric charges turns out to be even more dramatic; however, a question immediately arises: How real is this difference? It is most likely, that Humankind does not encounter these phenomena in explicit forms in everyday practice, but some natural electromagnetic phenomena amaze us with their strange manifestations.

As numerous observations show, most Ball Lightnings (BLs) do not carry an electric charge at all, but nevertheless some strange force effects are actually observed. Some BLs are the sources of a very strong magnetic field of tens of millions of gauss. Moreover, they can produce the corresponding force effects. For comparison, it should be noted that mankind has mastered a magnetic field strength of only up to 1 million gauss obtained during a very short period by the explosion of coils with high currents. Whereas in the case of the small ball of BL the magnetic field strength which is several orders of magnitude higher is retained for a long period of time - for several tens of minutes and even longer. This strong source of a magnetic field near conducting or semi-conducting bodies engenders high-power interaction force effects upon these bodies. However, when the BL is observed in Nature, its force effects appear so strange that they have no reasonable explanation within the framework of the well-known "basic" laws of electromagnetism. In this case, it becomes obvious that we have overlooked something in these basic laws.

An experiment with a copper pendulum swinging between the poles of a strong electromagnet is known to all of us from our school days. When the electromagnet is switched off, the pendulum swings freely. However, with the electromagnet switched on, the copper pendulum decelerates quickly and stops between the poles of the magnet, as though it is located in a dense medium. We have an explanation for this experiment within the framework of modern concepts. As the copper pendulum approaches the poles of the magnet, high Foucault currents are induced in it, whose interaction with the magnet creates a force that opposes the pendulum motion. This phenomenon can be easily inverted. If the copper pendulum is fixed and the magnet approaches it, the magnetic field will push the pendulum in the direction of motion. However, when the magnet moves away from the copper pendulum, the magnetic field of the magnet begins to entrain the copper pendulum. All this fully agrees with the well-known theoretical concepts of the laws of electromagnetism.

At the same time, it is well known that if we place a piece of iron near the magnet, it simply will pull the iron and attach itself to it, so that the piece of iron will remains fixed with respect to the magnet even when moved in an arbitrary way. All this is well

known to us and is beyond question. However, in actual cases where natural BLs were observed, their force effects were so strange that they have defied any reasonable explanation within the framework of the well-known laws of electromagnetism. Hence, it becomes even more obvious that we have overlooked something important in these basic laws.

For example, in one case a BL flew along a wooden fence. Boards were broken away from the fence one by one and fell down in disorder; however, the BL itself continued to fly strictly rectilinearly, as though the boards were not broken away from the fence by the BL itself. That is, the force effect of the BL on these boards was manifested without any counter effect from these boards on the flight path of the BL.

Another eyewitness witnessed an interesting force effect of a BL on nails that he hammered into boards that he was nailing into a wall. In order to properly place the boards on the wall, the eyewitness hammered the nails partially into the wood. When all the boards had been partially nailed into the wall, the eyewitness began to hammer the nails completely into the wall. However, he had completely hammered in only one nail when suddenly a BL appeared, flying toward the wall. Quite naturally, the BL attracted his attention and interrupted his work. When the BL had disappeared, the eyewitness turned to continue his work, but found out that all the nails had already been knocked completely into the wall.

In another case, a BL flew by in the immediate vicinity of an incandescent lamp, which exploded. If the BL, as many scientists believe, had had the density of air and had been a weightless formation, vibrations produced by the explosion of the lamp bulb would have led to a change in the BL trajectory; however, nothing of the kind happened.

> *...when taking into consideration the actual existence of this second scalar magnetic field, rather unusual magnetic nature and strange and mysterious behavior of the BL magnetic fields can be fully understood.*

On another occasion, a bellman who served in a church tolled a bell at the assigned time as he usually did. He pulled the rope, but heard no sound from the bell. The bellman was surprised and went out into the street to look at the bell, to see if something had happened to it. When he looked upward, he saw a bright luminous BL suspended near the bell. Moreover, the bell and its tongue remained fixed even when the tongue was pulled by the cord. The bell remained in this state until the BL disappeared. As soon as the BL disappeared, the bell began to ring as it normally did.

The violation of well-known physical laws was especially evident and observed in the well-documented case of the Gal'tsov phenomenon investigated by the Tomsk Group of Anomalous Phenomena.

A spherical lightning about the size of a football ball flew above a village at a height of twenty to thirty meters. The first shed in its way, with ferroconcrete poles, was crushed and collapsed. Flying above a house covered with an asbestos cement roof, the BL tore away the roof of the house together with nails (from an area of several hundred square meters), and after the entire roof had been raised into air, the BL entrained it, and then scattered its parts all over the village.

Flying above a tractor station, the BL crushed a frame welded from metal angle iron, covered with a tarpaulin. Another frame first trailed along the ground when the BL approached it, and when it had moved above the frame, it was lifted by the BL and carried at a distance of 300 meters. The frame weighed no less than 100 kg.

Let us now analyze this case based on well-known physical laws. The flying BL carried by its fields (that are obviously non-electric in nature) the frame whose equivalent weight was hundred kilograms. It is quite obvious that the frame also exerted the same force of hundred kilograms on the BL. However, the BL, for some unknown reason, continued to fly strictly along the straight line, not even noticing that a metal frame weighing hundred kilograms was attached to it. If the BL, as is commonly accepted, is a light formation (having a small mass), why did the frame, weighing a hundred kilograms, cause no changes in the trajectory of its flight? We can ask many "why's" here.

Why does the BL's behavior seem so strange to us? If our concepts of the laws of electromagnetism are actually incomplete, which phenomena have been overlooked in our concepts of these laws? In our case with the BL, the effects of the Foucault induction currents in conducting materials and the subsequent effects of the strong magnetic field of the BL on these currents were clearly manifested; however, the magnetic field of the BL did not pull the frames constructed from iron angle bars to the BL! Numerous observations of BLs have not revealed even a single case where any metal iron objects were pulled to the BL. Thus, it follows that all our notions of the laws of magnetism appear to be completely inapplicable to the BL.

Numerous experiments have already demonstrated that the second scalar magnetic field of a moving charge have induction properties just as does the conventional vector magnetic field. However, an unexpected and surprising property of the second scalar magnetic field is that unlike the conventional magnetic field, this magnetic field does not interact with ferromagnetic metals. And it is only now, when taking into consideration the actual existence of this second scalar magnetic field, that the rather unusual magnetic nature

and the strange and mysterious behavior of the BL magnetic fields can be fully understood.

Hence, the BL is not only a set of isolated single charges to which the equations of Maxwell's electrodynamics are inapplicable (and which Maxwell warned us about!). In addition, the BL turns out to also be an ideal source of the scalar magnetic field that still remains unknown to science. This field was overlooked by Maxwell and as a result the scalar magnetic field is not accounted for in Maxwell's equations of electrodynamics. And only now we can understand why Faraday could not register the scalar magnetic field during his numerous experiments on the defining of magnetic field with filings.

Over the long period of the existence of electrodynamics, a great number of theoretical and experimental evidences have been accumulated, so that even within the framework of existing concepts one can easily prove that the longitudinal magnetic forces actually do exist [3]

For example, within the framework of the generally accepted Lorentz force concept, no magnetic interaction should exist between two elements of the current if they are oriented along the same straight line, that is,

$$F_L \equiv 0, \qquad (1)$$

since the well-known to science vector magnetic field $\mathbf{H}$ created by these currents is absent in the direction of these currents. However, if one, for example, uses the expression for the energy of interaction between the magnetic fields $\mathbf{H}_1$ and $\mathbf{H}_2$ created by these two currents, which is given by the formula

$$W = \frac{2}{8\pi} \int \mathbf{H_1}\mathbf{H_2} dV \qquad (2)$$

he will find that the total interaction energy of two elements of the current oriented along the same straight line is nonzero and depends on the distance between them. It then immediately follows that a nonzero longitudinal force of magnetic interaction should exist between two current elements oriented along the same straight line

$$\mathbf{F}_H = \frac{\partial W_H}{\partial t} \neq 0 \qquad (3)$$

Moreover, if one again uses the well-known formalism in electrodynamics of the vector potential $\mathbf{A}$, for interaction energy of two electric charges e_1 and e_2, moving along the same straight line, one obtains

$$W_A = \frac{1}{C}\left(\mathbf{A_2}e_1\mathbf{V}_1 + \mathbf{A_1}e_2\mathbf{V}_2\right) \neq 0 \qquad (4)$$

Hence it follows that

$$\mathbf{F}_A = \frac{\partial W_A}{\partial t} \qquad (5)$$

that is, the force of longitudinal magnetic interaction between two charges moving in one direction is nonzero. However, one can compare Eqs. (1), (3), and (5) to show that

$$F_A > F_H > F_L \equiv 0 \qquad (6)$$

and all the results obtained give significantly different magnitudes for the same physical phenomenon. Thus, from Eq.(6) it clearly follows that the existence of the nonzero longitudinal magnetic interaction force is established even within the framework of the well-known concepts by using different methods of calculation. If in the procedure of calculation of forces (1), (3), and (5), one takes into account the scalar magnetic field $H_{||}$, all the above-considered methods will give the same result for the force of the longitudinal magnetic interaction, that is,

$$F_A = F_H = F_L \neq 0 \qquad (7)$$

The existence of the force of longitudinal magnetic interaction of a moving electric charge with a scalar magnetic field can be easily proven, for example, by considering the effects of magnetic interaction of a moving charge e with a field of vector potential $\mathbf{A}$ (or with a scalar magnetic field $H_{||} = -\text{div}\mathbf{A}$) of a toroidal coil with a current under conditions then the conventional vector magnetic field $H_{\perp} = \text{rot}\mathbf{A}$ is absent in the space outside of the toroidal coil.

It is well known that the magnetic field $H_{\perp}$ of an ideal toroidal coil is placed completely inside the coil. Outside the toroidal coil, there is only the nonzero field of the vector potential $\mathbf{A}$, for which we have

$$- div\, A = H_{||} \neq 0 \qquad (8)$$

When a charge moves in the field of the vector potential $\mathbf{A}$ of the toroidal coil (see Fig. 3), the following types of magnetic force interactions can be identified within the framework of well-known generally accepted concepts:
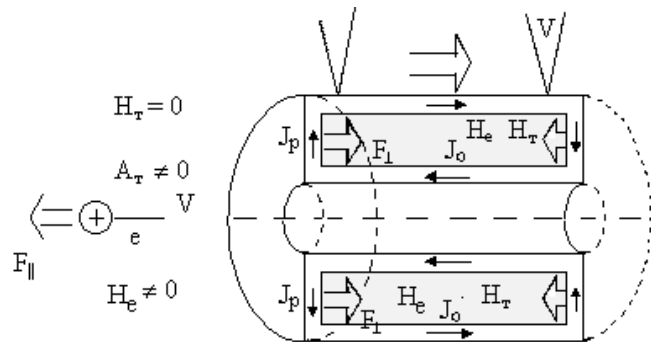

Fig. 3.

1. When the charge e moves along the axis of the toroidal coil with a current, the conventional magnetic field H_e, induced by moving charge e, penetrates into the toroidal coil, acting on neighboring radial currents in the conducting wires of the coil and creating the trivial

forces of the transverse magnetic pressure $F_\perp$. In addition, when the charge e moves in the field of the vector potential $\mathbf{A}_T$ of the toroidal coil, the energy of interaction with the vector potential field of toroidal coil can be easily obtained

$$W_T = \frac{1}{C} \mathbf{A}_T e_1 V_1 \neq 0 \qquad (9)$$

that is resulting in the nonzero longitudinal magnetic force

$$\mathbf{F}_T^\| = \frac{\partial W_T}{\partial t} \qquad (10)$$

Hence, the total force of the magnetic pressure exerted by moving charge e on the toroidal coil (neglecting the interaction with distant current-carrying wires of the toroidal coil) may be expressed in the form

$$F_o = F_\perp + F_{||} \neq 0 \qquad (11)$$

2. A nonzero value of the force of longitudinal magnetic interaction between moving charge and field of the vector potential $\mathbf{A}$ of the toroidal coil can also be derived from the energy of interaction between the magnetic fields of the moving charge $\mathbf{H}_e$ and the magnetic field of the toroidal coil $\mathbf{H}_T$ inside of the volume of toroid.

$$W_\perp = \frac{2}{8\pi} \int \mathbf{H}_e^\perp \mathbf{H}_T^\perp dV \quad \text{and}$$

$$W_\| = \frac{2}{8\pi} \int H_e^\| H_T^\| dV \qquad (12)$$

It follows then that the longitudinal magnetic interaction forces will act between the charge and the toroidal coil

$$\mathbf{F}_T^\| = \frac{\partial W_\perp}{\partial t} + \frac{\partial W_\|}{\partial t} \qquad (13)$$

3. Because the electric charge e, entering into the toroidal coil, will increase or decrease the magnetic field inside the toroidal coil, induction electric fields will be induced near the toroid. They will either decelerate or accelerate the charge motion in accordance with the well-known Faraday's law of induction

$$\varepsilon = \oint \mathbf{E} dl = \frac{1}{C} \frac{\partial F}{\partial t} \qquad (14)$$

4. If one considers the interaction of the moving electric charge with the current-carrying toroidal coil in the system of coordinates of the moving electric charge, then in the coordinate system of the charge, the eddy electric field will be induced by the vector potential $\mathbf{A}$ of the toroidal coil, which is time dependent, according to the well-known electrodynamics formula

$$\mathbf{E} = -\frac{1}{C} \frac{\partial A}{\partial t} = -\frac{1}{C} (\mathbf{V}\nabla)\mathbf{A} \neq \mathbf{0} \qquad (15)$$

The action of the eddy electric field $\mathbf{E}$ on the electric charge will create a nonzero longitudinal force in the direction of motion of the toroidal coil.

As one can see from Equations (9)-(15), the reality of the longitudinal force of the magnetic interaction between the moving electric charge and the field of the vector potential of toroidal coil can be easily proven within the framework of well-known concepts by several different methods. Taking into account that the examined problem of the interaction of the moving charge with the field of the toroid vector potential corresponds to the Aharanov-Bohm experiment performed by Japanese physicists [8], the above considerations may be considered as an alternative physical interpretation of positive results of the Aharanov-Bohm phenomenon. The positive results of the Aharanov-Bohm experiment may be explained by the conventional classical effect of variations in the velocity of the moving electric charge in the vector potential field rather than by quantum effects, as is commonly accepted by physics community. As a result, de Broglie's wavelength of a moving charge also is changed by the process of interaction. In addition one can conclude that the commonly accepted "fundamental" concept of the "wave - particle duality" (Niels Bohr Copenhagen School) is obviously unnecessary within the framework of new physical concepts.

There is no need to introduce the existence of a "wave-particle duality" in Nature, since the wave effects of moving particles may be naturally explained by the physics of the interaction of moving particles with the medium of the physical vacuum. Analogous wave effects are well known to arise in continuous material media when other material objects are propagating in it. They are manifested through approximately analogous physical dependencies (for example, the aerodynamic generation of sound in air, etc.).

Thus, as is seen, the well-known fundamental concepts underlying to the laws of electromagnetism turn out to be directly connected with many other commonly accepted concepts that are also considered to be fundamental, such as the principles of equivalence, principle of relativity, and constancy of the speed of light and erroneous concepts of the "particle-wave" duality, mass-energy inter-conversion accompanying annihilation of particles, concepts of special "magnetic" and "gravitational" fields, etc.

The basic philosophical (ontological) concepts of modern physics related to initial concepts of any physical theory, such as "space," "time," "matter," "mass," "gravitational mass," "inertial mass," "electromagnetic mass," "defect of mass," "dimensionality of space" and concepts of "time," "invariance of the laws of Nature," "invariance of equations," and so on and so forth, require serious and significant revision. The serious crisis situation in modern fundamental physics [9] is a direct

consequence of many commonly accepted concepts and dogmas of the modern "scientific perspective of natural phenomena". This crisis situation in modern physics is a direct consequence of many conservative scientific viewpoints, unfortunately supported and protected by modern official academic science. The evolution of our consciousness has been influenced by many undoubtedly well known experts and has been evolving for a long time in the environment of specific scientific vacuum and requires immediate revival. Even methods used for dissemination of new knowledge should be improved, if one actually wishes to accelerate the progress of Humankind.

The perspective for practical applications of new previously unknown scientific phenomena and effects looks very attractive, and they may be achieved by cooperative efforts of the human intellect. New breakthrough technologies of the 21st Century will require serious changes of many commonly accepted concepts and dogmas in fundamental physics. This process of progressive development cannot be stopped.

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Large-Scale Sakharov Condition

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Abstract

Recent far reaching theoretical results have used the quantum vacuum noise as a fundamental electromagnetic radiation field to derive a frequency (ω) dependent version of Newton's gravitational coupling term, $G(\omega)$. This paper reconciles the cut-off frequency with the observed cosmological constant, and then briefly puts forward a realizable laboratory test case in the 10 - 100 MHz frequency range. One analogy is drawn between the classical vacuum energy experiments with attraction between two closely spaced plates (Casimir cavity) and the arbitrarily dense material boundaries possible in Bose condensates, such as irradiation at MHz frequencies of superfluid helium or superconductors.

Theoretical Background

Zel'dovich [1] first suggested that gravitational interactions could lead to a small disturbance in the (non zero) quantum fluctuations of the vacuum and thus give rise to a finite value of Einstein's cosmological constant in agreement with astrophysical data. Using dimensional analysis and the suggestion by Zel'dovich, Sakharov [2] derived a value for Newton's gravitational constant, G, in only one free parameter, frequency, ω:

$$G \sim c^5 \left/ h \int \omega d\omega \sim 1 \right/ \int \omega d\omega$$

where c is the speed of light and h is the Planck constant. The free parameter in frequency when integrated over all values from zero to high frequencies must contain the usual integration cutoff value (Planck frequency on observable electromagnetic phenomenon).

Puthoff [3] and others [4 5] have extended Sakharov's condition in a relativistically consistent model to determine constants of proportionality. His model derives an acceleration term in first order expansion (in flat space time), then equates inertial and gravitational mass (by the equivalence principle) to make contact with the gravitational constant, G, directly as:

$$G = \left(\pi c^5 / h \omega_c^2 \right) \sim 1 / \int \omega d\omega$$

which is the Sakharov condition [2,3]. This paper revisits the meaning of the cutoff frequency, ω_c, for radiation interactions, of which the quantum vacuum [6-10] and

theory of multidimensional physical systems gives a direct way to the practice, showing the principles of construction of non-conventional systems and technologies and it allows joining of the paraphysics and parapsychology with the academic science. This theory supposes studying of the multidimensional physical phenomena, which should become a basis of a new direction of science that is named as "the theory of catastrophe". It is beyond doubt that the superfluid properties of ether lie in the base of inertia phenomenon and principle of relativity.

Further development of the physical principles of a new natural science will require a lot of time and efforts of the scientists of various specialties, while in the third millenium a strict theory will be constructed by means of application of mathematical methods for it. It will be similar to Feinman lectures on physics by its depth and seeming completeness.

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The Main Principle of Etherodynamics

Alexander M. Mishin

Experimental research work by Dr. Mishin leads to astrophysical discovery: The Center of the Universe is determined now. A unique gaging equipment was made by the author. This is the so called "device with an artificial biofield", which reacts to the strength of the ether wind.

Empirical studying of physical principles of the Universe discovers new sides of superfine, superfluid three-dimensional matter. All things existing in the material World were created from this matter. Our predecessors have been called this matter "ether" (it means "fire" in Greece) from the ancient times. They understood that it is a physical essence, which is very mysterious and incognizable in principle. In fact, the vortex-wave disturbances of ether are material, i.e. they contain energy, how we understand it, and thus they are observable. They occupy a space-time spectrum from zero to the Universal scales. A particular interval of this spectrum is given to the known material particles, which constitute the dense physical World. We are connected with this World energetically. The simplest ether vortexes (as in common superfluid liquid) looks like torus, vortex threads, solitary waves, but the long living elementary particles are the peculiar stereodynamically multidimensional auto-oscillating systems. Their main energy properties were described by V.I. Ilin [1]. Now the experimental methodology and devices, which allow us to observe and study the vortex-wave forms of ether (not belonging to our real World) are developed [2-5].

We should note that the properties of free ether are principally different from the properties of ether, which is a form of steady real matter studied by the official science. In the earth laboratories the laws of classic physics, which describe the processes in matter, are performed at 96% on average [6]. In the limits of Galaxy the laws of free and bound ether act together and dynamics of the entire Universe is subjected only to the laws of free ether since the common matter and anti-matter constitute the insignificant part of its volume.

At the same time special observations and experiments show that in real Nature the well-known elementary particles are accompanied by the topological multitude of other vortex-wave structures of free ether (topological harmonies look like the famous toy Matryoshka), which are situated conditionally in solid, fluid, gaseous, plasmic quasimaterial state as well as in the fifth particular state. This state was recently opened by American scientists and was called "fermion gas". The main laws of multidimensional etherodynamics were given in my previous articles [2-5,7,8]. However, the vortex-wave processes in free ether have unique properties unknown in the material World. The given article is devoted to the consideration of these

properties. Further the notions "material" and "anti-material" are applied for the vortex-wave structures independently from the characteristic sizes of ether vortexes (level of the Universe).

