Brief review on alternative physics

(An alternative opinion on physics**) –** *English version*

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Alternative ideas empower the scientific and technological progress. Exactly now we need new approaches and solutions that will lead us to a qualitatively new level. This has always been the definitive scientific principle, and it will stay so. Even dubious solutions give rise to discussions where the grains of truth are born. Refusing is easy. Understanding, finding grounds and defining new solutions is hard, but it is necessary.

We offer for discussion a summary of report by A. M. Savchenko who works at our Institute, on some new trends in (alternative) physics and its place in the general development of the scientific thought. Some parts of this paper may be questionable, and they are not always backed up by the official opinion. Yet, this is a real initiative. Let us discuss.

1. The emergence of alternative physics

There has always been an alternative physics. Take for instance the highly original works of the astrophysicist Nikolai Kozyrev, active in the 1950s-1970s, which obtained partial recognition from the Academy of Sciences (AS), yet have found no wide acclaim and are hardly used. Nikola Tesla's experiments, now also forgotten, fall into this category as well. The list may be continued. The humans will always keep thinking in a creative and non-standard way. Some of these mad ideas have naturally fallen into oblivion, some have given rise to scientific discoveries and people have forgot that these ideas had been at one time regarded as strange, to say the very least. V. B. Ivanov, our director, who tries devotedly to restore the academic life in our institute often quotes the popular saying regarding the three stages of an idea's development: "it can never be; there may be something in it; everyone knows that".

In my opinion, the central problem of our society is not the absence of new ideas, but the fact that the ideas are not wanted and none actually sets normal revolutionary objectives. People simply do not know what they need. Moreover, the imagination of all our leaders (as well as the scientists) does not go further than a several percent improvement of some material. This is where the money goes

Admittedly, the central problem which our science faces concerns the world-view and the psychological state of all the people – we are not ready to accept new ideas, and neither the society, nor

the AS require them. We may construct technological parks like Skolkovo, say proper words like “nanotechnologies”, but inside we are not ready to accept the real innovations and neither we know what to do with them. It is a disease, with which we have affected the whole world. Its roots are in the development of the red tape. When a qualitative innovation appears, it meets questions like “Is this idea a part of the long-term plan at ROSATOM”, or, in case of the Westerners, of any contract. In all countries, people are afraid of real innovations. Where does the new idea fit the schedule, how will the work continue from month to month with detailed reports, what equipment and materials are required for the next 5 years? What of the primary job, which gives you a planned, satisfied existence? Or suppose your idea is a success and whole organizations in this branch will be left out of work? So many problems lie around. Leaders or not, we all unconsciously develop fear and the innovations naturally wither. But this is a topic of another discussion, because there is another reason for that, one of cosmological nature. Yet, if we overcome this brain crisis, there will be no shortage of new ideas or their applications.

Another major point in the development of alternative physics is that its waves are subject to natural laws. Nature has it that something new is born to help a population survive in crisis. For example, rabbits find their rate of birth increased when there is an epidemic.

For the last 20 odd years, the alternative physics had two booms, and both were caused by critical events. The first boom corresponds to the dissolution of the Communist regime, when the planned academic system crumbled and engineers and scientists were left out in the cold. It provoked the development and implementation of revolutionary ideas that had real life-changing power. The second boom is now. It could seem strange, as people supposedly live better than before. Indeed, this is in part the answer to the question. Today there is a crisis as well, but it is mostly a moral and ethical one.

The Western civilization gradually drags the world into a swamp of spiritless satiety and materialism. At that, it flies the democratic flag. However, the democracy has gradually and covertly turned away from humanistic and Christian values such as moral and ethical behaviour and turned into its opposite. This maelstrom sweeps along other countries as soon as they agree that material prosperity is every human’s goal and physically destroy all that disturbs them. Carl Marx has once rightfully said that there is no crime which capitalism will not commit for a 300% profit. And according to Lentz's law or Le Chatelier principle there appear other processes that oppose this destructive trend. All humans are threefold, consisting of body, spirit and soul, and the domination of the material leads to degradation and degeneration of soul and consciousness.

Science is now also in a kind of crisis; we may say that it has found a dead end. Instead of reflecting upon its state and investigating new methods or ideas, it follows the old simple extensive way: give us more money, we will build a more powerful particle accelerator (with the latest machine costing no less than 15 billion euros), break the tiniest pieces of matter and male the world happy (yet one is never sure in what way exactly). And what about the discovery of hundreds of metastable elementary particles that survive for millionth parts of the second and do not constitute the basis of our world? Or the quarks with their fractional charge, “color”, “flavor” and “charm”? Let the scientists keep fit by playing virtual games at the state’s expense. They have a large potential: try to create this complicated CERN wonder and make it work from time to time. It is a hellishly difficult scientific and technical enterprise. But what we need is simple: reorient the scientists and put them to solving normal problems. If the scientists are left with financial support but without supervision, they will lose their head playing expensive toys that no one needs until they become an elitist club admitting no competition.

For instance, the whole world now faces a huge problem of nuclear waste treatment. For that, the whole world follows a complicated and expensive method which does not reduce the radiation measured mainly by number of fissions, but only compartmentalizes the waste making it more compact.

Why don’t we directly affect the radioactive nuclei? For example, the half-life period used to describe the speed of decay for unstable radioactive elements is in fact an averaged value. While some nuclei decay immediately, other nucleus of the same element are almost stable in natural conditions. It means there is theoretically a possibility that if we gain deeper knowledge on the structure of matter and atom

nuclei, we will create conditions of immediate decay of metastable nuclei and the transition of radioactive elements to a finite table state.

We already have some hints. For example, the beta decay speed is several times higher in ions than in atoms of the same substance. A neutron is stable inside a nucleus, but in a free state it will disintegrate in 11 minutes. And Shnoll's experiments have proved that radioactive decay speed may rise or fall by up to 10% according to the time of day and the season. It means that nature has the mechanisms which can influence this process if only we discover them. Moreover, there exists a theory that the stability of the nuclei is affected by relict radiation of low energy neutrino, which could be induced. At that, the official science doesn't deny these facts. Still, all we need to do is to set a task and to believe in it.

