

The Classical Concept of Long-range Action Fields Existence

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Abstract

Experimental data on the influence of planets and even stars on terrestrial processes are described. The paradox arises: according to the classical field theory, planets and stars cannot have any noticeable effects on terrestrial processes (briefly stated that by the thesis "the planets cannot influence the Earth"), but these effects are real. In this paper, this paradox is resolved by constructing the classical (not quantum) concept of existence of long-range action fields hereafter LRA-fields. It would seem that the energy conservation law and special relativity put under a prohibition the existence of LRA-fields. Our concept overcomes the prohibition. The concept appears as a logical consequence of the experimental data. The concept allows to explain many strange experimental results, eliminates the loss of the cause-effect relation that has been observed in the experimental researches, can refine the ideas of N. A. Kozyrev on the physical time in the most vulnerable their part. The concept and the physical model of LRA-fields contain new perspectives in prediction of earthquakes and solar flares as well as new perspectives in researches of the internal processes of the planets and stars. The concept may have far-reaching technological consequences, in particular, the perspectives for management of energy conversion, energy transfer and the perspectives of creating new technologies. It is necessary to recognize that disregard of LRA-fields results in incompleteness of the World picture.

Keywords: Long-range interaction, Field, Planets, Stars, The Earth, Energy-free, Kozyrev, Solar flares, Earthquake Precursors

1. Formulation of the Problem

Since the physical nature of the long-range action fields (LRA-fields) is not yet ascertained, now we can not give them full physical definition. Therefore, we will give a phenomenological definition in according to the facts of experimental observations of LRA-fields. Planets and stars are sources of various physical fields. By the term "the long-range action fields" of the planets and stars, we call such fields F of the planets and stars, whose actions are noticeable at least on interplanetary and interstellar distances, respectively. This does not mean, of course, that other physical bodies, besides the planets and stars, can not possess such LRA-fields. (Like any physical field, LRA-field is a field-intermediary in the transfer of the action at a distance. We must not confuse the LRA-field with "the long range action", which refers to the physics of transfer action at a distance *without intermediaries*.) On the one hand, LRA-fields of the planets and stars can not exist under current physical model of astrophysics. This thesis is briefly stated: "the planets can not influence on the Earth". This thesis is justified convincingly repeatedly in astrophysics (Surdin, 2000). On the other hand, the facts have emerged to suggest otherwise. Let's consider these facts.

At rises and settings, at culminations of the planets, Smirnov's detector (a specific gyroscope on a magnetic suspension) changes its average angular spin rate on 0.7-1.5% for a short period of time (generally 1.5-3 minutes) (Bogdanovich et al., 2000, 2005, 2006a, 2006b; Smirnov, 2006) (NOTE 1). The same is observed at the passage of the planets, the nearby stars (e.g. Sirius) and the distant galaxy (Andromeda) through the azimuth of the detector setting (Bogdanovich et al., 2000, 2005, 2006a, 2006b; Smirnov, 2006, 2009) (NOTE 2). For instance, at the rises of Jupiter the gravitational action to the detector is one and half billion times weaker than that of an observer moving around the detector. However, the device responded to the planet but no to the observer (NOTE 3). Here we observe an action of the planets to the motions in the Earth's region with a lack of the effective energy for such an event, and against all else, much more powerful effects. Obviously, the energy of the actions of Sirius and the galaxy, all the more, can not explain the observed effects.

LRA-fields of the planets, sun, moon, are poorly investigated. There are a few experiments conducted to study their dynamics. Hence, their physical nature is not determined. But the structure, some specific properties and the origination conditions of the LRA-fields were able to "have pull" from the available data (Vasiliev, 2004, 2008a, 2008b, 2009a, 2009b, 2009c, 2010). As a result, the physical model of LRA-fields has been built. This model allows, in particular, compute cycles and moments of brief abrupt flashes of actions of LRA-fields (Vasiliev, 2008a, 2008b, 2009a, 2009b, 2010). Using this model, the author has calculated the time window in which the brief abrupt flashes of the actions of LRA-fields of the sun, moon and planets must occur almost simultaneously (Vasiliev, 2008b). The author asked V. N. Smirnov to realize the special experiment. In Figures from (Vasiliev, 2008b) one can clearly see that the influences of the sun, moon and planets are comparable to each other in moments of these flashes. (The normalizations of the signals of the celestial bodies were not used.) Here we are again seeing the disparity between the real results and the appreciable differences of the actions energies of the sun, moon and planets.