New properties and possibilities of the modified electromagnetic auto-oscillating system with an artificial biofield were described in the work [5]. This system contains the linear pendulum, which swings in the horizontal plane with its own frequency of 1-7 Hz. Further research showed that the full pattern of ether waves disturbed by the pendulum looks like more complex and corresponds to the image on the Fig. 1 (in horizontal plane). Here the point 8 means the vertically located axis of pendulum. The swinging load 9 is shown in the center of the drawing. At first I demonstrated this diagram in the report on the International Congress in Saint Petersburg, 1998 [9].
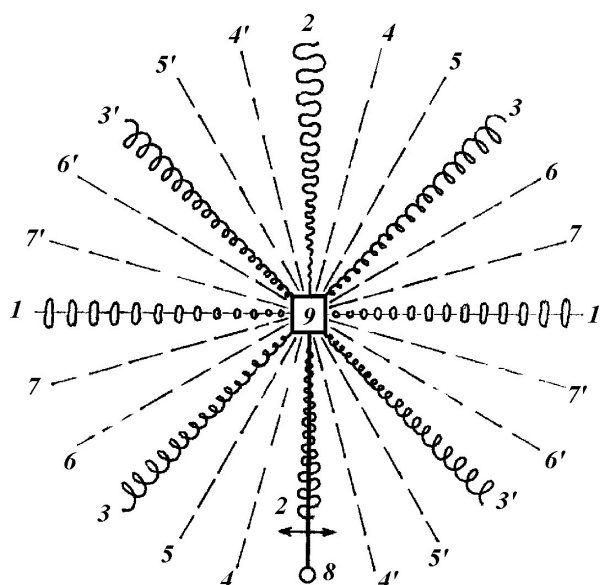

Fig.1

I will shortly remind about the methods of experimental research. Since we speak about the radiation of the narrow beams with the frequency of few Hz and divergency less then 2^0, then it is clear that there are principally new, non-traditional wave processes. These waves are propagating by the ether model with a small speed, because they belong to the macroscopic area of the vortex spectrum [8]. The beams shown on the Fig.1 are easily observed by the method of extrasensory perception. Along with this, the non-traditional waves are not only radiated but also registered by device with an artificial biofield [5]. Of cause, studying of ether properties is a laborious work, which can be compared by a traditional physicist with the work in a common laboratory and with common devices, but in a full darkness.

And now let's make some qualitative physical discussion on the nature of waves disturbed by the mechanical pendulum in a particular superfluid material medium in conditions of air atmosphere and gravitational field of the Earth.

Radiation along the line 1-1, which coincides with the direction of oscillations of pendulum, can be considered as longitudinal toroidal ether waves, which are the most neutral vortexes. They twisted only in the direction of the movement. The same kind of the wave is propagated to the left and to the right, but in opposite phases. With the extrasensory perception the longitudinal waves are "soft", elastic, corresponding to the properties of matter the load pendulum made of. However, the last circumstance, which demonstrates the "matter" of macrovortexes corresponds to all kinds of waves considered further in the same manner.

We should understand the matter of ether vortex as an assembly, spectrum of smaller vortexes of deeper levels, which take part in the localized movement under consideration. Since the vortex spectum of ether is quantized in all conceivable spatial scales (and corresponding circular frequencies) any ether processes have the same character.

Accordingly, in the perpendicular direction 2-2 the transverse waves are formed, which can be called the topological harmonies (sub-harmonies) of classic electromagnetic waves, because their vortex structure in this experiment has macroscopic sizes or rather sizes of vortexes, which form the waves. According to Azukovsky [10] these waves look like the Karman's track and it is close to the truth. These waves are perceived weaker both by the sensor way and artificial biofield device, but, however, it is not the evidence of their smaller intensity.

By the line 3-3 at an angle of 45^0 in the direction of the movement of pendulum (in the direction of propagation of longitudinal waves) a particular longitudinal-transverse radiation is formed. This radiation has a left helical spiral vortex structure with a twist angle of 45^0 and torus twisted in two directions. The research showed that this radiation corresponds to the common matter structure called in traditional physics "de Broglie waves". These are the most "heavy" and viscose spiral waves, which interact with the matter in a largest extent. In the direction 3'-3' the radiation has an analogous character, but with the right twist. It corresponds to the antimaterial, weakly perceived structure. The longitudinal-transverse waves are the protomaterial or quasimaterial formations only. In this case they belong to the macrofloor of the Universe and correspond to the essences of "jan" - "in" subtle energy in ancient Chinese philosophy.

Let's remind another time that while propagation of longitudinal waves on the surface of the Earth the left longitudinal-transverse wave is material, and the right wave is antimaterial. The similar waves represent the consecution of toroidal vortexes, which are twisted in two directions in such a manner that the point on the surface of torus moves along the right or left spiral at an angle of 45^0.

The quasimaterial spiral properties manifest also in the radiation in directions (4-4)-(7-7), which belong to the kind of unexpected longitudinal-transverse waves with an angle twist of 15^0, 30^0, 60^0 and 75^0 and the same antimaterial radiation in directions (4'-4'-)-(7'-7'). The intensity of these vortex-waves according to the available data is lower in comparison with the main ones (for the used methods of registration).

All considered radiation is propagated mainly in horizontal plane. The explanation of this feature is the fact that the near-Earth layer of ether in the part of spatial-time spectrum of vortexes under consideration has a pronounced vertical anisotropy and in horizontal plane it is practically homogeneous. It is experimentally proved that anisotropy of ether is stipulated by the gravitational field of the Earth [11]. We should take into consideration the fact that gravitation directly influence the process of formation of ether waves. That's why in the vertical plane and other planes ether waves have their features and now they are not studied enough. But it was stated that the material waves are propagating from the horizontal plane downward and the antimaterial waves are propagating upward. The radiation Rose also is formed in the planes, which pass through the beam of the longitudinal wave and situated at the angle of 45^0 to the vertical plane.

The given waves in free ether are sufficiently different from the known elastic waves, because in this case the radiation can be considered as a flow of macroscopic quasiparticles, which propagate with the low speed and divergence of about 2^0. (These 2^0 are due to the curvilinear movement of the pendulum. In reality the beam practically does not diverge). The wave properties nevertheless conserve and manifest in the partial reflection from the boundary layer and in the realization of the laws of geometrical optics with passing through the common lenses. As it is known, the optical properties of non-traditional waves was firstly discovered and used by N.A. Kozyrev [12]. In the solid ether phase, for example, in gravitational field elastic waves can also be, which do not have their own vortex structure, but these dynamic processes belong to the particular quasimaterial ether ("hologram" of the standing waves).

Technically simple and very difficult in method physical experiment described above has a deep cognitive meaning and allows to make the following conclusions.

1. Since the longitudinal-transverse wave with the twist angle of 45^0 as de Broglie wave corresponds in the microworld to the classic material structure (in the form of elementary particles) then other ether waves of this kind with another twist angle found by us should correspond to some forms of matter. It will be rational to include them into the program of scientific research. Potentially there can be 4 kinds of elementary particles and antiparticles besides the known ones. They can belong to our spatial-time floor as well as be situated beyond its limits or in some other vibration range.

In traditional physics the momentum of elementary particles is characterized by the spin quantum number. This number for photon is equal to 1, for electron it is equal to ½ and for pi-mesons it is equal to 0. According to the diagram on the Fig. 1 the transverse ether wave corresponds to photon. The longitudinal-transverse wave with a twist angle of 45^0 corresponds to electron. The longitudinal wave corresponds to pi-meson. Our experiment states that there are should be elementary particles and antiparticles of 1/6, 1/3, 2/3 and 5/6 spin.

According to the principle of topological and system fractalality [7] the seven-beam rose of material vortex-wave radiation inhere to all scales of the Universe including geophysical, solar and others. We should remember that the notions "left" and "right" as well as the notions "top" and "bottom" have their sense only with the presence of gravitation, when the processes in the vertical plane are considered. Any gravitating system has a center of gravitation, i.e. any physical body or system from elementary particle to the entire Universe. However surprising it is, but we can find a lot of mentions about seven vivifying beams of "light" in esoteric sources.

2. All waves in free ether has a vortex nature (we do not consider the elastic waves in the quasimaterial solid state here), then it will be logical to apply the stated principles of wave etherodynamics to all natural range of spatial-time vortex scales. Then the longitudinal and transverse waves appear to be common to all material and antimaterial Worlds. Therefore, we cannot determine by optical and other kinds of electromagnetic radiation, what object we observe, i.e. we cannot differ galaxy from antigalaxy. This fact should be noted by astrophysicists.

It is also evident that double and triple non-traditional images of cosmic bodies now can find their explanation taking into consideration the existence of seven kinds of narrow-beam material ether waves, which appear in every gravitating system (for example, the double image of the Moon given in [5]).

3. The speed of propagation and its own frequency (angular speed of rotation of vortexes) of the ether wave are in inverse proportion to the size of vortexes, which form this wave. Therefore, to the left of the microworld with the decrease of vortex scales the speed of waves (topological harmonies) will more and more exceed the speed of light, and to the right of the microworld the waves (topological subharmonies) will slow down [8].

Registration (detecting) of non-traditional wave by common physical methods is complicated because of the fact that there are an energy and informational barrier between the vortex-wave structures of ether, which belong to the different areas of the spatial-time vortex spectrum (different levels of the Universe). This barrier reflects the fundamental property of the superfluid ether as a stereodynamically multidimensional synergetic system [7]. We can say,

that the principle of least action is realized here on the ether level. An ability to control the above mentioned barrier lies in the base of functioning of all natural stable systems and it is specifically realized in the world of elementary particles and in the animate nature. It stipulates the permanency of all around us. The "lifetime" of the devices with an artificial biofield [5] in the same laboratory conditions lies in the limits of three hours up to several days. The devices are tested, which really react to the non-traditional disturbances during several weeks. It can be also that the given barrier spoils the life of many inventors tried to discover the perpetual motion machine, because they try to use the superfluid free ether as a working body of their machines.

The ether waves are represented in our World as flicker-noises, which characterize the change of penetrability of energy and informational barrier in time and with the growth of vortex size (decrease of circular frequency). They statistically reflect the influence of cosmophysical factors [6]. The external connections of the Earth on the classic material and field levels have another nature. Energy of this nature is defined by the spiral movement of the protogalaxy vortex of the fine-structure ether.

Characters of the flicker-noises as well as other experimental facts prove our supposition that the penetrability of the energy and informational barrier grow with the increasing of the spatial scale of the physical process. For example, the registration of the North-East ether wind in the laboratory condition can be made effective only during the first 3 hours. But such open systems like trees can detect this wind continuously that is proved by the corresponding asymmetry of their inner structure (pattern on the stumps) [4]. Thus, the influence of free ether really grow with the increase of the vortex size. We wrote about it in the beginning of our article. This fact should be taken into account for the theoretical models. When the experimenter creates the artificial biofields, i.e. overcome the energy and informational barrier, he oversteps the limits of the natural spectrum of ether vortex disturbances. This activity is amenable and dangerous. The so called "electronic smog" is also a kind of non-traditional technologies. It is created by all modern electromechanical devices in spite of the fact that the designers of these devices are not concerned about ether.

4. The next fundamental direction of physical research is a search and studying of methods to "stop" the radiation, i.e. studying the transformation of vortex-wave protomatter into the localized auto-oscillating systems (elementary particles). The methods to solve this problem require the further detailing of empirical model of stereodynamically multidimensional ether with the development of the main Principle of the Universe. The frames of this law we will describe below. Now we can only suppose that beyond the spatial-time limits of the common matter, in other quantum areas of the vortex spectrum the "temperatures" of quasimatter

are below the absolute zero even on the surface of the Earth. That's why in this case there are no circumstances for the appearance of the steady "stopped" vortex-wave forms (macro- or femto-scopic elementary particles). It is evident, that the huge flow of additional energy is necessary for the wave structures (moving in straight lines) to transform into the real matter. However, the phenomena of a ball lighting or UFO are undoubtedly prove the reality of existence of macroscopic elementary particles.

It should be understandable that now we are taking the first steps to the general theory of ether waves and quasimatter. Beyond the limits of the given physical experiment applying another empirical material it was discovered that any flow or movement of ether has vortex-wave properties independently from its origin [4,7,11]. A physical body situated in the ether flow becomes a source of secondary radiation taking into account the hierarchy of gravitational fields. But according to the scheme described above the ether waves of all 12 kinds are generated by the body in three planes. With this we consider the body as any material object having the classic mass.

Thus, besides the considered macromechanical method (Fig. 1) the ether waves as topological subharmonies and insufficiently known harmonies (femtoscale) are disturbed by all forms of material movement including electrons. That's why the spatial-time spectral composition of non-traditional waves is very wide and diverse, which creates the known difficulties to identify and study them. And when the physical principles of these waves are generally unknown, the discussions on the "non-physical component" of laser emission [13], chronal and torsion fields, psi-waves and other things begin.

(Editor's: We should note, that "non-physical" chronal, torsion and other fields mentioned here by Dr. Mishin are considered by others as real physical fields).

... we could determine the true coordinates of the Center of the Universe

Fundamental principle of etherodynamics plays an important role in formation of the Universe including our dense world. The twelve-beam rose of vortex-wave radiation allows to see the deep layers of electrodynamics. For example, on the base of this law a fine ether structure of electromagnetic fields was discovered and a new physical phenomenon was theoretically forecasted. This phenomenon was further discovered during the laboratory experiment. We will consider this phenomenon in the next article.

Rotation of the Earth creates the ether flow (ether wind) from the East to the West, which in every point of gravitational field of the Earth forms 12 beams in horizontal and other planes and creates a steady grid

of spiral vortexes and antivortexes. We call it Hartman's grid [4]. The most intensive material longitudinal-transverse waves (de Broglie's waves) are directed from the North-East to the South-West (that is Chinese term "jan"). The analogous antimaterial waves (that is Chinese term "in") having the characteristic sizes of macroscopic vortexes are directed from the South-East to the North-West. In my experimental practice the geophysical jan-wind was the first to discover, and it called a great perplexity, why it deviates to the South-West and does not coincide with the direction of the Earth's rotation [2].

The spiral-vortex cellular structures should also exist in the gravitational fields of the stars, galaxies and the Universe. It is very important that in the last case the process of rotation creates the spatial grid of galaxies and antigalaxies, which cannot have the steadiness of Hartman's grid in free ether. First of all, galaxy is a vortex, which contains the spiral with an angle twist of 45^0. The common matter is born in the structure of this vortex and fractally manifests itself. The quantity of galaxies and antigalaxies, matter and antimatter should be the same in the scale of the Universe. This is a fundamental property of free ether. A spirally symmetrical world of stereodynamic topological harmonies accompanying the material processes on the Earth can be called virtual in comparison with the left spiral dense physical world, or the physical plan according to esoteric science.

To hasten the understanding of the properties of real ether to the notions of classic physics we can say that for the separate galaxy ether is described by the theory of two-component superfluidity by Landau, where the normal component is presented by matter and the superfluid one is presented by free ether. Then the known state of superfluidity (for example, helium-II) and the fifth state of matter as a "fermion gas" appear to be transitional between matter and free ether.

The main principle of etherodynamics (Fig. 1) allows to identify the global anisotropy of space [14,15] with the material longitudinal-transverse de Broglie's wave, which is created by rotation of the entire Universe. And the main universal longitudinal ether flow, which can be registered on the surface of the Earth, constitutes the angle of 45^0 with this direction. Having the data on the radiation Rose we could determine the true coordinates of the center of the Universe in equatorial system:

right ascension $\alpha=330^0\pm3^0$;

declination $\delta=-30^0\pm5^0$.

According to the observations of the activity of the Center by non-traditional method in 2001, the maximums of radiation were registered on March 5, 22, April 3, June 4 and 26, July 15 and 28, August 23, October, 10. Members of SAO RAS in Pulkovo documentary proved a synchronous increase of activity

of radiation of the Sun on the wave of 4,4 cm. It was noted that the discovered Center of the Universe coincides in its direction with one of the quasar groups, while another group of these objects is situated in the same plane ($\delta=-30^0$) at the angle of $\alpha=15^0$ [15]. It is characteristic that the angular distance by α between the quasar groups constitutes 45^0.

As it is follows from the above-stated, the main principle of etherodynamics, which makes clear the dynamics of the Universe and explains the causes of matter and antimatter formation is as significant as the law of gravity. In the limits of the received empirical data we have let's formulate this law as follows.

Any dynamic physical process disturbs 12 kinds of the vortex waves in free ether including longitudinal, transverse and longitudinal-transverse, which propagate in straight lines as narrow beams in every 15^0 in perpendicular, parallel planes and the plane at the angle of 45^0 to the gradient of gravitational field. From the vertical zero plane, which goes across the longitudinal wave to the left from the observer (if the observer is normally oriented in the gravitational field facing to the side of the propagation of this wave) material vortex-wave flows are created. To the right from the observer antimaterial flows are created. In the perpendicular plane material waves are directed downward and antimaterial ones are directed upward.

Waves radiated in the perpendicular plane at the angle of 45^0 (and possibly at other angles) require further more detailed studying.

We have mentioned above the main consequences from this law. But I should note another time that the external ether flow (longitudinal wave) interacting with the Earth creates the quasimaterial de Broglie's wave on its surface in horizontal plane (spiral wave at the scale of the Earth). The wave can be easily registered. This wave deviates by the course of movement at an angle of 45^0. That's why the attempts to identify this wave with a hypothetical cosmological vectorial potential, which is perpendicular to the axis of rotation of the Universe [14, 15] are scientifically baseless.

In the real Space there are a lot of hierarchical small and big gravitational centers. That's why any rose of ether radiation reflecting the superposition of gravitational fields represents a complex many-beam and many-level formation. Studying of this formation seems to be a very important problem in science.

We can only regret that in spite of the evident constructive nature, the concept of ether is suppressed until now and is refused by the official science. To overcome the "ether blindness" we should only strain our intuition and senses. Then, if we overstep the limits of stereodynamically one-dimensional material world (concerning ether), we will open a wonderful and unknown new physical reality on every laboratory table, in every movement. I wonder why the academic elite is satisfied with the ideas of primitive materialism, why

it is bewitched by the illusion of simplicity and power of easily controlled "technocratic chariot", which is on the road to ruin?

The author is grateful to Dr. Alexandra A. Shpitalnaya, who assisted me in discovery of the correlation between the solar activity and processes in the Center of the Universe.

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COMMENTS ON THE WORKS BY DR. MISHIN

Fundamental research in the field of etherodynamics made by A.M. Mishin covers a wide range of phenomena including those connected with the method of registration of direction of global cosmic anisotropy.

There were found some directions, which are the cause of appearance of new physical interactions. These interactions are responsible for the fluctuation of solar activity and geodynamic processes on the Earth and other planets of the solar system. The direction, which cross the coelosphere in the point with coordinates of straight ascendancy equal to $330°$ and declination equal to $-30°$ (the second equatorial coordinate system) is the most interesting for the astrophysical application.

The author called this new discovered direction "the Center of the Universe" (CU). By means of observations with a big radio-telescope in Pulkovo, St. Petersburg, a new phenomenon was discovered in the microwave range of wave lengths (4.4 cm and 6.2 cm). This phenomenon consists in the following: after the disturbance of "the Center of the Universe" (this disturbance can be registered by A.M. Mishin by means of device with an artificial biofield) a powerful increase of radio frequency band radiation of the Sun were registered during next several days. This radiation also is accompanied by the disturbance of all nonstationary processes on the Sun. Thus, the new unique possibilities of short-term forecasting of solar activity appear.

The problem appears, which is connected with evaluation of simultaneous influence of activity fluctuations of CU on the nonstationary earth processes. First of all, the meteorologists, seismologists and services of Ministry of Emergency should pay attention to this activity.

The work of A.M. Mishin can be realized for the development of a detailed program of earthquake prediction and meteorological forecasting in various regions of our planet.

Members of Pulkovo observatory:

Senior staff scientist   /signed/   Dr. A.A. Efimov

Staff scientist   /signed/   Dr.A.A. Spitalnaya

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.
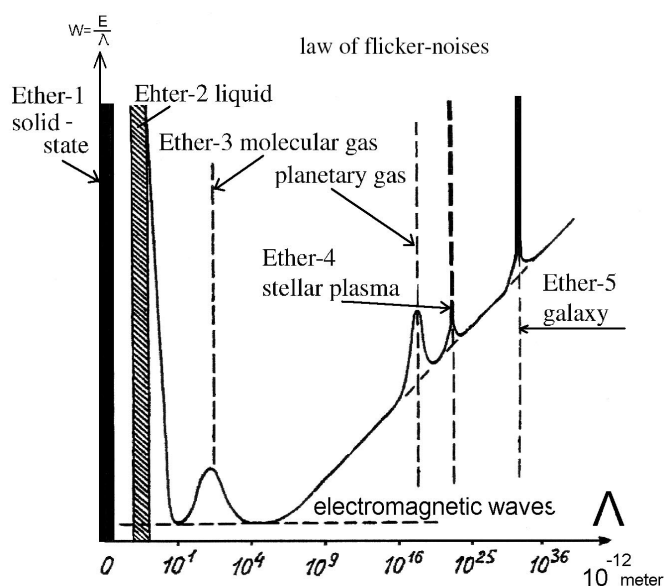

Fig. 1

We should pay attention to the very important point. **If the vortexes of ether of any size have the properties of elementary particles, then the enlargement or fragmentation of such vortexes is inevitably related with the emanation or absorption of energy.** We speak about some analogue of known reactions of decay and synthesis in the microworld. But as it was told above, the transformation or bifurcation of ether macrovortexes is **accompanied by the change of time course.** That is why Prof. Kozyrev's concept of materiality of time [7], which is able to emit or absorb energy, becomes clear and justified in some extent.