The fundamental science with the AS at its head is necessary. However, they should work efficiently and embrace the competition. It is quite simple to determine whether the fundamental science if efficient. In his book *The Fabric if the Cosmos: space, time and the texture of reality* Brian Green states that a scientific discovery is true if it is accompanied by a technological breakthrough. Quantum mechanics has invoked the development of electronic devices and computers, the discovery of nucleus structure (but not the proton and the neutron) has led to nuclear bomb and power plants etc. But Higgs field, strings, quarks, the Big Bang theory and other standard models have brought no fruits as yet. The alternative physics naturally speeds up in order to respond to the inertia of the official science.

2. Peculiarities of alternative physics and its relations with official science

Alternative physics develops separately from the conservative official science and is supposed to be more advanced and open-minded. That said, it should not be romanticized and believed to be able to deprive official science of leadership. New physics hype provided dozens of thousands articles and publications, thousands of experiments and hundreds of websites. Most of it, however, is only "foam" – purely philosophical rhetoric and criticism towards everything and everyone – of the AS, traditional science and, naturally, Albert Einstein above all (he happened to have "nothing to do with it", though). He was blamed for bringing science to a dead end with his Relativity Theory and denial of existence of aether, now called Physical Vacuum (PV). In our time, the PV is notably the main provider of pabulum for foam side of alternative physics. Only a little share of publications (huge if considered in net value, though – hundreds or even thousands of articles) was related to real experiments, appliances and devices of proper value. But they got simply lost in the torrent as the AS was not eager to sort it out and try to reach any worthwhile results. Instead, trying to protect itself and Einstein, it generated the Commission for Pseudoscience. The Commission did not sort anything out as well but started straddling, so to say. It has caused damage to those, who had science and experiments on the beam but fell under administrative measures of their own management. Our institution was also forced to almost stop researches and go under the radar.

In fairness, it must be said that Einstein and other patriarchs of science were forgotten by both sides. He did not actually deny the existence of aether; his special relativity theory simply did not require any medium. At the same time some energy filling of space was crucial for his general relativity theory. Moreover, he was really cautious about universally recognized quantum theory thinking that "God does not play dice". His late relatively unknown works can even be designated as alternative physics.

Of course, the AS was not entirely involved in battles with pseudoscience (serious scientist simply had no time for that) but only the small part of it, though carrying the Society banner. Some members themselves, such as Oparin, Kaznacheev and others, were heavily invested in alternative physics. To be honest, most of the AS members are good, liable specialists. Some seminars and institutes under the authority of the AS, financed by the found of fundamental research, for example, the MSU's multiannual seminar and Institute of Time Properties, managed by A.P. Levich (http://www.chronos.msu.ru) are just proper alternative science. There you can discuss and bring out any ideas, even the most insane ones and people there tactfully correct you, give some advice, and help to cultivate the rational part of the idea, if there is one. Actually, this must be a basic notion of the fundamental physics development, but

everyone has forgotten about it, which brings science to the crisis. You should not draw a line between the both sides and see them only in black or white.

Another peculiarity of alternative physics is its cheapness. It is both its strength and weakness. You cannot build a synchrophasotron or a tokamak in a hand-crafted laboratory basement. But it is also hard to get necessary results and, what is more important, the understanding of it. It requires research equipment and meticulous studies, for which the alternative physics have no time, no opportunity and no experience. This is the reason why some experiment result cannot be reproduced, and therefore considered to be a fraud by the AS. And if these researches had any, even the tiniest financial assistance, they go to the black list of the AS, where the torsionists Shipov and Akimov run the show, and subsequently labeled as science's gentlemen of the pad. Money does mean something in the science world after all. But in the heat of this truly holy war with the many phony scientists the AS, rather the Commission for Pseudoscience, tosses the baby out with the bath water.

At some point V.F. Sharkov from the Troitsk's TRINITI came up with a great idea and even tried realizing it. He planned to verify many controversial and sensational experiments, firstly conducted by single researches in their homemade labs, by testing it in real science centers with modern equipment. That was supposed to separate dogs from fleas at minimum cost and find seeds for a new physics to grow from, whilst reconciling pseudoscience campaigners with these "pseudoscientists".

This idea is genius in its own little way, because it does not need many facilities against its efficiency, as if at least some of hundreds of concepts and experiments were confirmed, it would bring great breakthrough not only for science, but for national economy. Unfortunately, the AS eluded the cooperation and the state had no interest in this. Our businessmen are not, mostly, good sponsor material. So the idea died on the vine. But it is still relevant, and I think, ROSATOM has a great, unique chance to put it into practice. Why not we make one of the ROSATOM branches, e.g. our institute an experimental platform? Nuclear research institute does not depend entirely on the AS opinions, so the alternative scientists will not have to fight official scientists every step of the way.

3. A very brief description of the trends in alternative physics

However strange it may seem, a broad scientific knowledge is required to "create" something in the "new" physics. No expert is able to create something completely new if they are only knowledgeable in a narrow sphere. This modern trend of scientific and technical development leads to a dead end. Most discoveries happen on the borderline between several sciences. And if you want to attempt something bigger, you may as well start at the very beginning – with the Big Bang. We live in a relict universe, so that to understand its properties we should first identify the scenario of its appearance. Only then we will be able to connect the cause with the consequence and understand the essential meaning. This approach was favored by the scientific traditions of our Institute, which dictated that a scientist should be a polymath.

I cannot describe myself as an expert in all alternative physics trends. There are more knowledgeable people such as V. F. Sharkov, whom I already mentioned, A. P. Levich as well as others. There are a lot of web pages (which may need some research beforehand), seminar and coference materials. There are also several magazine, including *New Energy Technology* (www.faraday.ru) published in Saint Petersburg, which offers a variety of experimental and theoretical materials (unfortunately, it provides no analysis and does not discriminate actual results from virtual models). The Moscow State University Research Institute of the Nature of Time has an online library located at http://www.chronos.msu.ru. There is a magazine called *New Ideas in Energy Engineering* and published, surprisingly, by the Research Institute for Agricultural Electrification, where many alternative physicists have found a place, as well as many others.