Smirnov's and Shnoll's detectors respond to the same astronomical phenomena. But Shnoll's one shows variations not in angular velocity but in the histogram G shapes representing macroscopic fluctuations of the rates of physical processes (NOTE 4). Recently S. E. Shnoll et al. (2011) has firmly discovered the influences of planets (Mercury, Venus, Mars) on the histogram G shapes in time moments when the planets pass through celestial equator i.e. when the ray from the planet is perpendicular to the axis of the rotation of the Earth. In their experiments, Shnoll's group (Shnoll, 2001, 2006, 2009; Shnoll et al., 1998, 2005; Panchelyuga et al., 2007a, 2007b) was studying the histograms G for processes of different physical nature and different energy saturation, from radioactive decays and chemical reactions to the noises in gravitational antennas. The following is important. Despite the appreciable differences in the energy saturation of the above processes (forty orders of magnitude) their histograms G are changed synchronously and in the similar way. As well as in Refs. (Bogdanovich et al., 2000, 2005, 2006a, 2006b; Smirnov, 2006), here we again observe the absence of any accordance between the action energies of the celestial bodies and the energies of the processes.

Recently, using special spectroscopy, V. A. Zubov and his colleagues have discovered the changes of per molecular structures of many terrestrial objects under the influences of the sun, moon and planets (Zubov, 2007, 2008, Zubov et al., 2010, 2011, Vasiliev, 2010) (NOTE 5). These include living and nonliving objects, liquid and solid media, in particular, solutions and water. For instance, during the upper culmination of the Jupiter, the variations were observed in the mean molecular weight of the clusters in the potato bio matrix, in the number of the various clusters and in their irradiation energy (Zubov, 2007, 2008, Zubov et al., 2010, 2011): "*During the Jupiter upper culmination the reliable picture of its action on the potato bio matrix is disclosed. . . the Jupiter effect is unexpectedly strong during its culmination. . . the commensurability of the planet and the Moon effects follows from the experimental data*". This is despite of the insignificance of the action energy of Jupiter compared to the action of the moon.

Researchers of the Siberian Branch of Russian Academy of Sciences have found (Eganova, 2005) that far from us the collision of the Jupiter with the comet SL-9 has generated, however, on the Earth the contrasting changes of the behaviour of the mechanical and physical-chemical systems, over which the long-term calendar scientific observations were carried out. The researchers have found the following (Eganova, 2005): "*The rotational displacement of the asymmetric torsion balance, which occurred over the entire period of the catastrophic event on Jupiter in July 1994, lasted until 21 October, after which the torsion balance back to its normal state with daily torsional vibrations, and, the return act had occurred without any further relaxational vibrations. . . Particular interest is the reaction of an old English device – of stormglass: the large ampoule contains the specially prepared the complex mixture, which combines great number of substances: water, camphor, ammonia, nitrate, and alcohol. Mariners had used this device as a predictor of the weather. After those events on Jupiter, a great layer of crystals had arisen in the stormglass and that layer was not eventually dissolved (as it usually happens), it is compacted and stored until now, that is, more than 10 years . . . Moreover, in one stormglass which was put in the thermostat (35.1 ° C), this layer had disappeared (note that in a thermostat, a stormglass operates, in principle, as usually), but when after few years the stormglass was removed out from the thermostat, the same layer was recovered (!) with time.*" – the end of citation.

Recently I. Charvatova has disclosed influences of the planets Mercury, Venus, Earth, Mars to solar activity and solar-terrestrial phenomena (Charvatova, 2007; Dmitriev, 2009). And, I. Charvatova has revealed a role of oppositions of the planets in the phenomena. According to the physical model of LRA-fields, just at the time moments of the planets oppositions relative to the Sun (and in special other instants) the abrupt flashes of the LRA-fields actions of the planets to the Sun occur with a possible long-lived aftereffect. The academic science starts to recognize influences of planets on the interior processes of the Sun. For example, as it is marked in the

handbook (Dmitriev, 2009): « *Physical origins of solar cycles are not known. They can be the internal property of the Sun as a star and its dynamo action as mostly believed now. Otherwise, planetary influences and interstellar causes could be involved. For example, it is believed sometimes that orbital rotation of giant planets (Jupiter, Saturn, Uranus and Neptune) is a natural source of the solar activity north-south asymmetries, and decadal and secular variations in the range of periods from ~11 years to ~165 years* » - the end of the citation.