On the Fig. 1 you can see that ether can be in solid-state, liquid or gaseous phases simultaneously. At the same time it was proved that every separated mass has its own solid-state (liquid-crystal) subspace as a material base of its gravitational field. Independent experiments also show that near-Earth environment is anisotropic in vertical direction. The cells of vortex-wave grid of the solid-state ether enlarge with the increase of altitude, that is equal to the decrease of mass-energy of space and change of its "phase" property. Any body moving in the direction of gradient is forced to adjust its associated ether mass ("fur") according to the structure of surrounding space. That is why with the movement upwards the body looses its mass
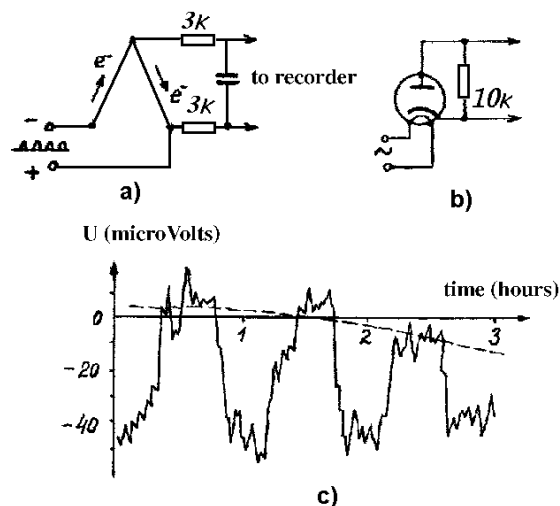

Fig.2

with the speed of $\dfrac{dm}{dt}$ and with the movement downwards it acquires its mass. In result the force of antigravitation $\widetilde{F} = \dfrac{dm}{dt}\upsilon$ acts on the body independently from the direction of vertical component of the movement, though the real dependence $\widetilde{F}$ from the speed of the body υ is nonlinear and requires a special study.

The space-time spectral transformations, as it was mentioned, are accompanied by the energy processes.

In this case the energy is emitted with the movement of the body upwards. With the movement downwards the energy is absorbed. We can connect this fact with the change of time property.

We should constantly remember that the phenomena of "flickering" physics and force of antigravitation appears and disappears spontaneously in technical systems. Sometimes it leads to the accidents. Only representatives of the animal world can "consciously" control the force of antigravitation. Experimental evidences of the stated theoretical clauses were begun from the use of electrons as a testing body.

First electromechanical experiments were made to estimate the fact of existence of the force $\widetilde{F}$ and its direction qualitatively. To perform these experiments the copper wire with the thickness of 3,0 mm was curved at an angle and powered with the monodirectional pulsing current J=0,5 A according to the scheme on the Fig. 2a (through the transformer and diode from circuit 50Hz). The oscillogram received on the recorder EN-3001 during the change of position of the conductor from the vertical to the horizontal one (one measurement in every half an hour) is given on the Fig. 2b. The diagram shows that with the horizontal position of the conductor the voltage is close to zero and with the vertical position the negative voltage up to 50 micro Volts will appear on the top. The dotted line corresponds to the drift of zero of the measuring equipment. In 3 hours the voltage falls 2 times. On the next day the effect in this circuit was observed during one hour or even less. When the copper wire was changed on the iron one, the voltage jumps appeared. These voltage jumps were two times higher than the level of previous signal.

The effect of anisotropy of space on the free flying electrons in the electrovacuum diode with a flat anode was experimentally tested (Fig. 2c) that also proved the presence of a new force. A difference in electrical voltage for the case, when the diode is installed with his anode up and down was 40 micro Volts during the first experiment. With the repeated experiment the effect was very small (on the noise level). It is an evidence of the fact that the energy and information barrier for free particles in vacuum appears very quickly.

The first series of experiments in a laboratory proved that anisotropy of near-Earth space with the movement of microparticles creates a specific "flickering" force of antigravitation. But the change of mass of the electron (as it is with any defect of mass) should be accompanied by the energy processes. In this case the release of energy with the movement of electrons upwards as well as its absorption with the movement backwards was expected. A laboratory unit was made to check this fact. It is shown on the Fig. 3.

Here, through the rectangular loop made of nichrome wire of 0,25 mm diameter, the pulsating or direct current I=0,6 A was run. It led to the heating of the wire up to 30-40° C (Fig. 3a). A thermopair was situated in the
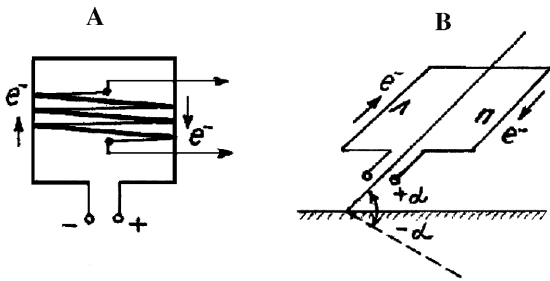
Fig.3

middle of the loop to measure the differential temperature $\Delta T°C$ between the left side and the right side.

Electrical signal, which is proportional to the differential temperature, entered the recording microammeter. We can see the dependence between the ratio of temperatures on the upward and downward sides of the loop and position of its plane regarding the horizon (angle α on the Fig. 3b). The obtained oscillograms are given on the Fig. 4.
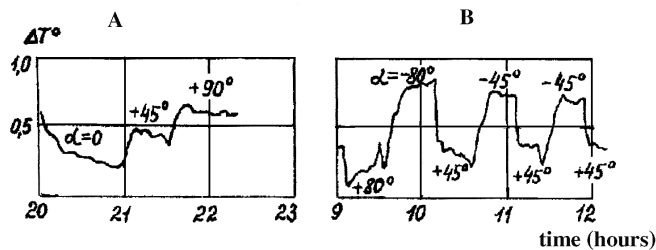

Fig.4

We should immediately note that the diagram on the Fig. 4b corresponds to the expected heating of the side of the loop, on which the electrons move upwards. But we can see an opposite situation on the Fig. 4a. There were other records of direct and reverse thermoelectrical effect. We can explain this situation by the following way.

The fact is that two oppositely directed thermodynamic processes act in the metal conductor. The first is the force $\tilde{F}$, which pushes the electrons upwards so, that they are accumulated in the upper side of the loop. It was proved by the first series of experiments. But such situation for electrical circuits is analogous to the decrease of electrical resistance for the upward flow of electrons and to the increase of resistance for the downward flow. That is why the left part of the loop should heat up less than the right one for the positive angles α (see Fig. 3). This result was recorded on the oscillorgam (Fig. 4a).

From the other side, the electrons moving upwards adjust their existence with the changes of spatial structure and they loose the part of their mass. The thermal energy should be released in this case. Diagram on the Fig. 4b shows this result. The circumstances, which give an advantage of appearance of one or another thermoelectrical effect should be studied in

details further. But we should take into account that the first record on the Fig. 4 was obtained with the direct current and the second one was obtained with pulsating current with the frequency of 50 Hz. It is important to underline that both effects are the result of a gravitational anisotropy of the near-Earth space.

Having the experience of non-traditional astrophysical observations [2-6], it was attractive to use the described laboratory units as recorders of gravitational disturbances caused by space bodies. The last scheme of artificial biofield appeared to be more flexible and vigorous. This scheme has a good spatial selectivity (the width of the main directional lobe on the level of 0,7 is about 2°) and high sensibility of the differential temperature $\Delta T°C$.

It is attractive to use the described laboratory systems as recorders of gravitational disturbance

The results of the observations are given on the oscillograms on the Fig. 5, where the Moscow standard time in hours, date of experiment and geodesic azimuth of the main sensitive axis β are given. We measured only the local horizontal component of the external disturbances in the near-Earth space, i.e. the direct ascent $\alpha'=\beta$ on the latitude of Saint Petersburg.

On the diagrams **a** and **b**, Fig. 5 we can see a powerful clear signal from Jupiter planet (during its passing through the main direction of the immovable recorder due to the Earth revolution) as a sharp impulse with secondary disturbances following it. Such result may be related to the phenomenon of electrical self-induction because mechanics of macroether is inseparable from its elecrodynamics. The signals received on November 19 and 20, 1998, were separated in time on 25 minutes. It corresponds to the real angular speed of Jupiter regarding Earth, which is about 6° in a day.

On the oscillorgam *c* a signal from the Sun is recorded, where the front steep corresponds to the appearance of the Sun disk and the next part of impulse
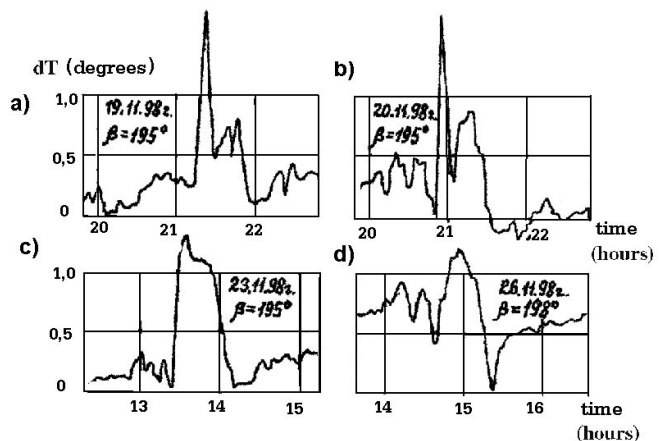

Fig.5

characterizes the aftereffect and, may be, the sun wind. Finally, on the diagram **d** the anisotropy of space is recorded. This anisotropy was discovered by Baurov, Efimov and Shpitalnaya [8,9] and was called by the author of this article the BESH anisotropy. According to our research this anisotropy is caused by ether wind, which is disturbed by the Universe rotation in a whole.

The given method of recording of non-traditional disturbances is clearer in a physical sense in comparison with methods tested before [1-6], because it relies on the new physical force created by the movement of mass in anisotropic space. The unexpectedly high-power signal from Jupiter planet can be compared with the influence of the Sun and the Moon. It is the evidence of the fact that only for the small bodies (according to the space measures) divided by the big distance the mutual influence on the structure of gravitational subspaces is very considerable. It is so considerable that anisotropy due to the gravitational field of Jupiter in the near-Earth space can change the temperature of the conductor in the simplest electric circuit at the whole degrees (!).

Unfortunately, if we don't take any specific measures, then the sensibility of the described recording device falls in 3-5 hours due to energy and informational barrier appearing between the non-uniformly scaled vortex-wave forms of ether. Ether acts in a similar way in respect of any other physical processes. That is why the study of methods and means of regulation of the energy and informational barrier in laboratory and natural conditions should become one of the main directions in modern physics. We should take into consideration that exactly "flickering" effect of parallel worlds lies in the basis of the present catastrophe theory.

There is a conclusion from the modern theoretical model of gravitation that the Moon ocean ebbs and flows on the Earth should be two times more than the Sun ebbs and flows. But the real correlation is equal to 5. This considerable difference is the evidence of imperfection of the universally recognized theory and needs a special study of structure of solid-state subspaces of ether, which are responsible for gravitation and antigravitation. At the same time we should pay attention to the change in parameters of the planetary orbits and "surfacing" of the train of comets, when they move through the gravitational field of the Sun that also can be explained by the antigravitational force effect.

The main thing is that on the basis of these results the principle of universal energy exchange was formulated [4], which states the spontaneous formation of thermodynamic potentials in space bodies. It explains how the energy inside the planets and stars is created. A new principle of energetics and effect of antigravitation can clarify the temperature anomalies in the atmospheres of the Earth and the Sun.

In conclusion we should note that these experiments are related to the least studied field of natural science.

They are technically simple, but they involve the fundamental principles of physics. They require some particular skill to obtain a positive result. But didn't we need an ingenuity in mastering of the first electric motor or the first semi-conducting device (Losev's crystadine)? And now the electric motors and tunnel transistors are easy and safe in operation. The same thing may occur to the artificial biofield devices. The principle of operation of these devices is based on the use of specific multidimensional properties of ether.

It is interesting that from the classic physics point of view we can call the research made by author the "search of determined patterns in informational array of the "flicker-noises". S.E. Shnol saw the reason of these flicker-noises in the effect of "cosmophysical factors" [10]. But it is more important that Shnol's "flickering" physics was considered only for the near-Earth space. And in its main essence it is the real determined physics of the cosmic gauges, i.e. it is Ether Physics. Many scientists on the Earth do not suppose the existence of it yet now.

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Research on the Capacitance Converter of Environmental Heat to Electric Power

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Nickolay E. Zaev works on creation of the prototypes of converter energy, which do not require any fuel. The direct conversion of environmental heat to electric power is possible in the processes of "charge-discharge" in non-linear condensers or by means of "magnetization-demagnetization" of ferrites. Such converters of energy create cold and electric power without any fuel.

Theory of the converter, results of early experiments on the generation of microwatt power, methods and features of research are given in this article. The methods of generation of a few watts power are described in details. The possibilities and difficulties of creation of powerful capacitance converters are discussed in this article.

I. Grounds of research.

1.1.   From positions of orthodox physics there is no subject of research. It is evident that the energy of charging (C) A_c condenser C_x is always equal or more than the energy of discharging (D) A_d, i. e. always $A_c \geq A_d$. Only the advanced analysis shows that it is not always true. Exactly, in C_x, where $\frac{\partial C}{\partial V} < 0$ an inequality $A_d > A_c$ is possible, and in C_x, where $\frac{\partial C}{\partial V} < 1$, then the work $A_c > A_d$. Therefore we should discuss the nonlinear capacitors (NC). In the end of 1969 I noticed a systematic inequality $A_d > A_c$ during the measurement of A_c and A_d

of many capacitors with different dielectrics. Theoretical grounds and results of measurements of this phenomenon are given in the publications in 1984 [1], [2, page 73]. On the industrial standards NC (varicond), ceramic condensers VK2-ZSH, $4 \cdot 6,8 \cdot 10^{-9} \mu F$ with an optimal voltage about 95 V it was stated that $\frac{A_d}{A_c} \sim 1,21$ with the power to about $98 \cdot 10^{-6}$ Wt and "generated" extra power is equal to $21 \cdot 10^{-6}$ Wt.

1.2.   In [1] and [2] the strict theoretical proofs of realization of $A_d > A_c$ (there are four of them) are given.

On 1m³ of dielectric $\left| A_d \right| - \left| A_c \right| = -\frac{1}{2} a \cdot \varepsilon_0 \cdot E_c^{3}$ (E_c is an intensity of the field, V/m; ε_0 is a dielectric constant of vacuum, a is a coefficient of nonlinearity of the capacitor). Below we state one more proof more connected with the parameters of circuit.

It is well known that with the charge of a linear capacity from the source of constant voltage V_0=const through the resistor R=const it gets an energy $A_c = \frac{C \cdot V_0^{2}}{2}$ exactly equal to the output energy in the time of charging t_c The output energy irradiated from the load R is a Joule heat $\Theta = R \cdot \int_0^{t_c} i^2 \cdot dt$ [3, page 546]. If NC (nonlinear condenser) is charged, then there are no proofs of such equation. The NC are the variconds or other capacitors, which have $\frac{\partial C}{\partial V} > 0$ in the interval V=0÷V_k. For the variconds V_k is some voltage, which corresponds to the maximum C_v. If V>V_k, then $\frac{\partial C}{\partial V} < 0$. For some other capacitors V_k is a voltage breakdown.

For further consideration let's believe that in the operating area of the given sample of varicond a function

$C_e=C_0(V_c)$ is linear, i.e. if C_0 is a nominal capacity (with $V_0\cong0$), then effective

$$C_v=C_0+a\cdot V_c \qquad (1)$$

and $V_c=V_0-i\cdot R$ and $dV_c=-R\cdot di$ [4, page 30,33]. In any moment $dQ=R\cdot i^2\cdot dt$, and in varicond

$$dA=\frac{1}{2}d\big[(C_0+aV_C)V_C^2\big]=\frac{1}{2}d\big[C_0V_C^2+aV_{Cc}^3\big]=$$
$$=C_0\cdot V_CdV_C+\frac{3}{2}aV_C^2dV_C=\Big(C_0+\frac{3}{2}aV_C\Big)\cdot V_C\cdot dV_C \qquad (2)$$

With the charging of NC because of $dV_c=-R\cdot di$, i.e. $i\cdot dV_c=-R\cdot i\cdot di$ it is clear that power of R and C_v are equal in any moment with $V_0=$const. That's why the integrals due to the process "C" will be equal. With "D" it is indisputable, all energy of NC will radiate from load R. Thus, in NC like in LC (linear condenser) the energy of charging is equal to joule energy on R.

More significant is the feature of energy of NC. With the charging the voltage on it:

$$V_C=\big[V_0-(Ri+dV_C+dV_C)\big]=\big[V_0-R(i-di)\big]$$

It is constantly lower than in the case with LC, when it is equal to $V_0-i\cdot R$ due to the formation of additional (virtual) capacity $dC=a\cdot dV_c$, which call the additional current **di** in the moment **dt**. The reason of **dC** is the features of molecular structure of dielectric. Namely it is ferroelectric. After the charging is finished $V_c=V_0$ and capacity of NC, $C_{v_0}=C_0+aV_0$. A corresponding energy

$$A_c=\frac{1}{2}C_{v_0}\cdot V_0^2 \qquad (3)$$

It is justified to consider it consists of two parts:

nominal $\qquad {}_NA_c=\frac{1}{2}C_0V_0^2$

and virtual

$${}_VA_c=\frac{1}{2}a\cdot V_0^3 \qquad (4)$$

With discharging of this NC, if $C_{v_0}=const$, the energy of discharging A_d could be equal to the energy of charging A_c. But with the charging the virtual capacity decreases. ${}_NA_c={}_NA_d$, but the virtual capacity gives the energy in a different way:

$$dA_V=\frac{1}{2}d\big(aV_0\cdot V_0^2\big)=[aV_0]\cdot V\cdot dV+\frac{1}{2}V^2d[aV] \quad (5)$$

While integrating we get:

$${}_dA_V=\frac{1}{2}aV_0^3+\frac{1}{6}aV_0^3=\frac{2}{3}aV_0^3 \qquad (6)$$

i.e. on $\frac{1}{3}$ more than the energy, which was in the virtual capacity at the moment the charging began. Energy is taken from free (heat) energy of ferroelectric. B.B. Golizin showed the possibility of such mutual conversion in dielectrics in 1893 [5]. It is a pity, that there are no mentioning of this basic article by B.B. Golizin in any works on thermodynamics of dielectrics. Modern monographs [6] are overload by formal ratios, which are difficult to check by experiment. They do not give any foundations for the formula (5) or (6). Some of initial formulas are do not proved by the measurements [7]. ***According to Golizin formulas (5) and (6) are natural.***

Let's determine efficiency factor of the cycle "C-D" in NC with the given $a\cdot V_0$:

$$\eta=\frac{A_D}{A_C}=\frac{\frac{1}{2}C_0V_0^2+\frac{2}{3}aV_0^3}{\frac{1}{2}(C_0+aV_0)V_0^2}=\frac{C_0+1{,}3333a\cdot V_0}{(C_0+aV_0)} \qquad (7)$$

Table 1

$a\cdot V_0$	1	2	3	5	7	9	20
η	1,1665	1,2222	1,24975	1,2775	1,2914	1,1997	1,31714

Thus, η is weakly depends on $a\cdot V_0$ and according to (7) hardly will exceed 1,4. The first experiments by the author show the same [1]. The further experimental research on cycles "C-D" on variconds can specify the level of efficiency factor (7). The case is, that instead of $a\cdot V_0$, $a\cdot V_0^n$ can appear with $n>1$.

If we purposely use the feature of discharge of virtual capacity of variconds (or another capacity in the interval of presence of $\frac{\partial C}{\partial V}>0$ in it), we can create a generator of electric energy (converter of the environmental heat) with the power of

$$W=\frac{1}{3}a\cdot V_0^3\cdot f \qquad (8)$$

if **f** is the frequency of cycles "C-D".

For this purpose we should provide a return of energy A_d to the repetitive charging, to select only new energy $\frac{1}{3}a\cdot V_0^3$ on the stage "D" by the scheme solutions. At the same time we should eliminate the loss of energy to the Joule heat on R according to (8) by introduction of inductance L to give a form $V_0\cdot\sin\omega t$ to the charge voltage $V_c(t)$ in the interval $0-\frac{\pi}{2}$ during t about $10RC_v$.

This generator is a converter, transformer, and concentrator of the heat environmental energy. It is because during its work dielectric refrigerates, absorbs energy from medium. For example, if C_0 is about 220mF, aV_0 is about 10C_0, R is about 2 Ohm, V_0 is about 100V. Then a=$2 \cdot 10^{-5}$B^{-1}·F, RC$_{v0}$ is about $4 \cdot 10^{-3}$sec., t is about $4 \cdot 10^{-2}$ sec., f is about 25 Hz (do not taking into account the losses):

$$W = \frac{1}{3} \cdot 2 \cdot 10^{-5} \cdot 10^6 \cdot 25 \cong 166 \text{ Wt}$$

It is obvious that dielectric due heat-insulated can become a "source" of cold. Realization of this converter (generator of energy from nothing) or refrigerator is not more that an engineering task, which can be solved by usual routine methods.

A notice by authors [9] on the page 501 is very interesting. Discussing the oscillation circuit with NC by $U_c(q)=aq+bq^3$ (q ia a charge) and following its solution according Puancare they came to a conclusion about the unlimited increase of amplitude in this circuit (in full accordance to our views). This conclusion was considered to be a mistaken one. They didn't see any physical ground of the required flow of energy to the circuit.

A bad joke played the law of conservation: they didn't take into account the flow of the heat energy from outside to NC, possibility of its conversion studied by us. Jokes of history do not end on this fact. In 1920-1930-s I.V. Kurchatov studied the Rochelle salt, which is a classic dielectric [13]. It was stated (p. 290) that

maximum of dielectric permetivity $\varepsilon = \dfrac{Q}{E}$ (Q is the charge, E is intensity of the field, V/cm) with the thickness of 4 mm is achieved with 2V/cm, ε=4000; with E_{max}>2 V/cm a quick decrease occurs and with E<2 V/cm ε grows from 1300.