Possibly, a large amount of data is systematized by our secret services – for instance, the works on longitudinal electromagnetic waves are under control now. I would also expect to find other reports. Their only fault is that they do not offer a satisfying analysis for people who wish to implement innovations. It is only understandable. The new researches yield unusual effects which as often as not

fail to appear, the experiments are not always verified, the theory is not developed, the research is not financed, there are persecutions and the AS scientists refuse to help. At the same time, the physics is a broad scientific field which a single specialist cannot possibly cover. Moreover, the prospective partners cannot reasonably conclude what the inventors have really achieved and what they have only imagined, since they do not know in person all those who work with the new physics. Therefore, I will now give, according to my limited knowledge, a brief classification of the contemporary trends in alternative physics. Some of them I will discuss in detail, while others will only be outlined.

I will not dwell on various models and theories developed by the new physics. This report will be limited to experiments and construction of equipment that is of special interest. In particular, developments in alternative energy productions will be described. Most of the work in this field has been based on old, hardly known and forgotten projects, or the lost know-how of the classics such as Nikola Tesla, Viktor Schauberger, John Searle and others. These works shall be verified in order to prevent malignant mystifications. Often, the effect will only appear if a special schedule is followed, but in practice this schedule will be hard to recreate. But the effect cannot be extended to other conditions due to weak theoretical background and the absence of a physical model.

Energy generation using, as the developers say, the Physical Vacuum *(as well as other physical phenomena)*. This includes various installations (electromagnetic, electric or magnetic, vortex, impulse etc.) A full list of these devices will constitute a separate paper.

Importantly, Physical Vacuum (PV) is a key notion in physics. If we had any knowledge of its structure and properties, even the most approximate, the alternative energy problem would be solved and we will land in Paradise. But we still should set the task of understanding what the PV really is.

The analysis of interactions between matter and PV requires a re-conceptualization of various physical laws and phenomena. I will therefore only briefly present my own conception of these interactions, even if it may be subjective. This conception will mainly be based on classical physics, which is mostly forgotten by the traditional physics (AS) as well as by the alternative physics. The worst danger is perversion of the classics. Both sides have a prejudiced understanding of Albert Einstein's works. By the way, Einstein is known to have said: "The mathematicians have disfigured my relativity theory so that even I cannot understand it now".

In what follows now, I will give a brief description of the PV. Contemporary physics has different conceptions of the space which surrounds us. As we all know, nature abhors a vacuum. Yet, many physicists consider that the universal space, which has appeared in the wake of the Big Bang, is empty.

The contemporary physics often suggests that the Physical Vacuum or ether as it was known earlier is not an empty space but a specific energy conducting medium where matter exists. Waves and interactions of different nature – gravitational, electromagnetic etc. can also happen here. James Maxwell developed his famous thermodynamic equations considering the PV. Paul Dirac regarded the PV as a compensated state of an electron-positron pair, which will appear spontaneously due to energy fluctuations in the PV.

Quite recently, PV has also been described as possessing energy. Even the Higgs field, which has supplanted the ether, is in terms of energy similar to the PV, and every modification brings this concept closer. However, to get a first taste of the interactions between matter and the PV its precise structure is of little relevance. It is important to know that the PV, the ether, the Higgs field or whatever it is called exists and that it has an energetic essence. It may be supposed that if matter appears out of the Physical Vacuum with the Big Bang, or an electron-positron pair is born of a gamma quantum, they will still have a connection to the PV. Thus, any energy impact such as deformation or heating of the matter will cause oscillations of the atoms intensifying the oscillations of the PV's energy lattice, compressing the lattice and increasing the PV's energy density.

I repeat that this is a subjective understanding of the PV, which is, nonetheless, indirectly confirmed by my own experiments on weight fluctuations due to energy impacts including remote ones. In the experiments, the material body surged up in the PV resembling the water weighing effect in a high

energy density medium. Possibly, energy production also accompanies the PV density fluctuations on the Sun as well as on other stars. Other experiments have shown that thermonuclear reactions only give a third part of a star's light.

Therefore, to affect the PV an abrupt, concentrated impact shall be applied to the material. This impact may be short-time and localized, but it has to be a powerful one. Such an impact will create a PV imbalance, causing a reaction. The optimal reaction is a resonance in the matter-PV system.

Unknown to their developers, various installation for energy production out of the PV use the same method. The only problem is that due to a pitiful absence of theory and lack of understanding in this sphere the obtained effects are not stable and as far as I know are not implemented in industry.

Another problem is that two different effects are conjoined. First, there appears an impulse effect with energy production, then after a short period of time and sometime in another place this energy will be absorbed. If these two effects are separated, the system will work as a heat pump does. It can be very effective, since nature can provide excessive heat.

The peculiarities described here are also valid for the next section 3.1-3.7.

3.1. Energy transformation effects with higher-than-1 factor

This section will cover energy transformation and remote energy transmittance effects mostly based on Nikola Tesla's experiments. Tesla conducted public demonstrations where he ignited a lamp without any power source present.

Here, a series of experiments with vacuum arresters shall be noted. The best known is A. V. Chernetski's circuit, which increased the power on entering resonance. This branch has its know-hows as well. Many varieties of his circuits have been developed, and many inventors have worked on it. As of now, I can only verify one of them, with a double power increase. A similar circuit was used for generating the so-called longitudinal waves with their specific properties, which are the most fully studied.

This group also includes Ken Shoulders' energy converter, Tesla's transformer, A. M. Mishin's experiments, the works of A. V. Frolov as well as Potapov's vortex generator and similar devices (his water experiments are described in section 3.6).