Exactly this area $E<E_{max}$ is interesting for us, because it is less studied in the aspect of energy. Only Andersen pointed that in this area Q=C·V^2 (page 287), determining Q by ballistic galvanometer (only this but not energy). It is an area of spontaneous polarization. It was stated (page 301), that ΔQ (deviation from linearity) is almost liner dependent from E^3 (as in [1] and [2]). With E_{max}=30

V/cm, e^2= $\dfrac{dQ}{dE} \sim 190 \cdot 10^3$. With the growth $E>E_{max}$ it is quickly decreases (thickness of 7,2 cm, i.e. V~216 V).

It is mentioned that with the thickness of 6 cm and charging V=70V (E=11,6 V/cm), discharging goes faster then the charging; with V=270V this process goes in opposite direction. It is understandable, because E=45 V/cm, i.e. more than E_{max}=30V/cm.

This circumstance was the evidence of the fact that A_d>A_c. This all tells us about a loss of chance yet in 1930-s to state a phenomenon A_d>A_c in NC in the area

$\dfrac{\partial \varepsilon}{\partial E} > 0$ and it was made exactly due to the conviction in impossibility, inadmissibility of A_d>A_c.

II. Objects and methods of research

Variconds were the objects of research. Variconds and other condensers, in which the non-linearity could be found were described in [4] in details,. Some of them are given in [1], which have a significant non-linearity. But now variconds are beyond competition. As numerous experiments showed the main difficulty of sure realization of NC converters on especially powerful ones, i.e. having the practical meaning, is commutation. Namely it is connection of C_x with C_δ ("C") and connection of C_x with the load "D". On the Fig.1 there is a scheme of demonstrational unit, which illustrates the fact that A_d>A_c.
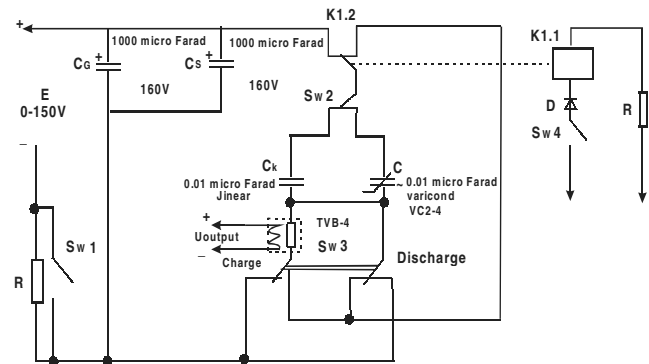

Fig1

Demo scheme of the separate measurement. The energy of charge and discharge in the common (linear) condenser and nonlinear (varicond) are measured.

Due to its very low power there is no problem of commutation. Relay RS-22 with the supply frequency of 50Hz provides 50 cycles "C-D" in 1 second. Increase of power by increase of capacity of C_x immediately changed the results. They became dependent from that on what pair of contacts provided the processes of "C" and "D". We tried few types of relay, their parallel switching on, change of frequency and all was in vain. It was clear that the problem is the processes in the contacts during connection and disconnection determined by the density of current and speed of "C" and "D". Then we tried to work with commutation by means of unipolar transistors. On the Fig. 2 the scheme of power analogous switcher on the unipolar transistors is shown (developed and made by Yu. S. Spiridonov).

Work with it showed that the switcher is asymmetrical. Some times it does not close "C" or do not conduct "D" to the end. A long operational development required, which was interrupted by external circumstances.

That's why we appealed to the classic collector, which serves to electrical engineering for more than 150 years. On the Fig. 3 the scheme of a measuring instrument for "C" and "D" with the commutation on the collector is shown.

Fig2
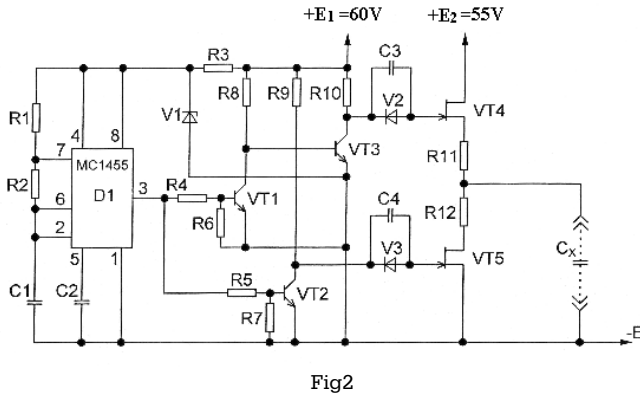
Scheme of the power analogues switcher for the varicond converter. $R_1=10$ kOhm, $R_2=100$ kOhm, $C_1=0,15$ micro F, $C_2=0,01$ micro F, V_1: D824A, $R_3=1,1$ kOhm, 2 Wt, $R_4=1$ kOhm, $R_5=1$ Ohm, $R_6=300$ Ohm, $R_7=300$ Ohm $C_x=0,5$ micro F Varicond VC2-4
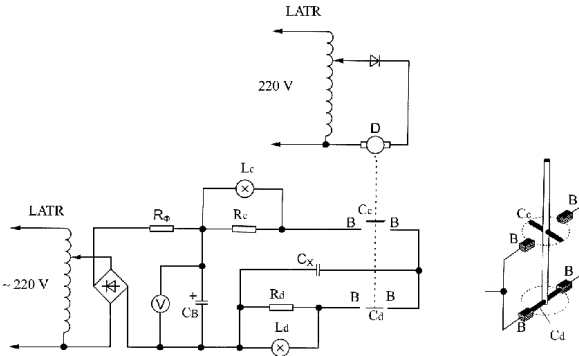

Fig 3

Scheme of measurement of the power W of charge and discharge of the condenser C_x:C_x are the variconds (nonlinear condensers) 0,5-3,5 micro F C_x are the common (linear) condensers for the control of $W_c=W_d$ C_c, C_d, are the collectors of charge and discharge on the same axis; D is the motor; B are the brushes; L_c; L_d are the filament lamps R_c, L_d are the resistors in the circuit of charge and discharge; C_B is a buffer condenser~500 C_x

These are two collectors from the tank generator put on the common axle. There are 27 lamellas on each of them. The conductor connects 4 and 5 lamellas diagonally, in the neighboring lamellas these wires are perpendicular to each other. On 1 lamella there are $\dfrac{2\pi}{27}$ radians. The width of brush is 1 lamella. If the angular speed $\omega=2\pi\cdot n$ rps, then the contact lasts for $t=\left(\dfrac{2\pi(3+1)}{27}\right)/2\pi\cdot n=\dfrac{0,148}{n}$ sec. On this faultless commutator we also found that the results of change of energy A_d and A_c depend on the situation that "C" and "D" are situated on the left or in the right side of the commutator. In other words, the change in places of "C" and "D" on the commutator leads to some changes in results. Theory and practice of use of collectors given in [10], [11], [12] proved the results of work with our commutator. Taking into account the information from these sources it was decided to increase the speed of rotation to sharply decrease duration of the arc during

the disconnection. And it improved the situation: change of collectors do not influence the results of measurements of A_d and A_c, but condition of surfaces of the contact began to influence the results. However, due to the perspective of producing of more powerful varicond converter, mechanical commutators should be changed on electronic ones, on the unipolar transistors or controlled transistors. They are noiseless, have big resource, small size and weight. Mechanical commutator is noisy and requires a lot of energy on the drive. It is heavy and requires maintenance (change of brushes, librication of bearings, turning of collectors, etc.).

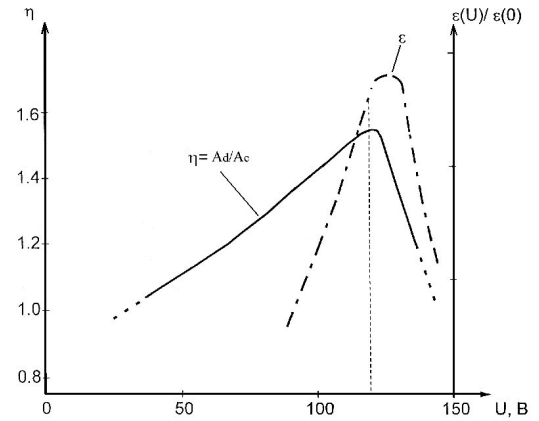On the Fig. 4 a general view of dependencies E(V) and η(V) are shown.

Fig 4

III. Research Results

Since the expected $\eta=\dfrac{A_d}{A_c}\sim 1,3$, we immediately have

a problem to get a reliable measurement of A_d and A_c. The scheme on the Fig. 3 is one of the applied ones. This scheme was tested as a demonstrational on with the power of ~0,5~1 Watt. Is was supposed that the lamps (having the size like the lams for a pocket torch) L_d and L_c will have a different light. L_d will have more bright light with $R_c=R_d$. An experiment proved it only with a weak light and low power

$(\sim W_c=\dfrac{3,5\cdot 10^{-6}\cdot 70^2}{2}\cdot 50\sim 0,4$ J/sec~0,4 Watt).

Then we switched on the thermoelectric converters TVB-9 instead of lamps. It appeared that A_d were different (like A_c) if to turn K_d from one brush to another one (the same was with K_c). Further we changed the scheme. We deleted R_d and R_c and connected a varicond C_x in series with R_x on the "common" wire. Thus we excluded an assumption about the possible inequality of R_c and R_d as the causes of inequality of A_c and A_d. Nevertheless, the inequality of resistance in "C" and "D" circuits remained due to the unavoidable inequality of resistance "lamella-brush" on that collector and

another one. That's why we applied an averaging method.

Method of analysis of efficiency factor: η:
a) if "C" and "D" were made though the common resistor, then the voltage drop on it $V_R = R \cdot \tilde{I}$, $\tilde{I}$ is an average current for the time "C" or "D". Then the power "C" or "D" is equal to $W_c = \tilde{I}_c^2 \cdot R$,

$W_d = \tilde{I}_d^2 \cdot R =_R V_c \cdot I_c = \dfrac{V_c^2}{R}$, and that's why

$$\eta = \frac{V_d^2}{V_c^2} \qquad (9)$$

b) if "C" and "D" are made though TVB (thermoelectric converter), then their power is proportional to electromotive force of thermopair TVB. $V_T = \beta(T_{hot}\text{-}T_{cold}) \cdot I^2 \cdot T_{hot}$ is evidently proportional (coefficient β) to the square of current strength on the fixed R of the heater. But $\eta = \dfrac{V_d^2}{V_c^2}$ and $\tilde{I} = k \cdot \sqrt{V_T}$, i.e. $W = V_T \cdot K^2 \cdot R_{heater}$. That's why

$$\eta = \frac{_d V_T}{_c V_T} \qquad (10)$$

c) perfectly strict measurements of energy of the act "C" or "D": multiplication $I_i \cdot V_i$ in the interval Δt. Then the energy of "C" or "D"

$$A = \sum_{i=n}^{i=1} I_i \cdot V_i \cdot \Delta t \qquad (11)$$

This method using the oscillograph with the memory is very laborious even with $t_c = 20\Delta t$.

III.1. Experiment of April, 9, 1997. $C_x = 5,29$ μF, VC2-B, nominal; $R_x = 2,5$ Ohm. LATR (Laboratory Transformer output voltage) is equal to 100 V. $V_{C_\delta} = 97$ V, $C_\delta = 4700$ μF, electrolytic, n~6 rpm, 12 Hz.

"C" to the left	TVB-9 #127	20mV
"D" to the right	TVB-9 #127	27mV
"C" to the right	TVB-9 #127	20 mV
"D" to the left	TVB-9 #127	24 mV

$D_{av} = 25$mV, $C_{av} = 20$ mV, η=1,25.

III.2. The same as III.1, but LATR output voltage is equal to 120 V, $V_{C_\delta} = 85V$.
$D_{av} = 25$mV, $C_{av} = 21$mV, η=1,19.

III.3. The same as III.1, but LATR output voltage is equal to 102 V, $V_{C_\delta} = 103$ V.

"D" to the left	TVB-9 #127	25mV
"C" to the right	TVB-9 #127	20mV
"D" to the right	TVB-9 #127	28 mV
"C" to the left	TVB-9 #127	23 mV

$D_{av} = 26,5$ mV, $C_{av} = 21,5$ mV, η=1,23.

III.4. The same as III.1, but LATR output voltage is equal to 100V, $R_x = 5,1$ Ohm, $V_{C_\delta} = 98$ V.

"D" to the left	TVB-9 #127	22mV
"C" to the right	TVB-9 #127	19mV
"D" to the right	TVB-9 #127	26,4mV
"C" to the left	TVB-9 #127	17 mV

$D_{av} = 4,2$ mV, $C_{av} = 18$ mV, η=1,344.

III.5. The same as III.4, but $R_x = 10$ Ohm.
$D_{av} = 25$ mV, $C_{av} = 19$ mV, η=1,31.

It follows from 1-5 that for optimum V_{C_δ} and $R_x = 5,1$ Ohm, we can provide η~1,35 , that corresponds to our theory (7).

III.6. Experiment of May, 24, 1997.

Variconds VC2, nominal is 6μF. Changes in "D" and "C" of the "stack" TVB in series C by thermoelectromotive, parallel by hermoheaters so, that R_{heat} total ~0,2 Ohm, LATR output voltage is equal to 170 V, n~50 rpm, 100 Hz.

V_{c_δ}	60	75	80
$_{II}D_{left}$, mV	11,4	18	25
$_{I}C_{right}$, mV	8	12	25
D_{right}, mV	9	13,6	21,6
C_{left}, mV	10	13,6	21
D_{av}, mV	10,2	15,8	23,3
C_{av}, mV	9	12,8	19
η	1,13	1,16	1,23

III.7. Experiment of May, 23, 1997. Variconds VC2-B, nominal 27μF, $C_\delta = 5440$ μF, without R_x in the circuit, only in "D" and "C", TVB-9x3 (see III.6), LATR output voltage is equal to 130 V, 20 rpm, 40 Hz.

D to the left, C to the right; then D to the right, C to the left.

V_{C_δ}	40	50	60	70	80	86
D_{av}, mV	4,4	9,6	19,8	33,2	46,4	60
C_{av}, mV	3,2	7	15,6	28	44	60
η	1,375	1,37	1,27	1,19	1,05	1,0

With the increase of battery capacity of variconds a tendency to the shift of maximum h to the side of more low voltage is noted. The reason is that every elementary capacitance $_iC_x$ of the varicond has its own of maximum $_ih$. To the right of absorption of $_iV_{C_\delta}$ energy begins.

That's why $_iC_{C_\delta}$ with higher $_iV_{max}$ absorbs energy from those, which have maximum to the left. And "positive properties" of all of them coincide on the ascending part of the curve $C_x=f(V)$. That's why the battery C_x should be consisted of separate capacities with the same $C_x=f(V)$. Otherwise the specific power of energy generation from the unit of volume and weight of variconds decreases. The optimal voltage of charging V_c also decreases. But we should remember that $A = f(V_c^2)$.

III.8. Experiment of October, 18, 1996.

The battery of variconds VC2-4, which consists of 250 disks of 0,01 μF connected in parallel, mechanical commutator (2 collectors); "C" and "D" were made through the load R=11 Ohm. The voltage was measured by the device B7-40/5. The control was made on the linear capacitor MBGM 0,05μFx4, 1000 B, C_k.

LATR V	T_c f	V_{C_δ}	V_c V	V_d V	η	Control		
						V_c	V_d	η
100	9 mc 112 Hz	100				0,52	0,54	1,08
100	-	119,3				0,53	0,58	1,2
100	-	99,8	5,1	5,3	1,08			
100	-	120	6,2	6,2	1,0			
100	-	92,1	4,1	4,3	1,10			
100	-	94,4	3,4	3,9	1,32			
100	-	72,6	2,7	3,1	1,32			
120		71,4	3,2	3,7	1,34			
130		71,9	3,4	4,0	1,40			

III.9. Experiment of May, 23, 1997. Varicond VC2-B, $C_x=6μF$, $V_{C_\delta} = 70$ V, collecting commutator "C↔D". Measurements are made on TVB-9x3 in the circuit "D" and "C". We give D_{av} and C_{av} depending on the speed of rotation (frequency of cycles).

LATR, V	Hz	η	D_{av}, mV	C_{av}, mV
130	40	1,2	2,1	1,75
140	50	1,15	3,45	3
150	66	1,03	7,1	6,9
160	83	1,07	9,6	9
170	100	1,16	12,5	11,2
180	125	1,08	15,6	14,4

We can see that even with so small content frequencies of >40 Hz provide the lack of time for the exhaustive passing of "C" and "D".

III.10. Experiment of May, 24, 1997. Variconds VC2-B, nominal 33 μF; TVB-9x3, mechanical commutator, 125 Hz, V=45 V (LATR output voltage is equal to 180 V). D_{av}=54 mV, C_{av}=40 mV by TVB-9x3. The efficiency is: η=1,35

III.11. Experiment of June, 04, 1997. Linear condensers are in parallel, MBGO-1, 20μF±10%, 500V, 04.91 and the same 10μF±10%, LATR output voltage is equal to 170V, 100 Hz. Let's give the average value "D↔C" on the collectors, TVB-9x3.

V_{C_δ}, V	20	40	60	80
C_{av}, mV	3,5	12	30	48
D_{av}, mV	3,0	7,5	23,5	42
η	0,86	0,62	0,78	0,87

This example shows a sharp difference between LC energetics and NC energetics; LC has η<1.

III.12. Experiment of June, 13, 1997. Variconds VC2-B, nominal 6 µF. Mechanical commutator. There are the lamps of 12 V, 21 Watt, with inductance of $12,6 \cdot 10^{-3}$ H in the circuit of "C" and "D" . LATR output voltage is equal to 110 V ($\approx$20 rpm). The voltage given in the table was measured on the lamps.

V, V	50	70	80	90	96	103	120
C, mV	13	26	37	53	66	84	140
D, mV	13	27	41	60	83	102	130
η	1	1,08	1,23	1,27	1,58	1,44	0,86

These results are given in diagrams on the Fig. 5. From this Fig. 5 we can see that the experiment quantitatively proves the common dependencies on the Fig. 4.

VI. Discussion of results

In the experiment III.10 we evidently proved once more the theoretical statement that with $\dfrac{\partial C}{\partial V}=0$ only the losses of energy can be in the content, i.e. the cycle "C-D" has η≤1. From the other side, the experiment III.8 shows that with the increase of V_{charge} the nonlinearity can appear in the linear capacitor. This fact was pointed out in the beginning of the article.

In all experiments with variconds we achieved the levels η, defined by the formula (7). We found that in some η>1,3 due to the fact that the expression aV_0^n has η>1.

The maximum value was achieved in the experiment III.11: n~1,6 with C_x=6 µF, VC2-B. In the experiment III.9 η~1,35 with C_v=33·10⁻⁶ F.
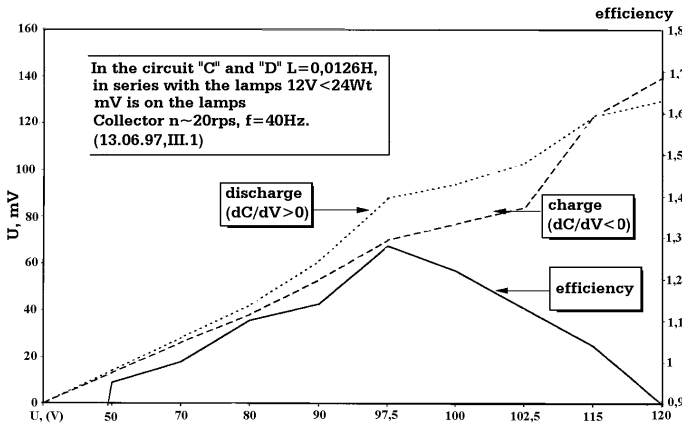

Fig. 5.
Dependence of efficiency and power in the load of the circuit of charge and discharge from the voltage "C" in NE about 6 micro F (nominal)

Thus, in the first case

$$A_c = \frac{90^2 \cdot 6 \cdot 10^{-6}}{2} = \frac{81 \cdot 6 \cdot 10^{-4}}{2} = 243 \cdot 10^{-4} = 0,0243 \text{ J},$$

i.e. absolute surplus energy with "D" $A_d-A_c=1,6A_c-A_c=0,6A_c=0,0146$ J. With the frequency of 40 Hz (20 rpm) the generated surplus power $\Delta=0,0146 \cdot 40=0,584$ J/sec≈0,6 Watt. In the second case

$$A_c = \frac{33 \cdot 10^{-6} \cdot 45^2}{2} \cdot 0,35 = 0,017 \text{ J and}$$

$$W=0,017 \times 125 = 2,125 \text{ Watt}.$$

It is a power of surplus energy generation. We could observe it visually with the lighting of lamps (12 V, 21 Watt). Lamp in "D" circuit is brighter than the lamp in "C" circuit.

Calculation of specific characteristics

Condenser VC2-B, nominal 0,15 µF, D=26 mm, h=10 mm. Volume is 3,714 cm³, weight ~3,714·4,7≅18 g. With V=55 V, 100 Hz, C_x=33·10⁻⁶ F, W=5 Watt, volume of battery is 220 units, V_δ=836 cm³=3,8×220, weight=3960 g.

With η=1,35, surplus power is 1,75 Watt. That's why the specific surplus power is 2,1 kWt/m³, 0,442 kWt/ton.

Let's note that the converters based on the nonlinear ferromagnetic materials has the specific indexes 3-5 times higher (for the same volume and mass of nonlinear material the efficiency will be higher).

We can simplify the difficulties of commutation placing the inductancies with the disappearing small ohmic resistance to the circuit "C" and "D". Also we can divide the battery on a great number of parts with smaller capacity with their own, may be relay, commutators.

Totality of the obtained results evidences on the necessity of the new level of work. We should separate the surplus energy from the energy, which is required to the second charging. We should develop a unit with A_d partly spending on A_c, and part of Δ=η-1 spending to the active load. In principle this scheme is given on the Fig. 6.

It is undoubtedly, that the practical realization of this scheme is a big separate problem of routine engineering and design character. And solution of it requires time and funds.
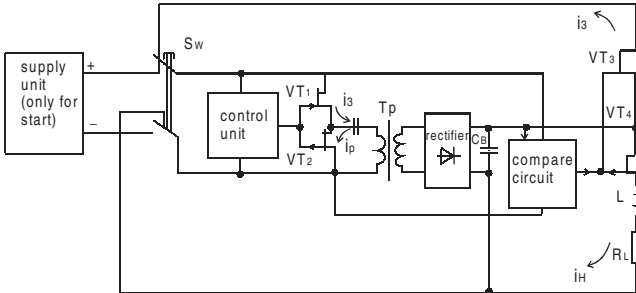

Fig.6.
S_w is a switch C_x is a working condenser (varicond) about 200 µF R_L is a load T_P is a pulse transformer, K=2 C_B is a ballast condenser about 300 C_x

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

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

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

4	+10	+20	0.273 (0.000235)		100		
	+10	+23		0.355 (0.000305)	130	0.2-0.355=-0.155	0.34-0.355= =-0.015
5	+6.6	+20	0.366 (0.000315)		100		
	+6.6	+19		0.338 (0.000291)	92	0.2-0.338=-0.138	0.34-0.338= =0.002

Calculation data demonstrate a considerable economy of heat energy at daily unevenness of external air temperature.

Heat productivity of the new structure of electric convector with 340Wtt power was calculated on the assumption on the suggestion that heating of the room is carried out by the irradiation at the process of heat exchange.

$$E = \varepsilon \cdot C_{\circ} \cdot T^4 \cdot 10^{-8} \qquad \text{Wtt/m}^2$$

where: $C_0 = 5.67$ Wtt/m^2 K^4 is a radiant emittance of blackbody, $\varepsilon = 0.93$ is an emissivity factor of the surface of earthenware duct tube; $T = 70°C = 343$ K is the temperature of the surface of earthenware duct tube.

On substitution of the known values into the formula we get:

$$E = 0.93 \cdot 5.67 \cdot 343^4 \cdot 10^{-8} = 727 \ \text{Wtt/m}^2$$

As the area of irradiation surface is equal to S=0.96 m^2, then quantity of heat, which is evolved by the convector, comes to:

$$E_k = S \cdot E = 0.96 \cdot 727 = 698 \ \text{Wtt (or 600 Kcal/h)}$$

The quantity of heat, which is required for the heating of the room, is 492 Kcal/h (at the external air temperature equal to minus 0.90 and temperature in the room equal to plus 200).

Thus, electric convector with 340 Wtt power is able to heat totally the room with 60m3 area.

Editors note: 340 input and 700 output!!!

Longitudinal Waves in Vacuum: Creation and Research

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The author presents a new elegant system, which is the symmetrized Maxwell's equations. In practice it gives a possibility to create the longitudinal waves in vacuum. This system is of great importance in telecommunications and aerospace technigue.

There is a stable paradigm in electrodynamics that the existence of the longitudinal waves in vacuum is impossible. This paradigm played its negative role preventing scientific minds from solving this problem. However, Maxwell was not as categorical in his opinion on this question as his following were.

Particularly he wrote: "Science of electromagnetism as well as optics is not able to confirm or deny the existence of longitudinal oscillations."

Maxwell's dynamic equations are usually considered as partial derivatives in time. However, the total derivative in time includes the so called substantial derivative, which was shown in the equations for the moving coordinate system. In particular, one of these equations was written by Maxwell himself to explain the phenomenon of electromagnetic induction discovered by Faraday. This induction takes place in the conductor moving across the field lines of electromagnetic field:

$$\vec{E} = \vec{V} \times \vec{B} ; \qquad \text{(I)}$$

Other equations were obtained later by other scientists. In the table I below Maxwell's equations are given in a split form. Their static and dynamic parts are given separately as well as the equations for moving and fixed coordinate systems. Such matrix concept of Maxwell's equations allowed finding their incompleteness. Really, the analysis of the matrix shows its high symmetry. However, full symmetry of the system of equations is broken by the absence of the equation (X). It seems to be strange and calls a desire to remove this defect in such an elegant system of equations.

A new equation is introduced in the Table 1 for the full symmetry of the matrix:

$$\nabla \cdot \rho = -\frac{1}{c^2} \cdot \frac{\partial \vec{j}}{\partial t} ; \qquad \text{(X)}$$

A joint solution of equations (IX) and (XII) gives us, as it is well known, a transverse wave with the density of energy flow equal to:

$$\vec{P}_{\perp} = \left[\vec{E} \times \vec{H}\right];$$

A joint solution of equations (X) and (XI) gives a longitudinal wave with the density of energy flow equal to:

$$\vec{P}_{II} = \frac{1}{2}\left[c^2 \rho \cdot \vec{A} + \varphi \cdot \vec{j}\right];$$

As distinct from the emitters of transverse waves (dipoles of the cylindrical symmetry) the emitters of longitudinal waves should have spherical symmetry, i.e. to be the monopoles.

During the analysis of the known physical fields we can see that most of them show themselves in a small volume near the sources, i.e. nuclear field, field of weak interaction, electrostatic field (which is compensated by the fields of charges of other sign) and magnetostatic field, though the latter can spread for the distances similar to the size of Galaxy. However, electromagnetic waves and gravitational field are really long-distance fields. At the same time both fields decrease according to the analogous law: inversely to the square of distance.

All this gives us a thought that the gravitational field can be undulatory just as the electromagnetic field. But unlike the latter it is some other class of waves, i.e. longitudinal, but not transverse. The penetrability of these waves should be very high. Admittedly, telecommunication by these waves can be made through the entire globe.

We can suppose that typically wave phenomena should be observed in gravitational field, i.e. diffraction and interference.

Material on this question was stated by the author in detail in 1991 in the article "Symmetrization of the Maxwell-Lorenz equations" in collected articles "Problems of space and time in modern natural science", part 15, Academy of Science, Russian Federation , Leningrad, 1991.

Table 1

		Statics in time		Dynamics in time		
Intensity of fields		$\vec{E} = \vec{V} \times \vec{B}$ (I)	$\nabla \times \vec{E} = 0$ (V)	$\nabla \times \vec{E} = -\dfrac{\partial \vec{B}}{\partial t}$ (IX)	Scalar products	Vectorial products
	Sources of fields		$\nabla \cdot \vec{D} = \rho$ (VI)			
		$\rho = -\dfrac{1}{c^2}\vec{V} \cdot \vec{j}$ (II)		**?** (X)		
			Equations of connection			
		$\vec{J} = -\vec{V} \cdot \rho$ (III)		$\nabla \cdot \vec{j} = -\dfrac{\partial \rho}{\partial t}$ (XI)		
			$\nabla \cdot \vec{B} = 0$ (VII)			
		$\vec{H} = -\vec{V} \times \vec{D}$ (IV)	$\nabla \times \vec{H} = \vec{j}$ (VIII)	$\nabla \times \vec{H} = \dfrac{\partial \vec{D}}{\partial t}$ (XII)		
		Dynamics in space	Statics in space			

Time is a Physical Substance

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One hundred years ago in 1889 Russian physicist I.O. Yarkovsky suggested a thought [7] that attraction of bodies to the Earth is stipulated by inflow of ether in it, which is partially transformed into substance in bowels of the Earth. This thought showed a possible way to overcome the problem of warming-up of the Earth by particles falling on it. J. Maxwell wrote about it when he considered the hypothesis by Lesaje, which explained the gravitational interaction by the pressure of flow of "extraworld corpuscles".

An important consequence about the continuous growth of the Earth's mass followed from the hypothesis by I.O. Yarkovsky that found its confirmation in further development of Earth science.

It was showed in works by I.V. Kirillov [2-4] that 250-350 millions years ago all continents closed up without any space on the surface of the globe of two time smaller diameter. There is also a consequence from his works that gravity in this epoch was two time lower than today.

L.S. Smirnov and Ju.N. Lubina [6] paid their attention to the fact that in ancient sediments natural angles of slope of sands in aqueous medium greatly exceed modern ones. They worked several thousands of their measurements and data from literature and found that

The Work

Advanced Energy and Propulsion Systems based on Chronal Reaction Method

Alexander V. Frolov

"Any quantity of energy can be trapped from vacuum if the corresponding mechanism provides a simultaneous trapping of the same quantity of energy in the anti-world. The total sum energy is equal to zero."

Academician Gustav Naan, "Symmetrical universe", 1964, Tartu, Estonia.

Introduction

The work is considered for most systems as a result of the spatial gradient of the potential, i.e. the result of the intensity of the potential field. The "field" in this sense is some spatial area where some force makes a body to move in a known direction, so this force is a spatial vector.

In another case we can consider the energy of the potential field in some single point of space and the value of the energy is not a constant value but it is some function of time. In this case it is possible to use two different moments of the space-time instead of two different points of the space-time to generate the power. The intensity is described here as a "chronal gradient", and the "chronal field" is the area of moments, when some force makes the body to move in time (in known 4-dimensional direction), i.e. this force is the chronal vector.

It is supposed that the natural flow of time can be considered as such a process, and the rate of time can be changed by some similar technical methods.

The power (mechanical work) generated by this method is not a free power, since any such system is a transformer of the 4-dimensional form of motion into the 3-dimensional form.

The previous experimental work on this method was made by N.Tesla and by other followers of the idea for single-wire power transmission. The present paper discloses the chronal and gravitation aspects, and discusses some approaches to realization of the technology that is known also as the "warp drive" by Miguel Alcubierre, University of Wales, UK.

The Work can be Created by Means of Potential Field

The concept of a physical vacuum as an energy source is proved mathematically [1]. It is recognized that space itself has some inner structure and it can be used as a source of energy if some process is organized to change the structure of space. The existence of this reality is described by means of a density probability function for energy [2]. So, any space is the result of some energy process and there is no space that has no energy at all. Some power process can be designed in any point of space by means of an energy transformation.

By common definitions:

1. Potential (lat. potentia, that means "force") is the possibility to make some action, to make some work. The gradient of potential is the intensity of some field.
2. Field is the area of action for some force.
3. Force is the reason (cause) for motion.

A conventional method to extract the power is the utilization of potential difference (voltage, or pressure) between two points of different potentials. For example, the potential is equal to the maximum on the surface of the charged mass M and it is equal to zero for an infinite distance from the mass M. In this way, there is some gradient and intensity of the field,

$$E = - \text{grad } \varphi \qquad \text{F.1}$$

which is a result of change for a potential value in the process of motion from the mass M to infinity. Ordinarily, the pressure $U = \varphi_{max} - \varphi_{min} = d\varphi$ is presented as a potential difference between two points in space, for example, between A and B. The process for measurement of pressure is the motion from one point to another point of space, and mathematically this work is a derivation procedure:

$$A = d\varphi / dx = j '(x) \qquad \text{F.2}$$

The work and power are the results of this motion, since potential gradient means some changes of energy value (energy transformation).

For an equipotential area case, any point of space has a potential φ = const, and in this case there is no change of energy for different points. Let's suppose that this area has zero size and it can be considered as some point C. In other words, let's consider the space of the point, the space of zero size. There is no possibility for motion in any spatial direction and in this case there is only one way for energy value change: it is a motion in time. It is possible to consider some motion from the moment CA to the moment CB. If the potential $\varphi A(t)$ is not equal to potential $\varphi B(t)$, there is some gradient of the potential in point C. But it is not the direction in space but the gradient as a direction in time. To note this difference let's use the designation "grad $\varphi(t)$" for the chronal gradient.

Some intensity is created also:

$$E = - \text{grad } \varphi(t) \qquad \text{F.3}$$

The intensity of the chronal field in the point C is created if the potential is a function of time. The change of energy (transformation of energy) creates the work and in strength of this reason the chronal field of one point of space can be used as a power source. The motion here is a motion in time. The work is determined here as a

derivation on time:

$$A = d\varphi / dt = \varphi'(t) \qquad F.4.$$

A technical system for power extraction in this case should include the "memory unit" to make the comparison between a past potential value $\varphi_A(t)$ and a future value $\varphi_B(t)$. An example for it is the diode system by Avramenko, Fig.1.
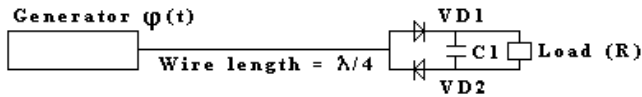

Fig.1

The generator of changing potential is connected to the wire. From my experimental experience, the length of the wire should correspond to some resonance value to create the maximum potential changes in the point O. The special system to produce the asymmetry in oscillation of potential here is a so called "Avramenko's plug" [3]. It is made of two diodes, which are connected to the point O (In my version of the experiment I have used KZ106 high voltage diodes and a 3 KV 0.47 microFarads capacitor). The diodes create unidirectional displacement of the electrons in the wires of this circuit when the potential is changing. The capacitor is charging by means of the changing potential only and does not require the power source. This capacitor plays the role of "memory unit": at the moment A plates of the capacitor have different potential because of diodes polarity. At the moment B the potential in the point O is equal to zero and the potential difference between two capacitor plates make the work in the load. **By such an approach grad $\varphi(t)$ is used to create grad $\varphi(x)$**. The device is working without the capacitor also, and the load R can be powered directly from the diodes.

In Tesla's experimental demonstrations the diodes were not used, but a special resonance coil was installed at the end of the single-wire line. Both ends of the coil were used to power the load. For more information, please, look at Tesla's drawings Fig.2., the book "The Inventions, Researchers and Writings of Nikola Tesla" by Thomas Commerford Martin, Fig. 176 - Fig.184.
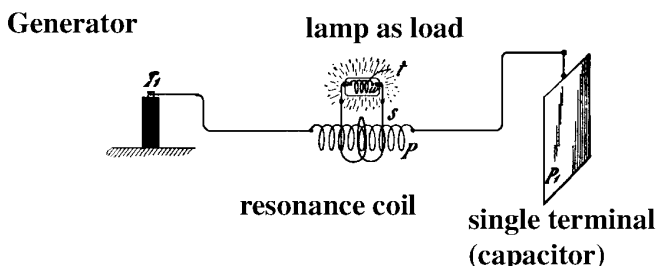
By analogy with electromotive force EMF that is produced by any potential difference source, let us introduce the so called "chronomotive force" CMF into the consideration. The field of this force is not spatial but chronal, i.e. it is an area of moments of time instead of the area of some points of space. Result of this force action is the motion in the time axis. Constant CMF in certain point can be created technically as the result of the unidirectional change of the potential as function of time.

Sure, it is impossible to increase the potential from zero value to infinity, but it is possible to create the periodical unidirectional changes of the potential. The sinusoidal processes produce only bi-directional changes and in that case the net force effect for CMF is equal to zero.

The nature of mass demonstrates the unidirectional motion in time from the past to the future. By the author's concept proposed here, it is the result of some unidirectional global change of some potential value. This change is global since the effect (so called "natural time flow") is observed in all points of space. Local time flow effect can be created by means of unidirectional change of potential value (for example, electrical potential) in some area of space.

So, two methods for creation of energy changes correspond to two methods for power extraction: by means of circuit "source - load" closed in space between two points of different potential or by means of circuit "cause - effect" closed in time between two moments of different potentials.

Tesla's Concept for Wireless Power Transmission

From Tesla's papers [4] the concept for wireless power transmission requires the source of high frequency potential electric field. The value for the potential in his experiments was a very high one also. There is the difference in principle between Tesla's scheme and Hertz's radio transmitter. Sphere capacitor C1 produces the oscillating electric potential mainly (Tesla's way) instead of electromagnetic waves (Hertz's way). By Hertz's way the generation of the electromagnetic wave requires to change the capacitor of LC-circuit into the "open-surface-system", and the electrical field between the plates will take a large space.
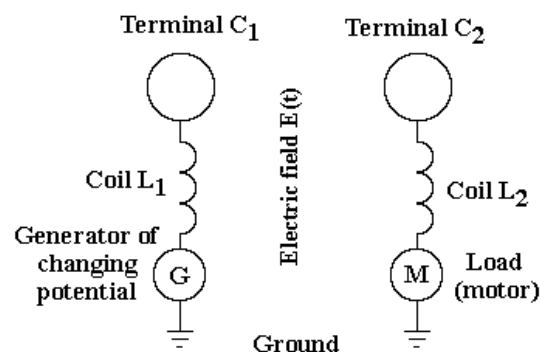

Fig.2

Fig.3

By this way, the two-plate capacitor of resonance LC-circuit was developed in dipole antenna element.

So, power can be produced by means of potential field only as a result of the inner field structure misbalance.

The antenna (according to Hertz) produces the wave if it is an antenna of generator, or it uses the potential difference between two dipoles as an output signal if it is an antenna of some receiver. By Tesla's way, the changes of induced charge created on the surface of capacitor C2 is the reason for electric current in the coil L2 and in strength of this reason some power is created in the load R. There is no directed radio beam here. Tesla's approach is the method for utilization of changing potential in one point of space.

Acceleration in Potential Field

In the classical example, the potential field produces some work to accelerate the body (acceleration a>0) but then the system should do the same work to return the body to the start point (acceleration a<0). Classical conclusion is: total net work of potential field is equal to zero and potential field can not be used to create the power in load. It is not a mistake but it is just the wrong general conclusion from the particular case

If parameters of the field or parameters of the working body are changing it is possible to create the constant acceleration of the body in potential field.

Examples: Screening for part of the rotor trajectory to use Coulomb forces only for acceleration of the rotor, patent USA 4897592. Another way to exclude the negative part of the work is a spatial superposition for the field source and working body.

Also kinetic energy of the electrons increases in the process of the motion of the electrons in some vacuum tube. Some analogy allows to consider a well known Chernetsky self-generating discharge as a demonstration of the work of potential field. Demonstration of Frolov's device on the topic was produced for the conference "New Ideas in Natural Sciences", 17 -22 June 1996, St.-Petersburg, Russia. The load was connected in series with the discharge arc. The input current decreases, when the arc is created in the secondary circuit and the power output increases. N. Tesla called this direction of research "the electric arc as the source of the power". Really, the arc is working in both sides: in the side of the source and in the side of the load, that allows to compensate the input power and to provide some power in the load free. So, the arc is a so called "bi-directional process".

Alexander Chernetsky [5] explained his result as a pinch-effect for the current of many hundred Ampere arc. His explanation involved the virtual particles concept and vacuum zero point energy theory. Other explanation is proposed here. Fig.4 shows two electrodes and it is clear that the charged particle would obtain some additional energy in the process of motion, since it is the accelerated motion in the electric field between electrodes.
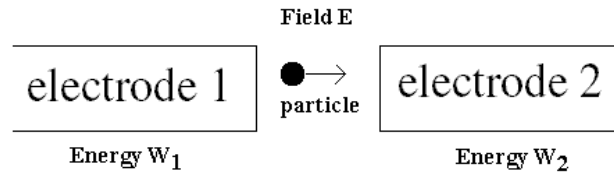

Field E

electrode 1   •→   electrode 2
             particle

Energy W_1 Energy W_2

Fig.4

$W2 > W1$ due to the acceleration of the electron by potential field E.

Inner Structure of Potential Field

Above we noted the bi-directional process. The Whittaker's potential concept considers the potential as a bi-directional energy flow [6]. Thomas E. Bearden [7] wrote in his book "Gravitobiology", p.2: "Space-time in a sense may be regarded as a conglomerate of potentials - including the scalar EM potentials. Therefore the simplest structure of EM scalar potentials (trapped EM energy) is also nominally composed of such spin-2 gravitons." Structure of graviton and potentials, by Bearden, is a coupled photon/antiphoton pair. Antiphoton is a reverse-time process. Therefore, the potential field can be considered as a bi-directional electromagnetic process/antiprocess. So, power can be produced by means of potential field only as a result of the inner field structure disbalance. Bi-directional energy flow described above, mathematically can be presented as the equation:

$$0 = A + B \qquad F.5$$

where zero balance is created by means of two opposite processes. If one of the processes A provides some free power in the load, the other part B should also change. So, there is an equation for such sort of the process:

$$0 = dA/dt + dB/dt \qquad F.6$$

and in another view:

$$dA/dt = - dB/dt \qquad F.7$$

If the time function for B part is considered as a reversed time t_r and time for process A is considered as a direct time t_d, we obtain the equation for total energy conservation law, which now takes into consideration the direct time and reverse time energy processes:

$$dA/t_d = dB/t_r \qquad F.8$$

Conclusion from F.8: Space power is unlimited for time/reverse-time balanced systems. There is no limit for power extraction if any change of value A corresponds to the change of value B. **The conservation law for energy means the conservation of time balance only: energy of processes in direct time should be equal to the energy of processes in reversed time**.

This formulation is a unification of Newton's mechanics law (action - reaction) and the conservation law. In general view it can be called the law for chronal balance.

Time structure can be more complex than bi-directional "time/reverse-time" and both chronal and space areas can also be considered in many-dimensional version.

$$0 = A + B + C + \ldots + N \qquad \text{F.9}$$

These ideas are close to ancient Indian Aryan mathematical-philosophical conception of " dynamic zero", which is not a "state" but a "process".

Inertia-less propulsion

By Newton's laws and by Nature common sense, any active force can be created only in pair with the reactive force. This rule describes the balanced interaction between two bodies. But there is a very interesting case: one body and some substance around this body. Ether also can be considered as this substance. Let's show that for any kind of "reactionless" moving system there is a reaction, but it is the reaction along the 4th dimension.

According to the Newton's notion for ether of 1670, there is no any ether in open space (i.e. open space is quite far from any mass) but ether exists only inside and near the bodies [8]. By this ether concept it will be possible to develop the ether-dynamics.