3.2. A series of experiments with magnets

These experiments produced additional energy (Rochin and Godin's experiments as well as antigravitation (Searle's effect). This group also includes Alekseenko's engine, Hubbard's power generator, O. V. Gritskevich's hydromagnetic dynamo, G. Nikolaev's experiments etc. In all these cases, cylindrical magnets were moved in relation to each other creating a variable magnetic field. As the authors note, at some point the resonance and with it the effect appeared.

The unusual character of the occurrences was confirmed by the appearance of alternating cold and warm zones around the experimental installations. Their distribution approximately coincided with the generated wavelength.

3.3. Longitudinal electromagnetic waves (LEW) where electric or magnetic field vectors are directed along the wave movement

This sphere is home for a large group of scientists: Nefedov, Protopopov, Jashin, Ermolaev etc. It may also include the existing single wire electric energy transmission method developed for the electric waves by Alekseenko. However, in order to use that, the system has first to come to a resonance and to create a standing wave. Again, the father of these developments Is Nikola Tesla.

The CEW are so exceptional (apart from energy generation they also affect the human mind and the weather) that they have recently fallen under the control of the secret services. Nevertheless, the drawings of the CEW generators are popular knowledge, they may be acquired if you know the right people and the Popov radio and technological society still hosts its seminar.

3.4. Cold fusion and cold nuclear transmutation

This is a strong group of scientists with yearly seminars and conferences. It can also boast the occasional effects. The most popular among them is plasma discharge in water. The effects are partially verified. With many materials collected, this could easily be a topic for a separate report. Some materials are available online at www.proatom.ru. But some effects are surely present, as confirmed by the fact that at one conference three of five coauthors were marked as deceased.

As has been mentioned earlier, such works are relevant for the ROSATOM if they can be used to transfer radioactive isotopes to a stable state.

P.S. Currently a multiple publications appeared regarding the results of cold core elements transmutation by various methods – without reactors implementation - (collected and systematized by A.A. Prosvirnov on the website www.LENR.SEPLM.RU).

First one to describe the transmutation effects in biological systems was Louis Kervran in 1963. Later many researchers confirmed these effects. One can believe or not believe that it is possible, but the experiments on bacteria, confirming this effect on the radioactive waste solutions, were conducted in our Institute (bacteria were designed by the group of A.A. Kornilova from MSU), which also confirmed this effect already with radioactive waste solutions (Cs transforms into Ba). In reality, there is no miracle. Bacteria just speed up natural decay process for isotopes, acting as a catalyst. And because the half-life period is an average definition – some nucleus decay immediately, their neighbors for an unknown reason,– after millions of years – then, by building up some conditions it is possible to trigger the decay of all nucleuses of the element.

Some of these effects accompanied by additional energy release (more than 500%) without considerable value of alpha, beta and gamma radiation – experiments Rossi, that were later confirmed by several scientific groups in Russia. Therefore, the competition for the energy customer market will increase in the nearest future.

Naturally, to explain this effect we need to move away from the common quark nucleus model, that does not allow the presence of electrons in the nucleus and neutrons.

3.5. Kanarev's plasma water electrolysis

These works have many bright prospects. Here, water electrolysis is performed with high voltage and some other know-how. According to the authors, the resulting amount of generated energy exceeds the energy used. Personally, I cannot evaluate their findings, but my friends confirm the effect. At the very least, this is no pseudoscience.

3.6. Potapov's vortex heat generator (VHG)

This device had a great success about 10 years ago. Its work is based on the as yet unexplained Ranque effect where an air vortex forming an Archimedean spiral separated in cold and hot sections. Potapov used water instead of air. He stated to have obtained more heat than the energy he used. Additionally, the generator should produce cavitation effects.

Being a genius manager, Potapov promoted his idea, which resulted in thousand firms selling a hundred thousand VHG. Soon afterward it became known that the VHG work similarly to the heat pump. No miracle happens. Still, some versions gave the effect, mainly base on cavitation effects (Krasnov's VHG). And yet, as far as my data indicate, it is once again somewhat unhealthy.

At our Institute, the standard VHG was modified to create a test bench for investigating these effects. Unfortunately, no effects were detected in normal work conditions. However, non-standard work modes and changes in heat carrier components did result in energy excess (but the experiment still requires an additional check). Interestingly, powerful entropy or anti-entropy flows appeared during the experiment depending on the work mode. Meanwhile, the use of such flows can have a greater effect than energy transformations with higher-than-1 factor.

3.7. Effects violating the second law of thermodynamics

Or rather an incorrect understanding of this law, and of entropy in particular. Richard Feynman, an outstanding XXth century physicist and a Nobel laureate, states explicitly in his *The Character of Physical Law:* «So it has often been said that Carnot's logic was wrong. But his logic was quite correct. Only Clausius's simplified version, that everybody read, was incorrect». To be fair, Clausius himself explains his reason for selecting the term "entropy" for transformed energy in this way: "I have purposefully selected the word "entropy" as closely resembling the word "energy", as both values corresponding to this terms are so close in their essence that in my opinion they require homologous naming". But once again, the classics are forgotten.

For an unknown reason, every interpretation of the second law of thermodynamics confuses the two notions: the decrease of free energy, which originally belongs to this law, and the increase of entropy. Interpreting the second principle of thermodynamic as "everything in nature leads to an increase in entropy" is not science; it is a domestic misinterpretation, a newspaper or a populist simplification at the very best.

However, the popular understanding has it that entropy is only a measurement of chaos. In fact, we nowadays do not have a single notion of entropy. In thermodynamics of alloys there is one approach to entropy and free energy, in chemical thermodynamics there is another, in mechanics and thermal processes there is a third one etc. There are also various modifications of entropy not connected to each other such as information entropy, star entropy, the entropy of the Big Bang and the extension of the universe. The abundance results in confusion. Whenever people want to make a new phenomenon sound more scientific they connect it with a new kind of entropy.