The key to understanding of the **nature of gravitation,** by Academician Vavilov, author of the book about Sir Isaac Newton [8], p.84, **is a gradient of the density of ether** in matter and in the space around matter.

It is known that accelerating or decelerating body in vacuum have some reactive interaction with space: it is the effect of inertia. The same processes inside of some liquid can be presented as a reaction of liquid to the change of velocity of the body. So, space itself can also be presented as some substance. The equality of the rest mass and inertial mass results from the liquid model and it confirms the supposition that ether is joined with the mass-object. So, in the paper "Optic" [8, p.86] Sir Isaac Newton stated that there is no ether in the "open space". If we consider the mass-particle as the "condensed ether", around the mass the ether is more rarefied, since it was used to create the particles, but from the other hand, according to Newton, outside the body the density of ether increases with the distance from the body. In this case, the "open space" should be considered as a very dense ether, but by Newton there is no ether in the "open space". How can we connect all this together?

Perhaps, the solution is the understanding of the structure of space, i.e. ether can be considered as some kind of change of the structure of vacuum. Some local change of vacuum structure that produce the mass-particle should be compensated by corresponding opposite change of vacuum structure around the mass-particle. The gradient of the density of ether is the reason for ether flows, by Newton, and it can be considered in other words as a gradient of potential and some potential field. In this case, the notion of the "density of ether" can be changed to the notion of the gradient of the potential "grad".

If we assume that "ether" and " grad " is the same notion, then we avoid the question showed above, since the gradient increase if the distance also increase, but for any two points of the open space (quite far from any mass) there is no any gradient of potential between them.

Important part of the gravitation concept proposed above follows from the Faraday's opinion about the nature of matter. In his letter of June 25, 1844 to Richard Tailor, M. Faraday wrote: So, matter anywhere is continuous... it is not necessary to suppose the difference between atoms of matter and some intermediate space. The forces around centers provide the properties of matter to these centers...

M. Faraday considered this aspect to make a conclusion for the nature of electric conductivity and insulation. But his point of view can be developed also in gravitational aspect. Atom and space around of an atom is the same matter in different states and the difference is the opposite directions of the time flow for "inner cosmos" of matter and "spatial cosmos" between atoms.

Pre-conditions above are a basis for conclusion: Any body displace the ether mass, which is equal to the body mass, it is a well-known Arhimed's law for ether (in generalized form). Since motion of any body have a place inside of real substance, this substance (space-time itself) can be used for "reactionless" or ether-dynamical (like aerodynamical) method of movement. Forces acting on the body in this case are external and the law of conservation (for energy, momentum, impulse) is true if body and substance around the body (air, liquid, ether) is considered as a closed system. But if the Arhimed's force is spatial only, **the force acting from ether to the mass-body is chronal, i.e it is the reason for motion of the mass-body in the 4-th dimension.**

Since ether-dynamical motion uses the mass of ether (which demonstrates itself as an inertial mass) to create the ether gradient, in this case inertia effect does not exist for accelerating or decelerating object, so the ether-dynamical motion can be named as the inertia-less motion. In fact, the natural gradient of electric potential is created around any charged mass-object M (single terminal) just due to the inner topology of space. The force applied to the dielectrical polarized body since the natural gradient of the potential exist, i.e. the value of the potential decreases from maximum on surface of the body M to zero at the infinity distance from the charged body M. The same phenomenon is the reason for mutual attraction of two plates of any capacitor. The example of technical method for compensation of this gradient is T.T.Brown's USA patent number 3,187,206 of June 1,

1965, which describes some methods for creation of the propulsion force by means of the gradient of the dielectrical properties of the substance. The method allows to compensate the gradient of the potential for one plate and to increase the gradient for the second plate, so attraction of the plates becomes asymmetrical.

The work created in such sort of system is a result of the constant propulsion force, which can be used by Brown to rotate any powerful dynamo or to make the flying machine. According to the present paper, it is also a result of the asymmetry of the chronal balance.

Conclusion

From the concept disclosed above any quantity of the energy can be created in accordance with the balance law: any energy process is created in pair with contra-directional energy process. Mutual-compensation for processes can take place both in space (spatial separation) and in time (chronal separation). Asymmetry for spatial separated paired energy processes is a technology for reactionless propulsion force in space. Asymmetry for chronally separated paired energy processes is the technology for propulsion force in time. Both technologies can be designed as an advanced propulsion system.

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Reactionless Propulsion and Active Force

Alexander V. Frolov

The goal of the report is the demonstration of some technological ways, which allow to create an active force. This force don't require a reactive mass flow. The active force can be applied to many aerodynamics systems and it is a result of the gradient of pressure. Usually air or water are the medium. By analogy, the space-time itself can be considered as some medium of interaction, where the gradient is created.

Introduction

Let's note some known research programs. There are several mechanical systems to get the propulsion: the gyroscope precession, gyroscopes of alternating radius and nonlinear vibrations gyroscopes. There is also a method: rotation speed of the mass can be changing in different parts of the trajectory that produce some inner gradient of pressure between the rotor and the stator. Some mechanical systems use special vortex (liquid or air). In some electromechanical systems electrically charged rotor is used to create a propulsion force. There are known electromagnetic systems to use Lorenz force, magneto-hydro-dynamical effect, Hall current. Some antigravitaton effects are investigated in so called Hooper's bi-directional coils and in the flat current systems (Moebius loop). There is an old idea to use diamagnetic vapor, which is accelerated in the permanent magnet field.

High electric potential systems are known from Tesla and T.T.Brown research work. The Biffeld-Brown effect describes the active force, which is created in the flat capacitor to the positive plate side if the voltage is above 50 kV. Dr. Brown did not explain the reason of the force, so we **have a chance to suppose that this force is a result of the asymmetry in orbital motion of the electrons in dielectric atoms due to the electric field between the plates.** The asymmetry leads to the centrifugal force gradient and non-zero linear component of this force. There are also some research programs on superconductivity – gravitation connection.

Thermo-gravitation propulsion technologies is a special case. Fig.1.1 shows a plan of the experiment, which was described by Alexander Schegolev, Russia as the weight changes in heated metal ball. In the top of the ball the cone part was removed to create non-zero total heat flow of this mass. Let's find the reason of this active (reactionless) force. There is a known fact that interaction between atom or molecule and space-time demonstrated as chaotic oscillations or movements those are considered as heat processes in matter. In material objects of a special shape (like the ball above) the vector sum of such sort oscillations is not equal to zero so the object should get some impulse (moment) in

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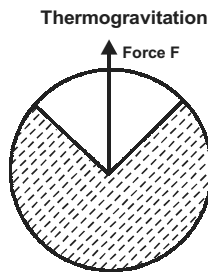
Thermogravitation

Force F

Fig. 1.1

the direction, which is defined by its shape. **The nature of this moment is the same like the nature of chaotical impulses, which are received by any atom directly from the space-time (from ether).**

Fig.1.2. is a plan of another thermogravitation closed system design: the reactive flow is transformed by some converter. One of many versions for it is the cooling of the flow by means of special vortex process. In analogy with Fig.1.1 the active force is a result of non-zero vector sum of the heat processes of each particle of matter, which is involved in the process.
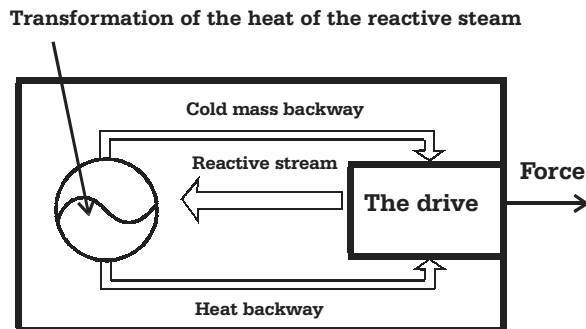
Transformation of the heat of the reactive steam

Cold mass backway

Reactive stream

The drive   **Force**

Heat backway

Fig.1.2

To continue we should make some supposition about the **nature of the heat energy.** According to Pavel D. Ouspensky (Russian philosopher) and Nikolay A. Kozyrev (Russian astrophysicist) there is an energy exchange between the particle of matter and the so called "flow of time" and it is a working physical mechanism for any really existing material particle. In other words, it is a physical mechanism of existence of the mass-matter in the time flow. According to P.D.Ouspensky the heat chaotical oscillations are the result of this energy exchange. According to N.A.Kozyrev, the stars have not any inner source of energy but they are working like some kind of machine, which transforms the energy of the "flow of time" into the energy of heat radiation (electromagnetic waves). So, we can make a conclusion: The existence of any material system is defined by its energy exchange with "flow of time", which have a certain speed (the rate of the process).

Modern physics of vacuum considers the notion about the "virtual particles". An old idea of ether particles also can explain the chaotical impulse interaction between real particle of matter and vacuum (ether). The goal of our research now can be formulated by the following way: **an active drive should be designed if the**

conditions of directed impulse energy exchange between the real and virtual particles are created.** The interaction takes place anytime and always but its total vector sum is zero due to spontaneous nature of the process. We have a chance to order this process as a directed heat flow in the mass of the drive, or to influence onto vacuum by means of force fields (electrical, for example) to order the processes of creation and annihilation of the virtual particles.
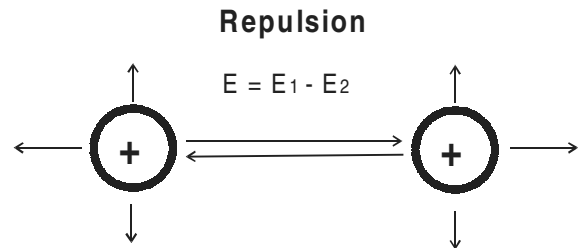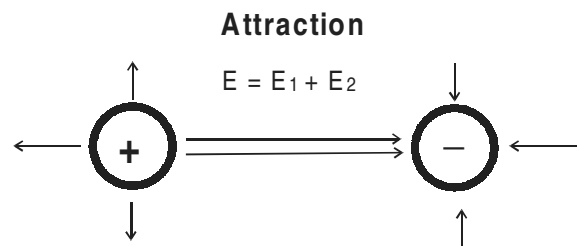
Repulsion

$$E = E_1 - E_2$$

$+$ $+$

Fig. 2.1.

Attraction

$$E = E_1 + E_2$$

$+$ $-$

Fig. 2.2.

The Lorentz Force
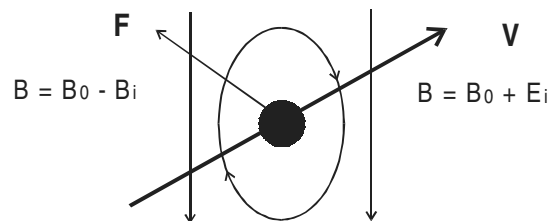
F   V

$$B = B_0 - B_i$$ $$B = B_0 + E_i$$

Fig. 2.3.

Such sort of influence is the reason of electrical interactions (it is an original author's conception). The Fig.2.1 shows the repulsion and Fig.2.2. shows the attraction modes for two electrically charged bodies. In the first case, total sum intensity between bodies is less than intensity of each body. The second case is that the intensity between bodies is more than intensity of electrical field of each body. ***In fact at any case there is net summary asymmetrical electrical field, which surrounds each electrically charged body. Due to this fact some gradient of electrical intensity is the reason of the Coulomb forces between them.*** It is important to understand that there is a direct interaction between the body and surrounding space (ether) and the force is a result of the gradient of the pressure like in the case of aerodynamics. We do not need a hypothesis about the so called "long distance interaction" since all force interactions (electrical included) are the simple

mechanical effects in ether. Lorenz force also can be considered as a result of some gradient in ether, since the pressure of ether depends on the relative velocity (vector sum or difference) (Fig.2.3). The effect seems to be the aerodynamics effect of ether.

Since the "intensity of the field" itself is a gradient of the potential, so the gradient (grad E) of the "intensity of the field" is qualitatively new notion, which leads to a new physical effect, i.e. to the **active non-compensated force.**

Assuming the common nature of the considered examples we have to conclude: the basis of all electrical and magnetic interactions is the energy exchange, which we considered for the case of the heat processes. The "field" means some area of space where the processes of interaction between ether and matter are not chaotical and spontaneous, but they are ordered in some degree. More order means a higher value of the force. The "field" is an equivalent of influence to processes of impulse interaction between material particle and ether (virtual) particle, that makes this interaction to be directed (unidirectional) in some certain direction. **By this way we come to the ether level mechanics, which is the basis of all electrical and gravitation phenomena, that is an electrogravitational unification.**

Let's consider some design, where the properties of matter are used to create the gradient described above. It is necessary to note that there is no principal difference between the particle of matter and space area near the particle that was mentioned by Faraday. They (particles and space) are both the certain physical processes in ether. **So, when we want to produce some special structure of space, we can work with the matter properties.**

The dielectric on Fig.3. is placed between the metal plates and it is a non-linear dielectric, since there is a gradient of permittivity along the electrical intensity lines. Normally, the polarization of particles of the dielectric is a symmetrical one to the side of positive and negative plates.
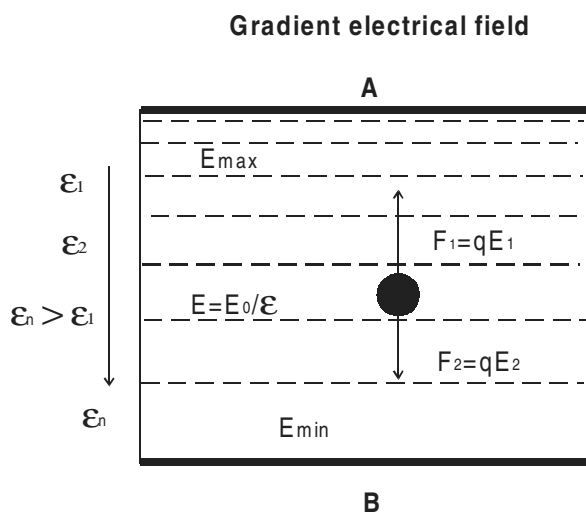
Gradient electrical field

Fig.3

But in our case, the asymmetry of properties of the dielectric produces the asymmetry of polarization and there is some non compensated force in such sort of a capacitor. T.T.Brown patented a similar idea in USA patent 3187206 of May 9, 1959. The simplest case is a two-layer dielectric, (Fig.4.1.) where the force is created on the border between two different dielectrics. This force has been known from 1927 and it is applied in industry as Johnsen-Raabek effect.
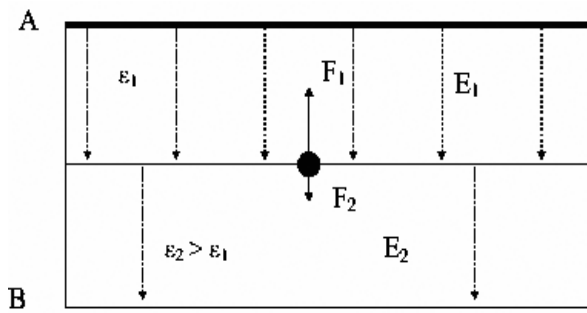

Fig.4.1

Let's consider some experiment (Fig.4.2) produced by me in 1997. The basis of the design is a dielectric plate of permittivity 6 and the second layer is a dielectric plate of permittivity 1. The square of the plate is 100 square cm. The high potential (direct current) source is a home-made design. The potential is about 10 kV. The calculated active force should be about 0.001 N or 150 mg that was detected by means of rotation torsion effect.
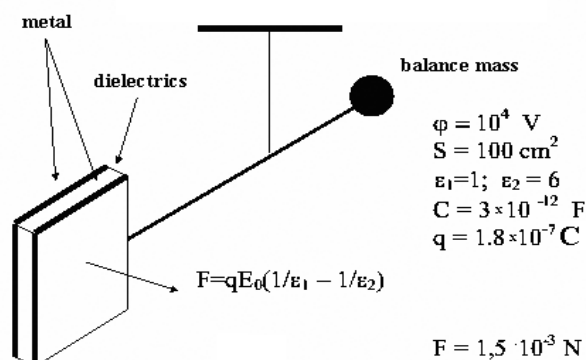

$\varphi = 10^4$ V
$S = 100$ cm^2
$\varepsilon_1 = 1$; $\varepsilon_2 = 6$
$C = 3 \times 10^{-12}$ F
$q = 1.8 \times 10^{-7}$ C

$F = qE_0(1/\varepsilon_1 - 1/\varepsilon_2)$

$F = 1{,}5 \cdot 10^{-3}$ N

Fig.4.2

Fig.5 is an example of commercial aerospace project. Let's take the surface to be 100 square meters.

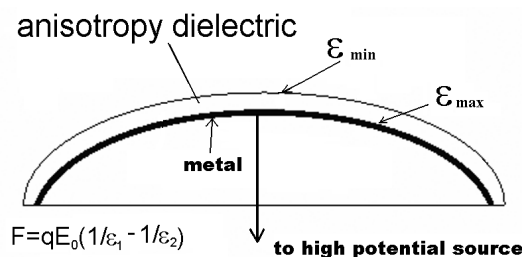$F = qE_0(1/\varepsilon_1 - 1/\varepsilon_2)$

Fig.5

The capacity of 1 cm radius sphere is 1 pF, so the calculated capacity of the system should be about 1 micro Farad. The special gradiental ceramics can be used in the design, that allows to increase the permittivity gradually in the dielectric layer from 80 to 1. The potential of 100 kV is a quite real value. So, for this potential and this surface we'll get the electrical charge about 8 Coulomb. The difference of forces, which act on the particles of this gradient dielectric should be about 80 tons. There is a square function of force from the potential, so it is more useful to increase the potential than to increase the surface.

As a conclusion let me say about necessity of a true law of the momentum conservation. The name of the report "reactionless propulsion" means the absence of ordinary reactive flow of mass (rocket fuel). In the systems considered above there is a reaction, since the velocity of system changes and the compensation effect here is the change of the impulse (momentum) of the "virtual particles" or "particles of ether". **So, the heat energy exchange balance we considered above should be changed and ether becomes colder.** It can be experimentally detected as 4-dimensional effects, since the time rate should be changed in local space around the device working according to the reactionless principle of active force.

DNA Molecule and Four-Dimensional Holography

Alexander V. Frolov

Development of the four-dimensional notion of curvature allows the understanding the physical sense of time.

Search of the facts, which can prove the correctness of the concept, led to the discovery of a new Law, which demonstrate itself in whole numbers values of curvature of space for any natural object (for example, a planet, a proton, and a DNA molecule). The curvature of the given objects (with high accuracy) can be considered to be a whole number. The conclusion is: space itself is created as some periodical process and we can calculate its curvature as some "wave number", which already is a common notion in quantum physics. This proves the general correctness of quantum mechanics in all natural processes. The practical significance of the new approach lies in the possibility to calculate the resonance conditions of four-dimensional space of some object.

Curvature

Mathematical idea of the line curvature is a value inverse to the radius and measured in reverse meters:

$$r = 1/R \ [1/m] \qquad F. \ 1$$

The value of the same measure is known in physics. It is called the "wave number", which is inverse to the wave length. For any surface the curvature is defined by two cross lines and in the case of sphere we will get the following formula:

$$r = 1/R + 1/R = 2/R \qquad F. \ 2$$

May be it will be logical to develop this approach for space, but it is necessary to set the direction of radius. The line can be curved in the direction, which "is not contained" in it like P.D. Ouspensky wrote [1]. The surface of sphere is curved in a direction, which is orthogonal to it. In both cases the space of a line (one-dimensional) or a surface (two-dimensional) can be closed on itself, then the movement in such a space becomes cyclic. Some parameter appears, which characterizes the repeat of the position (coordinate) of the point with its movement in such self-closed space. This parameter depends on the speed of movement and radius of the closed space. Really, it is a period of time. Therefore, time has a physical sense only under consideration of some process (movement) in the space of some given curvature.

The 3-dimensional space, which is usual for us, is curved in the direction of the fourth dimension. This creates the periodicity of processes observed in nature: from the oscillations of pendulum to the half-life period of isotopes. We suppose that space itself is created due to some process of energy change. That's why we should introduce the term "space of a process" of the defined dimensionality.

Using the term "density of energy" for the one-dimensional space it is easy to find a physical analogue – the density of current. In the 2-dimensional space the density of energy corresponds to the transverse electromagnetic wave. In its turn, the change volumetric density of energy is a physical mechanism of creation of 3-dimensional space of the process. The periodicity of existence of 3-dimendional space is characterized by its curvature:

$$r = 3/R \ [1/m] \qquad F. \ 3$$

In technical sense, the volumetric density of energy in space can be changing with the modulation of the density of substance (vapor or plasma) or density of energy. There are also some methods to form the longitudinal electromagnetic waves.

Examples of calculation

1.   The period of rotation of the planet T is equal to 31557600 seconds, which corresponds to the frequency of electromagnetic oscillations

the rotating solid-state object, which is filled with mass. It is an inner solution of Einstein equation of the rotating solid-state object. The inner solution of rotating solid-state object is unknown. If the shape of the rotating solid-state object is a sphere, then inside of it space-time must have characters of Schwarzshild inner space-time and rotating coordinate system. And it must be continuous smoothly with Kerr space-time on the surface of the object. If we get above solution, then next we will discuss the external space time of the rotating solid-state object, which has valuable rotation. The solid-state object, which has valuable rotation, can generate a gravitational wave. We will be able to get information of energy-momentum conservation by analysis of above gravitational wave.
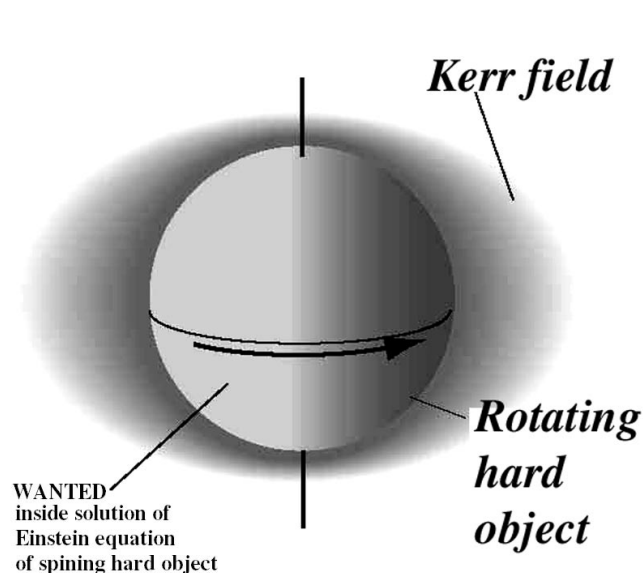

Fig.1 Space-Time propeller.

Rotation of the turntable and the wheels causes a difference of time delay late in the turntable and the wheels. Time delay in the wheels (at point P) depends on $Sin\phi$. It means that time delay of P at $0 < \phi < \pi$ and P at $0 > \phi > -\pi$ is different.
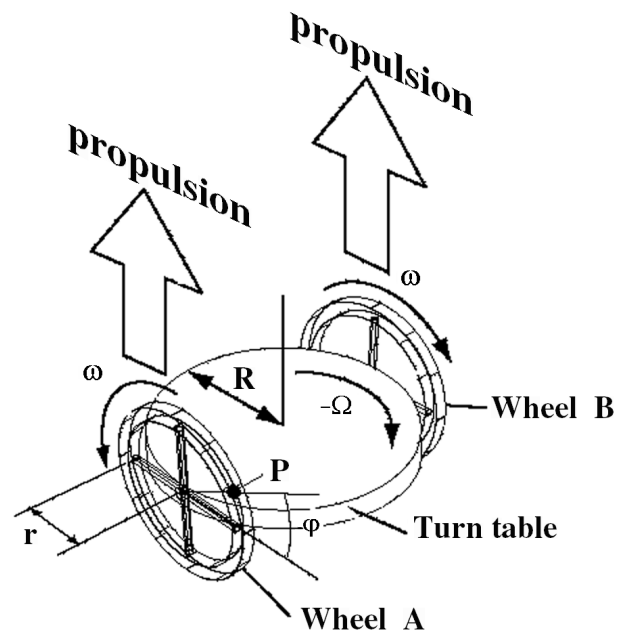

Fig 2. Space-time image of rotating hard object.

Space-time structure of inside field of rotating hard object is unknown. Out side solution should be Kerr field. Both fields should be smoothly continuous. To know the structure of inside field is the first step for the discovery for activity matter of space-time propeller.

Rythmodynamics of Amplitudeless Fields

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Theory is a well-reasoned hypothesis!

In this article we give an example of hypothetical black holes and effects, which accompany this phenomenon. This example helps us to develop the closest reason of gravitational attraction of the bodies. Also we introduce new ideas of amplitudeless field (gravitational field), amplitudeless quantum (graviton), frequency horizon. It is supposed that the reader has already got acquainted with the main principles of monographs "Rythmodynamics" and "Frequency space".

BLACK HOLES

In the XXst century all people know about black holes. "According to the Newton's laws and theory of relativity even the only one quantum of light cannot leave the star. Space in the place, where black hole appeared, becomes distorted and isolated in itself." [14].

In the world of science when we speak about black holes two theories are considered to be principal. These are classic (diffusive) and "neoclassic" (Buracanian) concepts of cosmogonical process. The first one is based on the ideas and constructions by V. Gershel (the end of the XVIII century). V.A. Ambartsumyan proposed another concept in the late 40s of the XX century.

In contrast with the "classics", who consider black holes to be the natural steps of evolution of substance, the «buracans» postulate the hypothetical "prestellar substance" (D-body) as a relic heritage of cosmogonical

singularity. A prestellar substance is believed to be superdense and its state is not subjected to the fundamental laws of modern physics. In this sense the buracans go away from the physical concrete definition of the nature of hypothetical D-bodies that leads to the explanation of unknown through the more unknown.

Though black holes are only theoretical objects, the representatives of the competitive theory seriously recognize a possibility of their presence in the Universe.

Acad. V.L. Ginzburg, the follower of "diffusive cosmogony", points out that black hole can exist in the limits of Common relativity theory (CRT). Acad. V.A. Ambartsumyan also states that the existence of black holes in the Universe is quite possible because it is predicted by the relativist theory of gravitation. Both schools consider black hole to be a relativist object. But there are other points of view. For example, A.A. Logunov, who created his own variant of relativist theory of gravitation, states that there are no black holes [13].

The most interesting is the substance of black hole, which concentrates in the central "extended singularity" having the size of $\sim 10^{-33}$ cm (Plank's size). It is supposed that our fundamental physics including CRT and quantum mechanics do not work in this field. Here black hole is the object ruled by unknown physical laws. Exactly around the substantial part of black hole the vehement discussion is carried on. But there are common properties:

- superpower gravitational field;
- existence of the horizon (surface of Shvarzshild);
- unobservable matter, which crosses the horizon during the collapse and follows its movement to the central singularity.

All scientific schools recognize these properties. That is why it is considered that communication of collapsed object with the external world is impossible. Any emitted particles of black hole (even photons) will return back to black hole. The Shvarzshild's surface is a horizon. We are not able to see anything outside the boundaries of this horizon. It means that the body falling in black hole becomes invisible after it has crossed the Shvarzshild's surface. Here CRT suggests an original interpretation. Geometry of space changed, it became deformed, isolated in itself [1]. Presence of superpower gravitational field also is interpreted by deformation of space.

To have a full idea we should mention the ether concept, which consider gravitation as a consequence of ether flow to the substance [5,6]. If the speed of flow is higher than the speed of light, then the light cannot break out.

Thus, there is a problem of black hole and few hypotheses, which pretend to its explanation. But is it possible to explain the properties of phenomenon using the limits of scientific logic and operating only with the known physical phenomena? Let's put some questions:

- What happens with the bodies in the interval between the remote observer and surface of black hole?

- Why bodies got out of the Shvarzshild's surface become unobserved?

- Is it possible to explain the superpower gravitation without using the hypotheses like deformation of space?

- Is the Shvarzshild's surface a barrier for electromagnetic waves?

We can try to give a complex explanation to the things happen.

Let's highlight the consequence of consideration of phenomena and effects, which we are going to use:

- gravitational red bias
- wave notion on the microstructure of substance;
- frequency self-synchronization of different oscillation sources ;
- deformation of interference field;
- gravitational drift;
- frequency horizon.

Gravitational red bias

There is bias of frequency properties of the substance in the field of gravitating masses. Gravitational red bias and Moessbauer's effect are the known ones. On the base of experiments, which have the Moessbauer's effect in foundation, it was stated that deceleration of oscillation process occur on the corpuscular level. This deceleration depends on the distance to the gravitating body. The closer to the surface the frequency of oscillations is lower [1,7]. In the Earth conditions, for example, this difference is practically invisible (the order of relative gradient 10^{-15} to 10 meters of height), but it can be detected using the atomic clock. This clock goes slower near the surface than on some height. The other confirmation that the frequency state of real bodies depends on the proximity to the source of gravitation is the bias of spectral lines to the red side in chemical elements situated on the surface of stars. We can evaluate the mass of remote star using the size of bias. The bigger is the bias, the bigger the mass or density of the star. Let's consider the mechanism of bias of frequency characteristics.

Frequency pulling in the amplitudeless field

In the end of the XIX century Relay noticed that two organ tubes with the holes situated near each other can play in harmony with a close tune, i.e. the mutual synchronization of oscillations occurs. Sometimes these tubes can make each other to become silent [4,8]. Here the sources of vibration impose their own frequencies competing with each other. The extent of such "obtrusion" (pulling) depends on the ratio of powers and mutual distance. [2]

According to [1] substance has a wave nature and can be presented by the set of standing waves. There are atoms in the center of these waves (Fig. 1).
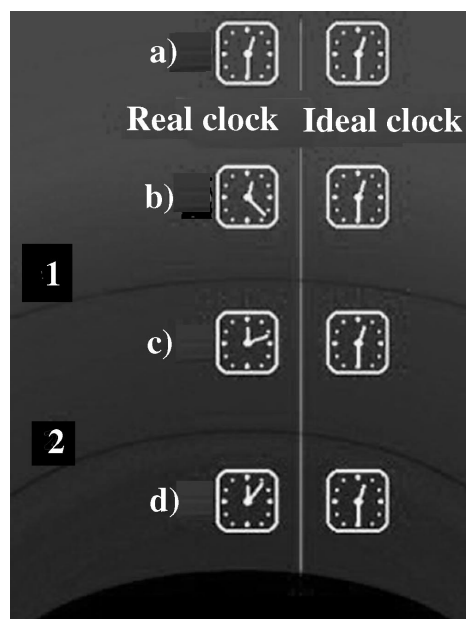

Fig.1

Every element of substance (atom) vibrates. If the minimal distance between the atoms is defined by one wave loop (~1-10E) then we can consider the order of frequency of these vibrations (~10^{18}Hz). In this sense substance is invisible for us because the range of visual perception is much lower (~10^{14}Hz). The only thing to help us is a property of real bodies to reflect or rather to re-emit the wave, which are required for the visual perception of the wave. If substance is in disturbed (plasma) state, then the substance itself begins to emit the set of spectral line and by this process it shows its wave nature.

From the point of view that the world environment has a universal nature, every atom of a chemical element forms its own frequency interval (frequency medium) inside or around itself, in the limits of which it is stable. During the interaction with another chemical element or atom another frequency medium is formed, which is comfortable to the assembly of these elements or for any number of elements. Chemical elements or their assembly can comfortably exist only in frequency mediums formed by them. With any change of elements as well as their set the formation of corresponding medium is a condition of stability. In other words, we cannot consider a substance ignoring its frequency medium. It is evident from the fact that different chemical elements consist of the same elementary particles and their set is very important. This set can be stable only in a certain frequency interval. The influence on the frequency interval leads to the chemical reaction. If the reaction is impossible, then it leads to the change of chemical elements. Taking into consideration all above mentioned we can interpret the sense of periodic table by Mendeleev in another way. Mendeleev discovered periodicity but didn't give any explanation. And what is more, development of physical and chemical theory of frequency space will open a new epoch in synthesis of environmentally appropriate substances and compounds, which have the given properties and technological parameters. Phase-frequency interpretation of periodical table has a sense because it will allow seeing new patterns of structure of complex compounds and explain many artifacts of behavior of chemical pollutants in environment.

There are interesting characteristics of frequency medium (field), i.e. density and amplitude. The density of field (thickness, saturation) depends on the quantity of oscillating elements of the object and distance to it, i.e. decreases as it moves away. There is a different situation with the amplitude. If the quantity of emitting elements is high, then for any emitted running wave (quantum) an identical antiphase running wave exists. A situation of zeroing (conpensation) of the amplitude appears. This situation contains the running waves and there is no any resulting wave. For this situation the calculation and volumetric modeling were made [4]. A principle possibility of the fact that there are "nonradiating" systems of oscillators and wave amplitudeless fields in nature was discovered.

Absence of amplitude makes difficulties for the possibility to register the wave characteristics of the field and creates an illusion that there is nothing in space. In these cases we consider the field as another kind of matter. However, recognition of method of amplitudeless propagation of wave disturbances is founded by modeling. It allows us to speak about the wave nature of fields. Let's dwell on the gravitational field, which is a high frequency wave amplitudeless background according to the rythmodynamic approach, in ideal it consists of amplitudeless (nondeveloped) quanta – gravitons.

Absence of amplitude allows us to speak about high penetrating property of gravitational field. If "there are nothing", then "it" penetrates through all. We can assume it, but bodies can feel the amplitudeless field somehow. In another article about "nondeveloped energy" we have found that transition of energy from the nondeveloped, amplitudeless state to the developed one can occur on the interface of mediums, i.e. during the refraction. If the property of nonlinearity of a material object can shift phases of waves, then the part of energy releases directly in the place of refraction. Rythmodynamics consider this released energy as a reason of appearance of frequency gradient in the bodies. Evidently by the same reason the spectral lines of excited substance shift to the red side in the field of gravitation. Here is an analogy: "If there is a mechanical pendulum clock, then their period of oscillations in vacuum, air and water is different. The higher is the density of medium, the oscillations are more difficult. The clock goes slower in water than in vacuum, but faster than in liquid mercury". In this sense we can speak about gravitational medium, which imposes its own "frequency game" to the bodies got into this medium. But the bodies in their turn make changes in medium and deform the general field.

Deformation of interference field

When the body is situated in the gravitational field, it results in dismatch of its frequencies. The body is volumetric and discrete, i.e. it consists of separate atoms. That is why parts of the body (atoms) are situated on the different distances from the massive object (the source of the gravity field). This is the reason for the fact that the degree of "frequency pulling" is different for every atom. Let's consider this question more particularly.

Let's consider a substance as a set of standing waves. Atoms are situated in the center of these waves (See Fig.2). Atoms are the sources of waves. Standing waves appears between the closest atoms. Wave crystalline structures appears (sets of standing waves). Atoms are situated in the center of these waves.

Fig.2

Atoms are multidistant from the surface. A distance between the upper and the lower parts of a crystal is calculated by angstrom units, which is sufficient for the appearance of gradient of frequencies. Difference in frequencies leads to the appearance of so called "spider-effect" [4], i.e. to the deformation of general interference field and to the deformation of internal connections. Sense of deformation is in the directed (vectorial) bias of centers of the wave crystalline lattice relatively to atoms. Atoms tend to remain in the centers, that's why they should continuously follow these centers. System begins to move.

Fig. 3. Due to the fact that atoms are multidistant from the source of gravitation, the degree of their "frequency pulling is different". Dismatch of frequencies takes place in the system.) Gradient of frequency leads to the deformation of interference field and its slipping down from the object. Appearances of the interference pattern looks like a spider (it is the reason for its name): spider-effect, gravitational spider. Such kind of deformation leads to the movement of system.

Gravitational drift and weight loss

Black hole (any source of gravitation here) imposes a vectorial deformation to the body. Object tries to escape from this deformation with all available methods. One of them is movement following its own interference field.
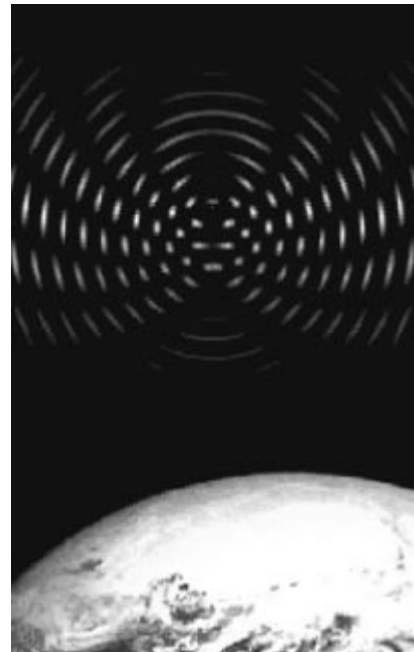
Fig 3

A result is a drift in direction of black hole. We interpret this drift as a free fall.

If the reason of free fall can be explained through dismatch of frequencies, i.e. internal reasons, then we do not need to introduce the curvature of space. It will be logically to speak about distribution of potential characteristics in linear space, which can create an energy discomfort in the bodies.

As regards to the curvature, here we should compare the standards of length. Metrics of these standards is generally determined by the frequency condition of substance. Absence of the source of gravitation guarantees an equality of frequency conditions to the standards, and therefore the equality of their lengths . Presence of gravitating body breaks the frequency equality, standards become unequal, i.e. linear figures cannot be constructed with them that we consider as a curvature . Rythmodynamics speaks about the illusion of curvature.

If the reason of gravitational drift is the dismatch of frequencies, then equalization of frequencies will inevitably lead to the stoppage of the free fall, i.e. to antigravitation [12]. Body will loose its weight (but not mass) and will hover without any support. But it is not a "free" process.

Frequency horizon

What will happen, when the frequency characteristics will fully shift to the infrared area relatively to the observer? Disappearance of such body from the field of vision of the observer is expected.

Something similar can happen in the surroundings of black hole because as the body approaches to its surface, the frequency characteristics shift to the infrared area.

Let the body to fall from A to D (Fig. 4b). For the observer A spectral lines of the body shift to the infrared side. He sees that the body, which moves away, becomes red at first, then it disappears. Visual disappearance will come in the moment when set of spectral lines fully shift to the infrared area. If another observer falls together with the body, the situation will be symmetrical. Set of spectral lines, which characterize the state A will fully shift to the ultraviolet side. We should note that no one of the observers will notice any frequency changes in his own system.
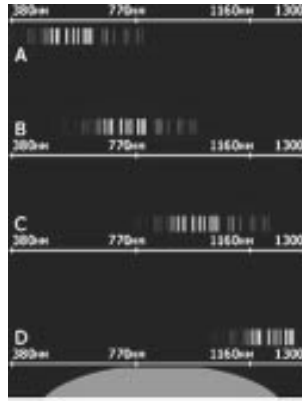

Fig 4

Gravitational red shift of spectral lines (frequencies) in the systems B, C and D regarding the scale of system A.

We can state that A and falling observer "disappeared for each other", i.e. they were separated by the Shvarzshild's surface. But it will be logical to explain this mutual disappearance by the strong difference in frequency characteristics of the objects. In this sense the Shvarzshild's surface is a *frequency horizon*. Disappeared observers did not disappear anywhere. They are really in space and can observe each other for some time with the help of infrared or ultraviolet vision devices.

But then there are no reasons to forbid the electromagnetic signals to leave black hole, i.e. come outside. The other question is: what happens with the sources of these signals, if we consider the substance of black hole to be them?

If the question is about the red shift only and its dependence from the concentrated mass, so when the mass accumulates, the frequency characteristics of falling body (which did not reach the surface of black hole yet) will appear as a radio-band waves. In this sense black holes will be a radio source. But the frequency state of the body of black hole constantly increases ($m=kv$, where $k=h/c^2$).

Let's review the theoretical experiment:
- For the external observer A the objects situated in the gap between the Shvarzshild's sphere and the body of black hole are invisible because all their frequency characteristics are shifted to the infrared area.
- For the observer D situated on the surface of black hole the external observer becomes invisible because all frequency characteristics of the external objects are shifted to the ultraviolet area.
- With the accumulation of mass black hole should degrade to the astrophysical radio band wave source.

Relativity of the frequency horizon

The substance of black hole forms a corresponding medium inside and around itself. Any matter object, which falling into black hole or moving away should change. At first it concerns to its frequency interval.

We compared the frequency horizon with the Shvarzshild's sphere. Radius of this sphere usually is determined by the formula $R_0=2GM/c^2$, i.e. the bigger is the mass, the bigger is the radius of the sphere. The frequency horizon is a relative notion in rythmodynamics because it has a different physical sense. The formula describing the radius of the horizon to the remote observer looks in a different way too: $R_\upsilon=kgn$, where $kg=2Gh/c^4$. Change of the general notion of mass (M) to its particular state (ν) in the generally accepted formula allows us to consider the phenomena and processes accompanying black holes in a frequency consideration. Now we can say that the higher the frequency of BH body, the bigger the radius of its frequency horizon is. Unlike the Shvarzshild's sphere, the frequency horizon is a relative notion because it depends on ratio of frequency states in the systems of observer and object.

If for the observer A the frequency horizon is defined by the surface B (Fig. 4), then the object C is invisible for him. The frequency horizon for the observer B is another one and is marked by the surface C. That's why the object C is observable to him. The reason is the different relativity of frequency characteristics of the system "observer-object".

It is interesting that there are two frequency horizons for the observer C, internal (where the system D hides) and external (where the system A is beyond the visibility). The system C and the observer appear to be isolated from two sides. However, if the objects with similar frequency characteristics will appear in space, they will be visible for the C. In the real world we can see only the things, which do not leave the limits of visible frequency band.

Let's consider a hypothetical example with two black holes similar by their frequencies. There are observers D' and D on the surface of these holes (Fig. 5). D' and D are situated in the equal frequency conditions. That's why the communication between them is possible. But the external objects (for example, A) are invisible to them due to the big difference of their frequency characteristics (violet shift). It is clear that objects D' and D are also invisible to A. Here we can speak about the areas of a common space delimited by their

frequency properties. For every kind of observers the world seems to be real only in its frequency band, which is determined by inborn qualities. Any thing situated out of the limits seems to be the "beyond world" for the observers, i.e. situated on that side of the frequency horizon. In this sense every world limited by its frequency for another one is some kind of a black hole!
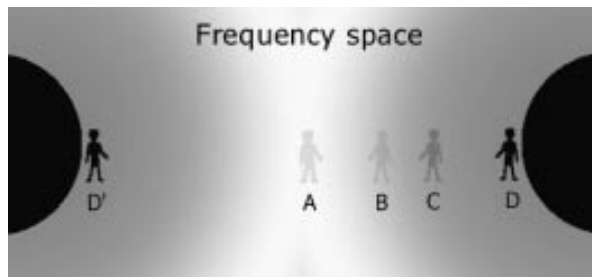

Fig 5

Fig. 5. Illusion of frequency space (pseudofrequency) appears in the surroundings of the massive bodies. For D and D' the real observers A and B are situated on that side of the frequency horizon. That's why we speak about their system as a beyond real world.

Illusion of materialization and dematerialization of objects

A material object moving from D' to D (or visa versa), flying by A, will behave in an exotic way. At first it will appear from nothing, then moving away it will disappear, dissolve. The reason is that the frequency characteristics of the moving object change and when they are in a zone of visual perception A the object becomes visible. The further shift of the frequency characteristics leads to the visual disappearance of the object. However, as we pointed before, the object can be observed in infrared diapason by means of special devices.