It is still unclear to what extent the second law of thermodynamics in itself (the decrease of free energy in a system) is applicable and unchangeable. Originally, this law was deduced only for an ideal heat machine using ideal gas. Later, Clausius, Thompson and other scientists extended its applications to include the whole universe and came up with the hypothesis of the heat death of the universe. Then, the process went in the opposite direction. First, the physicists confirmed the absurdity of the heat death theory, stating that this hypothesis is not applicable to the macrocosm understood globally. Then it was proven that the law did not hold regarding the microcosm (quantum mechanics and elementary particles). Finally, Prigozhin proved that the law is violated by living nature where anti-entropy processes run spontaneously as organized structures are formed. By the way, Thomson, one of the people who first defined the law, already indicated that the law could not apply to plant growth or bio-chemical reactions.

The astrophysicist Nikolai Kozyrev has shown with his experiment that each entropy process always triggers an accompanying anti-entropy process.

Going further, we address the possibility of spontaneous heat transfer from a colder to a warmer body without compensation, or, in a more standard wording, the impossibility of obtaining mechanical work from any mass of substance by cooling it below the temperature of its environment. This means that there is still enough energy, but none of that energy is free i. e. available for transformation.

There are natural processes that violate the second law of thermodynamics due to two basic properties of the substance. First, even at room temperature gas molecules are characterized by high energy content, with their speed reaching hundreds m/sec. Unfortunately, their movement is chaotic and distributed along the three coordinate vectors. Secondly, their speed distribution is irregular, described by Maxwell formula and in one material at set temperature the speed will change from dozens to hundreds m/sec. At that, nature has it that the molecule energy here is not averaged.

The two natural property of gases described above result in many natural processes violating the second law of thermodynamics. Let us briefly consider 3 of them:

1. Separation of molecules according to their speed. When water evaporates from a porous container, the molecules with higher energy leave its surface, while the lower energy molecules stay in the water and cool it. The hot and the cold molecules are naturally separated and the thermal gradient appears.

2. Separation of molecules according to speed and direction. In natural tornadoes and vortices the molecules are separated according to their speed due speed differential across the vortex section. Moreover, instead of oscillating chaotically in all three directions, the molecules now mostly move along the vortex swirl. Then, after the vortex performs some work, sucking in new and new portions of air, accelerating them, growing larger and destroying other things, the vortex loses its kinetic energy and crumbles. The molecules become chaotic once again, but they oscillate with reduced energy. As a result, air temperature decreases. Natural formation of vortices is always accompanied by temperature fall.

3. Separation of molecules according to their direction. These effects appear with such events as hydraulic impact and accelerated laminar flow of liquids and gases. At that, the oscillations are blocked in two directions, and the movement in the remaining direction is facilitated. As a result, there is an increase of liquid pressure, which may be employed for useful work. After loss of energy the liquid cools according to the first law of thermodynamics.

Additionally, a partially perpetual motion machine of the second kind already exists in nature. It is osmic pressure which appears, for example, when salt and sweet water are mixed together using a semipermeable barrier. Here, free energy, or, to be more precise, the energy of mixing, expressed by the mixing entropy, performs useful work – create osmosis pressure and hence should be considered not only as probability of state. The Norwegians have managed to exploit this phenomenon and supply the water pressure to a power generating turbine, as they can provide a lot of salt and sweet water (see http://news.cnet.com/8301–11128_3–10404158–54.html). If we master the next step and complete the process with return osmosis, separating the sweet water from the mixture, the result will be a perpetual motion machine of the second kind. However, to reduce excess pressure during return osmosis another salt composition will have to be applied and the process will slow down. Understandably, no wonders will happen and the water will cool following the first law of thermodynamics. But it may turn out useful in the end, as we know that the planet is overheating.

To return to specific devices, the most popular principles here are vortex effects or supersonic acceleration of gas streams. Naturally, the gas cools down in the process.

This group also includes installations using the Earth's gravity field such as a gravity vacuum pump with supersonic ejector nozzles.

Most probably, the accelerated air streams induce the separation of molecules according to their direction.

3.8. Low power laser effects

The foremost representative of this group is the unknown laser radiation component discovered by Kvartalny. (K-radiation). He succeeded in separating this invisible component from the visible radiation and studies its properties. In some ways, this radiation is similar to Kozyrev's entropy flow.

Thanks to this component, low power lasers may be used as catalyzers to increase the quality of oil products and other liquids. The low energy laser radiation changes the physical and chemical properties of the liquid. For oil processing, the impact of the low power lasers reduces work tie and increases the resulting volume of oil products such as gasoline and kerosene.

This effect is produced by the unknown laser radiation component. Apparently, it consists of even order waves with a shift of 180^{o}, although the official science supposes that such waves shall annihilate instantly (see section 5). If the mysterious component is explained, it will give us the possibility of instantaneous and lossless signals and energy transfer as well as of influencing biological objects.

3.9. Kozyrev's legacy

Kozyrev and his followers are not by chance singled out into a separate group, although they never called themselves alternative physicists and did not promote the universal happiness. Still, they investigated the fundamental natural laws which Kozyrev described in his *Causal mechanics*, while their experiments have as yet no theoretical explanation.

Kozyrev suggests that time is an autonomous natural phenomenon, which possesses active properties, i. e. physical properties evolve not only in time, but also under the direct impact of time. Furthermore, time is characterized by other features such as its movement, the density and instantaneity of signal transmittance through time. Kozyrev declares that time is a type of energy and all natural processes involve emission or absorption of time.

During experiments conducted by Kozyrev and his followers, faster than light signals were registered. As of now, such signals have no theoretical explanations, but they may easily find a practical application.

3.10. Bioemitters for biofield correction and medical use

This field of physics cannot be ignored and warrants a long and careful study.

3.11. Everything else

I have left many things out, as my task was to give a general understanding of topics in alternative physics. There is a lot of interesting subjects that have not been included in this survey and require a separate analysis or research.