Fig. 6 is an illustration to the question of the frequency horizon. The angle of reflection does not allow the above-water observer to see the underwater objects. Also it does not allow the underwater observer to see the plunger flying to the water. Transition through the real and at the same time imaginary boundary between water and air is accompanied not only by the disappearance of the object in one world and appearance of it in another world, but also by intensive wave disturbances of the boundary of divide. The underwater observer can have an opinion that the spontaneous birth (materialization) of the object, and the above-water observer can have an opinion that he saw a disappearance (dematerialization) of the object. In the given example the boundary between the mediums with different frequencies is obvious, because our senses overlap both diapasons of frequencies.

> **From the position of rythmodynamics this object is present, but it cannot be observed**

There is an interesting situation, when the Worlds with different frequencies (mediums) are inserted into each

other in their volume. If the gap of frequency is sufficiently big, i.e. it is not overlapped by our senses, then transition from one frequency band to another one will be accompanied by the effects of disappearance in one world and appearance in another one, wave disturbances of boundaries of divide. These effects can be formalized not only mathematically without any additional regularities, but also can be understood by means of three-dimensional logic.
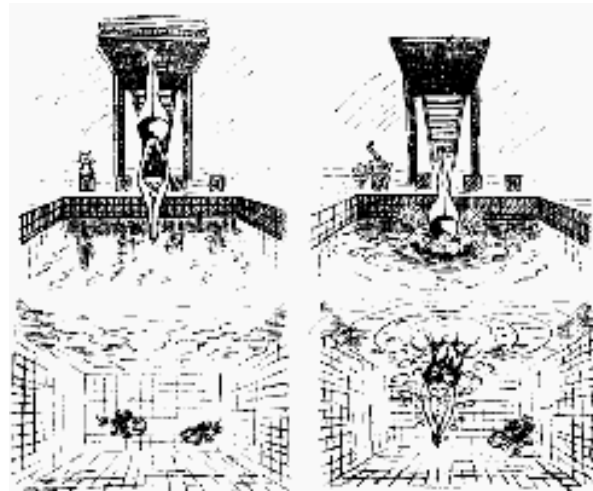

Fig 6

The mechanism of materialization and dematerialization was described in the brochure "Frequency space" [3]. We suggested there to use the notion *time* instead of *frequency* and to change the time coordinate (t) to the frequency coordinate (n).

Introduction of the frequency coordinate is a natural logical step. If we change the time coordinate axis to the frequency one, we will get a chance to interpret the movement by this axis as a change of frequency characteristics of the object but not as a movement to the past or to the future.

Transition by frequency in free space is different from the analogous transitions in the surroundings of black hole.

In the surroundings of black hole the change of frequency characteristics of objects occurs not directly and always is connected with the movement in metric coordinates. In this sense black hole creates the conditions similar to the frequency space.

Transition by the classic frequency space is different. The object shifting by the frequency axis materializes or dematerializes without any movement. Does it mean that it is absent in the space? From the position of rythmodynamics this object is present, but it cannot be observed.

We came close to the boundary, which we can step over and get to another world, the same as the real world. These worlds can be situated side by side with each other, they are divided by the frequency horizon and

they are "black holes" visually for each other. Interaction of these worlds is weak, that's why it is called perceptible, informational interaction [9], which can be conceived in the intuitive level [10].

Conclusions

- There is non-linearity of distribution of frequency-amplitude characteristics (potentials, conditions) in the rythmodynamic space, which creates an illusion of curvature.
- "Frequency pulling" is a reason of gravitational red shift, deceleration of rate of the atomic clock, dismatch of frequencies.
- Dismatch of frequencies of the object leads to the vectorial deformation of the interference field. Reaction on the deformation is the movement (free fall).
- A massive body becomes invisible due to the shift of its frequency characteristics to the infrared (black hole) or ultraviolet (white hole) area. In such an interpretation the "collapse" is a quick process of shift of the frequency characteristics of the object.
- A notion of "Shvarzshild's sphere" is changed by the frequency horizon. An object got beyond this horizon becomes invisible.
- Electromagnetic waves pass through the Shvarzshild's sphere free in both directions.

If the uncompromising classical (diffusion) and "neoclassic" (buracanian) hypotheses were in contradiction concerning the question of black holes up to the present time, then with appearance of this article a new point of view (rythmodynamic) came out. This point of view states:

- There are no curvature of space, there are no black holes in a common sense, but there is an illusion that the bodies become invisible due to the shift of their frequency characteristics to the infrared or ultraviolet area.
- Our Universe is bounded from the both sides by the frequency horizon. That why it is non-observable for the external worlds, i.e. it is a "black hole"!
- As the mass of black hole increase, its frequency increase too and the moment can appear, when the further increasing of frequency will lead to the weakening of gravitational properties at first, then to the leaving of black hole to another frequency interval of space. For the habitant of another frequency scale this process can be observed as a birth of a new star or new elementary particle.

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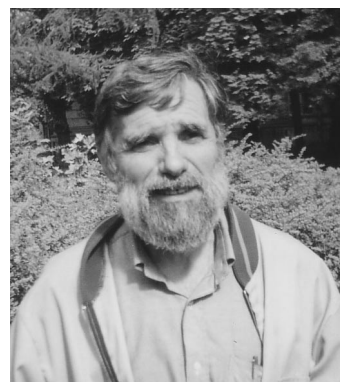

Hydrogen-Helium Energy on the Base of Laminated Silicates and Tectosilicates

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In October 31, 2000 an opening of Research Institute on Cosmic Energy (RICE) took place in Munich. The opening of a branch Institute in Saint Petersburg is planned to be done in a year. Official materials were published in the magazine "Raum und Zeit" ("Space and Time") #109 and #110, 2001. Internet address is www.raum-und-zeit.com. A gravielectrical transformer of cosmic energy was shown on the presentation of the Institute.

Transformation of energy is a central notion in universal (analitical) electrodynamics by Maxwell-Zubov. Acad. Vladimir I. Zubov studied the unification of electromagnetic and gravitational interactions. Eighler's rotatory mechanics with three Eighler's angles (precession, nutation and proper rotation) is opposed to Newtonian translational mechanics. Proper rotation is usually called as rotation, twisting or torsion.

The capacity of 1 cm radius sphere is 1 pF, so the calculated capacity of the system should be about 1 micro Farad. The special gradiental ceramics can be used in the design, that allows to increase the permittivity gradually in the dielectric layer from 80 to 1. The potential of 100 kV is a quite real value. So, for this potential and this surface we'll get the electrical charge about 8 Coulomb. The difference of forces, which act on the particles of this gradient dielectric should be about 80 tons. There is a square function of force from the potential, so it is more useful to increase the potential than to increase the surface.

As a conclusion let me say about necessity of a true law of the momentum conservation. The name of the report "reactionless propulsion" means the absence of ordinary reactive flow of mass (rocket fuel). In the systems considered above there is a reaction, since the velocity of system changes and the compensation effect here is the change of the impulse (momentum) of the "virtual particles" or "particles of ether". **So, the heat energy exchange balance we considered above should be changed and ether becomes colder.** It can be experimentally detected as 4-dimensional effects, since the time rate should be changed in local space around the device working according to the reactionless principle of active force.

DNA Molecule and Four-Dimensional Holography

Alexander V. Frolov

Development of the four-dimensional notion of curvature allows the understanding the physical sense of time.

Search of the facts, which can prove the correctness of the concept, led to the discovery of a new Law, which demonstrate itself in whole numbers values of curvature of space for any natural object (for example, a planet, a proton, and a DNA molecule). The curvature of the given objects (with high accuracy) can be considered to be a whole number. The conclusion is: space itself is created as some periodical process and we can calculate its curvature as some "wave number", which already is a common notion in quantum physics. This proves the general correctness of quantum mechanics in all natural processes. The practical significance of the new approach lies in the possibility to calculate the resonance conditions of four-dimensional space of some object.

Curvature

Mathematical idea of the line curvature is a value inverse to the radius and measured in reverse meters:

$$r = 1/R \ [1/m] \qquad \text{F. 1}$$

The value of the same measure is known in physics. It is called the "wave number", which is inverse to the wave length. For any surface the curvature is defined by two cross lines and in the case of sphere we will get the following formula:

$$r = 1/R + 1/R = 2/R \qquad \text{F. 2}$$

May be it will be logical to develop this approach for space, but it is necessary to set the direction of radius. The line can be curved in the direction, which "is not contained" in it like P.D. Ouspensky wrote [1]. The surface of sphere is curved in a direction, which is orthogonal to it. In both cases the space of a line (one-dimensional) or a surface (two-dimensional) can be closed on itself, then the movement in such a space becomes cyclic. Some parameter appears, which characterizes the repeat of the position (coordinate) of the point with its movement in such self-closed space. This parameter depends on the speed of movement and radius of the closed space. Really, it is a period of time. Therefore, time has a physical sense only under consideration of some process (movement) in the space of some given curvature.

The 3-dimensional space, which is usual for us, is curved in the direction of the fourth dimension. This creates the periodicity of processes observed in nature: from the oscillations of pendulum to the half-life period of isotopes. We suppose that space itself is created due to some process of energy change. That's why we should introduce the term "space of a process" of the defined dimensionality.

Using the term "density of energy" for the one-dimensional space it is easy to find a physical analogue – the density of current. In the 2-dimensional space the density of energy corresponds to the transverse electromagnetic wave. In its turn, the change volumetric density of energy is a physical mechanism of creation of 3-dimensional space of the process. The periodicity of existence of 3-dimendional space is characterized by its curvature:

$$r = 3/R \ [1/m] \qquad \text{F. 3}$$

In technical sense, the volumetric density of energy in space can be changing with the modulation of the density of substance (vapor or plasma) or density of energy. There are also some methods to form the longitudinal electromagnetic waves.

Examples of calculation

1.   The period of rotation of the planet T is equal to 31557600 seconds, which corresponds to the frequency of electromagnetic oscillations

$$f = 1/T = 3,16886 \ 10^{-8} \ [Hz] \qquad F. 4$$

and the length of wave

$$L = c/f = 9,46\ldots 10^{16} \ [m] \qquad F. 5$$

So, the curvature of the corresponding resonator (an inverse value to the length of wave) is a whole number:

$$r = 1/L = 1057,00 \ 10^{-20} \ [1/m] \qquad F.6$$

2.   The radius of Bohr atom (hydrogen) constitutes $R = 0,52917 \ [A]$. The wave-length $\lambda = 2\pi R$. According to F.3 we find that the corresponding curvature is equal to one

$$r = 3/\lambda = 1,00 \ 10^{-9} \ [1/m] \qquad F.7$$

Let's note that it is an element of matter (simple atom) and its curvature is equal to the unit.

3.   Let's calculate the length of the proton wave. Mass of the proton is

$$m = 1,6726231 \ 10^{-27} \ [kg] \qquad F.8$$

The length of wave is equal to

$$L = h/mc = 0,75676739\ldots[m] \text{ (without taking into}$$
account the mathematical power) $\qquad$ F.9

The curvature of the space of proton is also a whole number with a high degree of accuracy

$$r = 1/L = 132141,000 \ [1/m] \text{ (without taking into}$$
account the mathematical power) $\qquad$ F.10

Taking into account the mathematical power do not play any role in this case because it is a question of measurement of the unit of length.

4.   The resonance parameters of DNA molecule

There are known parameters of helical spiral of molecule. Diameter is 20A, step of spiral is 34A, and shift of branches is of 0,7 period. The unfolded length of one turn is 71,44117 A. The value inverse to the length of turn, i.e. the curvature is equal to the whole number accurate to the third sign after the comma

$$r = 1/71,44117\ldots = 13,997 = 14 \ [1/m] \text{ (without taking}$$
into account the mathematical power) $\qquad$ F. 11

Let's note that 10 nucleotides falls to the one turn of DNA spiral. The branches are shifted between each other on 0,7 turn. The length of this part is equal to 50A

$$L = 0,7 \times 71,44117 = 50,00 \ [A] \qquad F. 12$$

Accordingly, the curvature is equal to the whole number $r = 2,00 \ [1/m]$ (without taking into account the mathematical power). Taking into account the fact that both branches of DNA are "winded" round the cylindrical

surface, then they can be mentally combined jointly during the shift along the axis of a cylinder on the direction corresponding to the single curvature for the surface (formula F.2).

The conclusion is: the structure of DNA reflects the construction of some energy and informational field and it can be considered as a parametrical resonator, in which the oscillations of energy of the given field are disturbed. Later we will discuss, what kinds of fields can have such structure.

The resonance parameters of processes in codon (area of three nucleotides) are calculated analogously. These parameters correspond to one codon: the length of all code (19,2 turns), length of informational code (18,3 turns) and length of stop-codon (0,9 turn).

Let's note, that molecule is twisted in proportions known in radio engineering as an optimum ratio of the length of turn L and step of the spiral X for the antennas of circular polarization

$$L/X = 2,1 \qquad F.13$$

Taking into consideration this fact, let's consider the physical principles of mechanism of energy conversion and informational signal peculiar to DNA and other elements of biological systems.

Longitudinal waves

The longitudinal wave is the wave, which has the change of density of energy occurring in the direction of wave transmission. An acoustic longitudinal wave is known as an alternation of compression and decompression of gas medium (air). From the time of Tesla and Hertz there have been a discussion about the existence of longitudinal electromagnetic waves. Now the advanced part of practical scientists studies the ways of creation and detection of these waves. At the same time the official science rejects this possibility. Why? The case is that the longitudinal wave can exist only in the medium, i.e. in some physical substance, which allows the compression and decompression. Recognition of the existence of such medium, for example as some World Ether, means the recognition of presence of an absolute system of co-ordinates. It is equivalent to the evidence that Creator exists. This is the topic of discussion between the theorists.

Practical scientists use the experimental facts. In 1932 N. Tesla wrote: "I have showed that universal medium is a gaseous body. Only longitudinal impulses can propagate in 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." [2]

A famous Russian scientist N. A. Kozyrev created the theory of active properties of time [3] and experimentally showed that any irreversible process, in which the entropy is changed, creates the "wave of density of time". The methods of registration of such waves show that they are the longitudinal waves and have electric and acoustic components. Really, this wave is a compression-decompression of space itself, i.e. with the comparison of the parameters of space in the area of compression, we can find a relative difference between the sizes of objects and rates of process passing. In other **terms, the density of ether defines these parameters of space.** During Kozyrev's experiments detectors on the base of quartz resonators showed the change of frequency of oscillations at few orders. At the same time in usual conditions the quartz resonators are the standards of oscillation frequency.

The longitudinal wave passing in air creates the sound wave also. Research by P.P. Garyaev [4] showed that genetic apparatus of organisms is able to transfer information "by means of electromagnetic and acoustic waves". Perhaps, authors found the both manifestations of longitudinal electromagnetic wave in their experiments. How do DNA molecules can create this wave?

Formation of waves with a longitudinal component is possible by means of spiral antennas (the analogue between the structure of DNA and such antennas had been already discussed) and with the change of volumetric or surface density of charge. Particular properties of longitudinal waves had been considered in details by A.V. Chernetsky [5] during the studying of self-generating discharge. Let's note that due to the half-period of "negative conductivity", during which the vector of intensity of electric field is directed towards the vector of displacement current, "the conditions for transition of energy from medium to the wave are created" according to Chernetsky.

That's why such waves can exist in the self-oscillating persistent mode. Interference of longitudinal waves appearing in the processes of life creates the persistent holographic pattern of a common informational field of the planet, the so-called "noosphere" by Vernadsky.

Studying of a mechanism of informational exchange in DNA will allow creating new methods of telecommunication, and experiments by Akimov and Shipov [6] are very perspective in this field. The works on irradiation of DNA by non-Hertz electromagnetic waves [7] show that there is an analogue between the methods of creation and reproduction of holographic information and the methods of creation and reproduction of genetic information. Let's consider this idea in details.

Four-dimensional hologram

This notion is an original author's term. Usually in holography some information is recorded in the thickness of photoemulsion of the plate as the interference layers. These layers are created by the waves coming from the various points of an object during its scanning by the laser beam in a process of hologram recording. In 4-dimensional holography information is recorded on some interval of time. In three-dimensional hologram every point of the surface during the reproduction of the image gives a full picture of the object as the beam of light penetrates to the thickness of emulsion and is refracted on every part of the interferential picture. In analogous way, for the recording and reproduction of 4-dimensional hologram will be sufficient to work with one point of space, but we need some minimal "elementary" interval of time. The pattern of events is recorded on this interval like in the thickness of emulsion. Thus, we can ground the quantum of action by Plank and understand the physical sense of regularity in integer values of space curvature for natural processes found by the author. Evidently, there is a minimal interval of time in nature, i.e. some period, which is defined by the energy parameters of every particular process, which create the space, for example, space of a planet, atom or space of DNA molecule.

Whole number curvature in microworld and macroworld shows the fractal character of time structure. The same rhythm of change of energy density in space repeats on the various levels of frequency spectrum. These changes reflect all irreversible events, which are the causes of creation of longitudinal waves of the density of energy.

It is clear that the technical methods of reproduction of information from 4-dimensional hologram are different from the methods of work with 3-hologram. Instead of the image of a thing (as an idea of its form in space) we will get a record of events and processes as a reflection of change of energy density in time, i.e. the peculiar rhythm or "music of time". Some odd phenomena can be clarified by means of the suggested concept and it can be applied for development of many new technologies.

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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

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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.
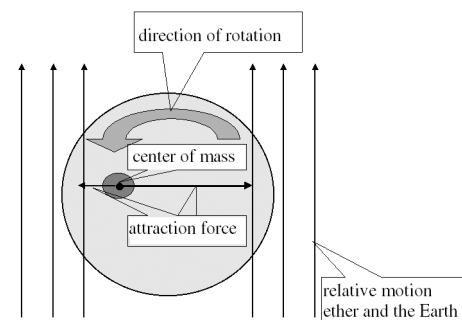

Fig.1.

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.

The force is also increases with the approaching to the walls of the cylinder (Fig. 2). We can always find a point of minimum gravity force inside the cylinder.
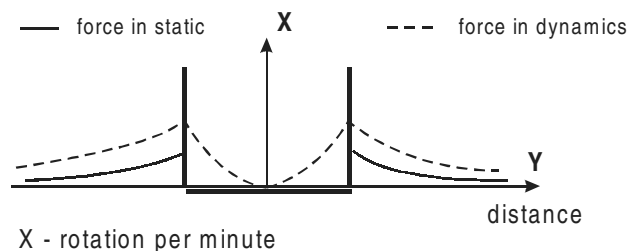

Fig.2.

During the experiment it was established that the increasing of gravity forces takes place around the rotating centrifuge. When the centrifuge is on, the mass begins to be attracted to the side of rotating centrifuge.

CONCLUSIONS

With the horizontal location of axis of the centrifuge there is a tendency towards acceleration to both walls of the centrifuge. We can notice a small shift in the center of gravitational equilibrium depending on the direction of rotation of the centrifuge (Fig. 2). Probably this happens due to the slow emission of ether by the Earth.

With the vertical location of axis of the centrifuge the direction of attraction of the mass depends on the direction of rotation of the centrifuge as well as on the position of the arm of rotating scales in regard to the force field of the Earth. With this the mass also is attracted to the both walls (Fig. 3).

The centrifuge was made for this experiment (Fig. 1). For the clear experiment we should avoid the electromagnetic radiation possible with rotation. We could do it by using appropriate materials for the centrifuge like paper and wood. There were no movements of the compass during the experiments. The

paper was twisted into a cylinder with internal and external diameters of 20/30 cm accordingly and height of 21 cm. The entire unit was put on a metal disk with diameter of 40 cm and aligned by a stainless steel rope with diameter of 3 mm. The centrifuge is situated on the axis of a 3 kW electrical motor rotating at 2860 rpm.
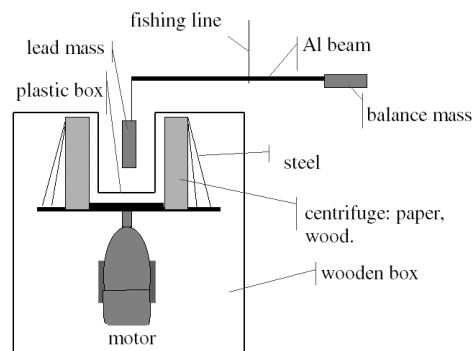

Fig.3.

Disturbances of the air appear with rotation of the centrifuge. To prevent them from affecting the experiment we should make a wooden box. The polyethylene reservoir with diameter of 16 cm was placed inside the cylinder of the centrifuge to isolate the mass from disturbed air.

A pendulum in the form of beam with the weights on its ends is suspended on the rope. The upper end of the rope made with 4-thread fishing-line with diameter of 0,15 mm. It is attached to the ceiling of the second floor and it has a length of 5 meters. To achieve a stable equilibrium of the pendulum we should split the upper end of the rope on 1 sm. The beam, on which the mass was attached, was made with a hollow aluminium tube of 8 mm diameter and 1,20 m length. The mass placed in the centrifuge was made of lead and has a weight of 3 kg.

Editor's note: The theory is well known but this simple experiment is a good illustration.

Design of an Engine for Free Space Based on the Pondemotor Effect

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This engine is based on the pondemotor effect, which is the principle of the creation of propulsive force by means of the interaction between electric and magnetic fields. The interaction between electric and magnetic fields produces energy-flux, determined by the Poynting vector [1,2]:

$$P = ExH, F = P / c, P = mc^2$$

Peculiarities of Poynting's vector are:

1.Violation of the principle of composition of fields:

$$P = \sum P_i(f_i)$$

2. Poynting's vector changes with double-frequency for flat polarized electromagnetic field:

$$/ E_0 \sin \omega t /, / H_0 \sin \omega t / P_0 \sin^2 \omega t$$

3. Poynting's vector is constant for circular polarized electromagnetic field: /P/=const