4. A.A. Bochvar High Technology Research Institute of Inorganic Materials (VNIINM): researches in alternative physics

It happened so that 25 years ago, as the alternative physics was resurrected, the scientific potential of the Institute was still large and its leading workers such as A. A. Bochvar, A. S. Zaimovski, Konobeevski, A. S. Nikiforov and others were world famous. Although at that time they were already deceased, their scientific school still survived due to inertia. The management had some conversion funding and was able to support the most insane enterprises, even those beyond the limits of the Institute's profile.

It has already been mentioned that the breakthrough ideas and technologies appear at the borderline of various sciences. All spheres pf physics are interconnected. Consequently, in order to understand the essence of things, one has to start with the Big Bang and the origin of matter, as well as with an attentive reading of the classical works in order to combat the frequent cases of misinterpretation that appear in books and school materials. To start with, we decided first to construct a scientific base (including Physical Vacuum, the structure of matter, thermodynamics) for personal practical application and did not dare invent new theories [6].

From a purely theoretical point of view, three hypotheses were of interest [6].

First, the hypothesis explaining the baryon asymmetry, that is, the disappearance of antimatter at the Big Bang. In fact, the antimatter is hidden inside the matter, as protons and neutrons contain both particles and antiparticles. In specific conditions, these particles will annihilate, resulting, in particular, in supernova explosions.

Secondly, the extension of the universe was accompanied by a release of energy know now as relic radiation. Apparently, this radiation has powered up the Sun and the other stars. In a way, it is also implemented in installations described in p. 3.0 and has been detected in our experiments with the VHG.

Thirdly, apart from the described relict radiation, the universe should contain an even bigger co-phase relict radiation that has been mentioned in section 5. It could be artificially generated and employed.

Importantly, our approaches do not violate physical laws. Instead, they concern the fields governed by hypotheses. These fields also include more traditional conceptions of the Big Bang and the structure of elemental particles but these are still conjectures [6].

In particular, our approach included experiments on weight changes following the interaction of physical bodies with Physical Vacuum (PV). During the interaction, the PV became more dense and the body surged up as in hydrostatic weighing. The maximal result was a 0.2% change [4, 5]. We also succeeded in changing the body weight under remote impact. These anti-gravity effects may be augmented. This year, a treatise on the experimental part of our research is scheduled to appear [4].

Another sphere of interest is for us the point where physic meets thermodynamic. That implies the study of vortex and cavity effects in water, in particular, with the VHG. A special test bench was designed

and constructed. The experiments have demonstrated that the VHG can work as a heat pump, but without an intermediary working medium [4, 5]. Most interesting was the fact that in specific work modes the VHG generated entropy and anti-entropy streams. The anti-entropy streams may be used to eliminate admixtures from water (desalination) or to separate isotopes, while entropy streams can melt any material at room temperature.

Finding the extended interpretation of the second law of thermodynamics and the physical basis for the entropy of mixing (statistical entropy) has allowed to explain many other effects [1]. Examples include high durability of thee so-called high entropy alloys or super-alloys, depressed melting and the eutectic melting procedure [2, 3]. At that, it has been proven and further confirmed by experiments that entropy influences the alloy properties. We even managed to obtain the first samples of stainless iron identical to the famous column in Delhi [2]. Using special electromagnetic treatment we could increase the entropy of iron. As of now, the iron nails have held without corrosion for 10 years, while identical non-treated parts had to be changed annually. But the experiments are no over yet.

Importantly, all research was performed in small installments with few resources and little financial support. Therefore, many things still await their time to be finished. If the situation of Russian science will change to better, many interesting ideas may play out.

5. Carefully concealed blind spots in science as fodder for alternative physics

The official science has lot of blind spots. It is to be expected, as you cannot seize the unseizable. Unfortunately, the blind spots are concealed instead of being highlighted to provoke a search for a scientific solution, as the official science is afraid of losing its authority. Thus, it denies itself the possibility of scientific breakthroughs and delegates these problems to alternative scientists. With significantly less scientific power, the alternative physicists still try to penetrate the problem spaces.

The first item in a brief list of such problems is the fact that the official science denies an energy medium such as ether or the PV. Michelson's early experiments that seem to prove the absence of the ether wind have in fact only shown that the ether does not blow over matter. If the ether is simply related to matter, as the matter appears out of ether and its energy, there will naturally be no wind. Of course, it opens up a wide field of research in many spheres of physics at once.

Another example is the relativity of movement according to Einstein. I will not now state whether it was correct or not, but Einstein only considered linear motion. In nature, do we often meet linear motion? The galaxies rotate, inside them the star systems rotate, the planets rotate along their axis, the electrons rotate in atoms, and in atom nuclei, the nucleons rotate. Moreover, each particle has its spine so that it also rotates. Rotating motion is always absolute due to inertial force. If we put the observer inside a centrifuge, there will be no telling what actually rotates: the observer or the room around. By the way, a little known fact is that the speed of light was found to differ if we measure it along the direction of the rotation and against this direction. Apparently, a thorough study of vortex effects considering the PV and the energy conservation principle (which I will address further) may provide unprecedented results.

The next effect is widely used in science, but it is difficult to implement. I am talking about the Lenz rule or the Le Chatelier principle, which is in fact a subtype of Newton's third law (action equals counteraction). Its approximate wording runs as follows: if an external impact is made on the system, there appears in this system a force to counter this impact. This rule is used in all fields of science. To a large extent, it is the basic principle of work for all electric devices. Its well known implementations include the self-induction EMF and the oscillating circuit, the two basic formations for most devices. This principle is also used in chemistry, biology etc. Its importance is comparable to the first law of thermodynamics – the energy preservation principle. So why is it so little known? Why does it bear the name of rule or principle, not law? The answer is simple. In many cases, the direct impact also influences the PV, as the matter is related to it, and the counter impact also includes the force produced by the PV. But the official science denies the existence of ether or the PV. As the Soviets used to say, "no man – no problem". Unfortunately, this approach is still present.

I will now address the gravest mistake of traditional physics which has been repeated in all books starting with school aids. It is a violation of the basic natural law – the energy preservation principle – regarding the propagation of oscillations and waves. In some extent, oscillations are an issue for all branches of physics as well as other scientific and technical spheres. By the way, the alternative

physicists also make this mistake, since they had the same textbooks at school, but their intuition makes it more seldom.

Nature has a vast amount of processes that involve the generation or propagation of waves. In macrocosm they include sea waves, the oscillations of bodies, molecules and atoms. The microcosm has various radiations, mostly of the electromagnetic type. There is even a separate branch of science for studying oscillations and waves. But let us consider its interpretation of an interaction between any two waves, such as interference or diffraction. Let us say that the two waves are equal in length and displaced in phase by 360 degrees. Then the waves will intensify each other (their maximum points will be summed with the maximums, and their minimum points- with the minimums). On their interference pattern, it will show by light-colored stripes. But if the displacement is 180 degrees, we are told that the waves will compensate each other (a darker stripe). At that, the energy is said to disappear, as one wave will destroy the other (fig. 1) [2].

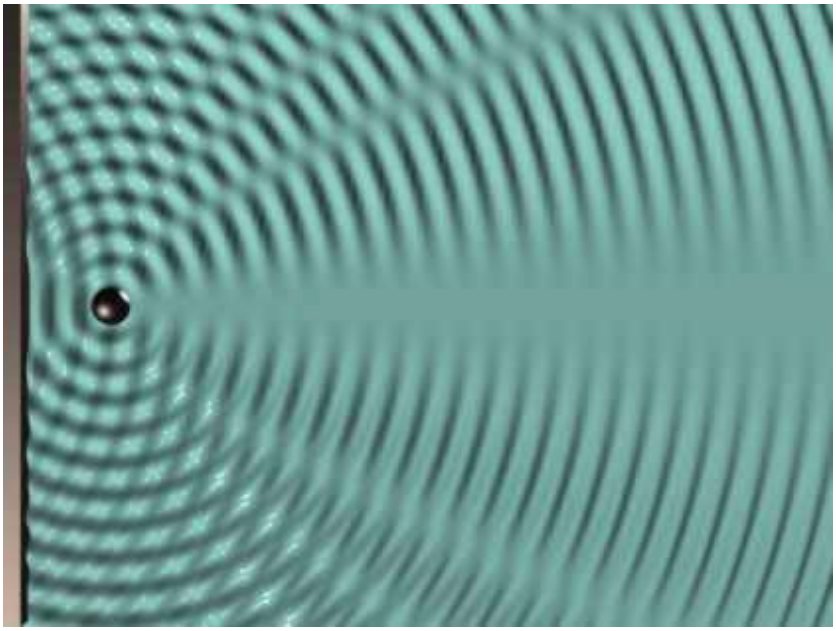

Fig. 1. Wave interference pattern during the reflection from the wall

It is difficult to stay calm while commenting on this error. Of course, the cancellation of waves is the work principle of the wave breaker or special screens for sound attenuation. However, it has been little noted that such devices heat up a little during their work. Energy never disappears, it only changes it form. An interaction between electromagnetic waves with a phase displacement of 180 degrees does not result in their mutual annihilation. Instead, it makes the PV denser. However, the official science cannot admit this fact, as does not confirm the existence of the PV. A similar effect is used in low power lasers (see section 3.6). Before the wave leaves the laser, it bounces off many times of the tube walls, so that a part of it is intensified, and another part is annihilated and leaves the tube transformed into a component of electromagnetic radiation with special properties. Living cells also induce such radiation, which could give us an understanding of telepathy etc. The amount of this radiation produced during the Big Bang must have been equal to that of the registered relict radiation. It has a vast penetrating power, so that it is the perfect candidate for triggering the beta-decay of nuclei. So the scientists have a lot of work here.

6. Who is to blame? Present mistakes and future prospects

6.1 Psychological aspects.

To a large extent, the present condition of science seems to have been caused by an incorrect world-view and a mistaken philosophy of science. The world is now covered in red tape, and naturally, science is a part of this process. Reports and papers are everywhere, and money is paid not for the useful things

done, but for a well-compiled document. The whole structure is a deception, as in Anderson's *The Emperor's New Clothes.* One day it will come to an end. Badly if in the form of collapse.

Related to this is a universal habit (I have it too) of concealing the fact that we do not know or do not really understand a thing. We are afraid to tell the truth. If the AS admits not knowing, its authority will suffer – what is the matter, they have been researching it for years, and they failed to thoroughly understand it? For university lecturers, the truth is out of question. Yet, the great man was not ashamed to say: the more I know, the more I understand that I know nothing. Here you have a normal approach to science.

There is a psychological barrier that keeps us from admitting the truth, because we are afraid to sound stupid or to provide a laughing stock. Let us remove the barrier and try to look around as a child does. But in order to do this, wisdom is required (note the moral and the ethical implications), not only the scientific education. Try to experience the harmony of nature, feel yourself a part of the universe and do all things with ease and merriness, considering that God has a wonderful sense of humor. To give a good example, when in the 18th century the French Academy of Sciences decided that they would receive no more applications for the invention of the perpetual motion engine, they also decided at the same seating to deny the possibility of rocks falling out of the sky. The explanation was logical enough: rocks are heavier than air, which means there can be no rocks in the sky. Yet, they effectively refused to believe the many registered cases of meteorites. By the way, if we go further along that line, the French Academy at the time had no idea of electromagnetic radiation, so that its impact on a body could easily be classified as a potential perpetual engine.

6.2. Indirect reasons.

The difficult situation that science now faces was indirectly caused by the latest achievements of the scientific and technological progress, including the invention of the PC. All clouds have a silver lining, but apparently, any piece of silver will have its dark cloud. Before the computers were invented, the production of red tape papers was limited by the capabilities of an average typist. Now, everything gets printed, and the quantity of papers has increased a dozen times.

For me, another evil which the progress has accidentally brought is mathematic. The normal function of mathematics is that of serving the sciences and providing descriptions for processes discovered by physics. Instead, mathematics now invents its own findings. There has even appeared a new science called mathematical physics, which creates a virtual, unreal world where most scientists have to dive. It is a drug, such as computer games are for some children. As a result, the CERN creates its vast and most expensive underground.

Due to the prevalence of mathematics in physics, understanding the essence and the internal connections of physical laws, processes and phenomena becomes unnecessary. The ability is now lost. Richard Feynman explicitly declares: "Today, our physical theories, our laws are a multitude of odd parts and scraps that go together quite badly. What we now have is many details, and we find it difficult to put them together".

Indirectly, the increasing domination of mathematics promotes the irrelevance of understanding the physical gist. Moreover, mathematics drives the physics to a crisis with its multitude of transformations, simplifications, reducing small quantities and introducing abstract assumptions that contradict the physical sense.

6.3. The philosophical factor.

Newspapers and television give an erroneous impression that everyone approves of the scientific and technical progress and promote its rapid development. The government bureaucrats are almost sincere when they say it. I have already mentioned such popular topics as Skolkovo and nanotechnologies. In actual fact, this is a kind of game. However many times you say "sugar", it does not taste sweet. The worst thing is that the young people fresh from the Universities quickly understand the fictitious nature of this progress, and in half a year all their interest and ambitions are dead.

Why must it happen so? A political scientist once said that out country has passed through several periods including the dictatorship, the thaw, the stagnation, the perestroika etc. We now enter the period of the absurd, of universal falsehood, when no one understands what happens and what principles are at work. The only solution is to refrain from succumbing to the absurd and to map one's life with the normal human and ethical laws, to do one's thing without judging others. As he Bible says, if

you save yourself, the others around you will follow. Then we shall pass the heaven-sent test and the absurd will be over.

6.4. Setting the task properly.

For normal development of science, task-setting shall always include wonder. If the task is only to improve a thing by several percent, there will be no quality development. Scientific tasks shall be anything but trivial. (However, this demand makes it difficult to decide who will be doing the job, because a properly set task already includes a part of its solution).

A good task shall inspire by its difference form the standard, it shall make you shiver as a sportsman preparing to enter a competition. Only then, you will use all your resources to reach the goal.

Moreover, we should make do with the safety fences. Our scientists shall be taught that everything is possible. Indeed, the history of science confirms it. We now have things and findings that were unimaginable just a hundred years ago.

6.5. Implementing the task.

I suppose that time has come to implement V. F. Sharkov's brilliant suggestion of verifying the alternative physics. The best place for it will be the departments of ROSATOM, and in particular, A.A. Bochvar Institute (VNIINM). For one thing, we do not directly depend on the AS position (they now do not have the resources to force their opinion, as they are feeling rather uncomfortable). Secondly, ROSATOM has some funding, making it able to finance this project. Third, there is a decree by ROSATOM and the TVEL Corporation to reorient their activity so that 40% of total production volume does not relate to nuclear technologies. Finally, although the last ten years were a time of troubles, we can still find scientists who think out of the box, and wake up the others.

Our Institute is not the worst place to implement this idea. Our new director, V. B. Ivanov, has already suggested developing new fields of science and proceeded to implement his initiative. The administration support us, which means a lot.

Naturally, the question is how to organize the work and where to turn first.

I have already explained that the alternative physics is noted for its low cost. Therefore, we don't have to rush and find out what we should really develop. Separating the useful from the useless is like sorting the wheat from the chaff, and there is only One skilled enough to do this work. Competition here is not ethical. The Soviet science was evenly financed in all directions, and the efficiency of this principle has been demonstrated. By the way, the Westerners have kept this principle. It is a normal way of building a pyramid. As in sport, the masses are the base, and the Olympic champions are at the top.

However, careful selection is required from the very beginning in order to reach the top. Analyzing reviews and articles is not sufficient. Demonstrations of the devices at work (if available) are not enough. Required is active participation in all events in all spheres of alternative physics. Only attending seminars and participating in discussions will reveal which directions of search are valid, and which are not. Alternative physics is already competitive, and many people may obtain the same effect. The scientists themselves may chat on what their competitors are up to.

Let us begin with simple things: Chernetski's vacuum arrester, Kanarev's water electrolysis, the study of low power laser radiation. If we succeed in making the invisible part of the radiation visible (reverting the phase displacement), we will already gain lossless energy transmittance and new information technologies. Neither shall our own research be forgotten (here at least we know what is really valid and what is not): anti-gravity effects, entropy and anti-entropy flows, non-rusting (stainless) iron. An interesting direction is the study of beta-decay, which could solve Rosatom's problem of radioactive waste treatment.

Of course, we shall not neglect other directions, as no one knows where the first fruits will appear. Never put your eggs into one basket.

Theory shall be respected. But theory shall have a concrete, applied nature, that will describe the registered effects and help to plan experiments.

Furthermore, it is important that we should try to reduce the red tape in planning and conducting research. Reduce the number of papers. Cut off the unneeded staff and only employ experts with creative thinking. Thousands of trained workers will not make the result come faster. As we know, nine joint pregnant women cannot produce a child in one month.

A non-final conclusion

Nowadays alternative physics are sometimes called insane or even crazy. There is even a term coined for them: scientists with nonstandard scientific orientation. Sometimes, however, they can be glorified and treated as martyrs of science. These are normal stages of evolution. Time has just compressed and things that used to take centuries, now is concentrated to few years. When the society is ready to accept new ideas, the new physics will become a norm, and these advanced and ultra expensive accelerators will be called insane projects. The funny part is that today's most active opponents of pseudoscience will manage to switch sides to that moment and take the lead of then recognized alternative physics. To each their own: someone may choose science, others may choose privileges.

Afterword

In science as well as in other spheres of the social life, progress is somehow foretold by regulations and reports, grants and goal-oriented programs. We have got used to it. We have been trained so. Yet, all the more often the "crazy" people of science, history, culture and other fields are the ones who advance the progress, regardless of anything to the contrary.

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