Nearly thirty years ago, Meidav and Sadeh (Sadeh et al., 1972) had discovered the action of pulsar CP1133 on seismicity. According to Weber, the energy of the pulsar gravitational waves is many orders of magnitude lower than that required for the detected pulsar action on seismicity (Sadeh et al., 1972). A.Ya. Lezdinsh forecasts simultaneously the epicenter, the time (usually within a few days) and the magnitude of the strong earthquakes at Kamchatka Peninsula with using the correlation between earthquakes and planets' positions relative to the Earth and the local horizon plane (Lezdinsh, 2008). In reality, this method comes first in the open five-year competition among many other methods of earthquake forecast (with maximal magnitude error 0.4 point). The effectiveness of A.Ya. Lezdinsh' method proves the interrelation of seismic activity and LRA-fields - a significant influence of planets at interplanetary distances. This proof is difficult to refute. The reasons of the interrelation of the tectonic processes and LRA-fields were described briefly in a number of works (Vasiliev, 2008, 2009a, 2009b). In according to these reasons, the processes, related to earthquake preparation, are the sources of LRA-fields. At the same time, seismic activity is influenced by total LRA-field. As a result, firstly, in the process of the earthquake preparation the precursors should occur in the form of anomalies of LRA-fields (Vasiliev, 2008, 2009a, 2009b), and, secondly, the correlation of seismic activity should arise with the actions of LRA-fields - with the configuration of celestial bodies. The emergence of the precursors at 2-10 days before strong earthquakes in the form of the abrupt anomalies of LRA-fields have been registered by the detector of Smirnov (Smirnov et al., 2008, Vasiliev, 2008a, 2008b, 2009a, 2009b). The correlation of seismic activity with the configuration of celestial bodies, including planets, is confirmed not only by the work of A. Ya. Lezdinsh but also by the new statistics data about earthquakes in North America, Japan and around the globe (it will be described comprehensively in the nearest special paper). According to the statistical estimates, the revealed influences of Mars on seismic activity are not random with the probabilities of 0.9998 - 0.99997.

The foregoing facts contradict to the thesis that "the planets can not influence on the Earth." In addition, these facts contradict to the energy conservation law. The actions' energy can not explain the observed effects. Besides, there is no dependence of the results from the ratio of the actions' energy and the processes' energy. All occur thus, as if, energetically insignificant actions strongly stand out on the background of the incomparably more powerful actions. In other words, it is realized such control of processes on the Earth, which requires negligible or may be zero of energy consumptions. These facts can not be ignored. Why is it happen? Similar situations occurred many times in the history of science. Each time, the contradictions between the facts and the predominant ideas of science indicated the scopes of the applicability of the existing representations of science. Each time, these contradictions led to yet another new understanding of the scopes of applicability. As a result, a new model of the world around us was created. The new physical model was coordinated with the new facts. The new model came out over the scopes of applicability of the old model. But the new model included the old model. The old model remains valid in the old scopes of applicability. It was happen with a discovery of the fact of non-planar surface of the sea that has led to the emergence of the spherical Earth model yet of the ancient Greeks, who could well calculate the radius of the Earth. The same happen with a discovery of the light velocity constancy (the emergence of relativity theory), a discovery of quantum phenomena (the emergence of quantum models), and so on. Consequently, these contradictions are productive. They contain the potential of the science development. Hence, such contradictions can not be ignored. On the contrary, similar contradictions should be used to expand the scientific knowledge.

Thus the problem arises to use the contradictions between the facts and the modern model of astrophysics in order to improve our knowledge. That is a subject of this paper. In this case, the author tends to minimize violations of the modern physics concept. Concretely, the problem is solved with the following restrictions:

- 1). *the examination will be carried out within the framework of the correctness of the classical field theory - LRA-fields are the classic (nonquantum) fields;*
- 2). *there are no violations of the energy conservation law;*
- 3). *special relativity theory (SRT) is not violated.*

In works (Vasiliev, 2008b, 2009a, 2009b) a concrete physical model was developed. The model revealed the structure, some specific properties and the appearance conditions of LRA-fields. This paper discusses a general concept of the possibility of their existence without the violations of the above items 1-3.

2. Concept

According to the facts, the planets and stars remotely act on terrestrial processes. Hence, there is some agent carrying such actions. Such agent is called in the physics as "field". We have named this agent as LRA-field.

However, astrophysics states firmly at the position that "the planets can not influence on the Earth". These are not mere words. Actually, the total energy flow of a field (known or still unknown to us) through its frontal area must be constant and must be spread throughout the frontal area. The frontal area increases with respect to r^2 (in the case of its spherical shape, where r is the distance from the point-source of the field). Finally, the energy-flux density of the field together with the field intensity should decrease with respect to $1/r^2$ or faster. The corresponding numerical estimates lead astrophysics to the present position. However, astrophysics keeps back the following: *the position is correct for the class of energy fields*. Hence, the energy fields of the planets and stars can not significantly affect on the Earth processes. Scientific experiments and observations demonstrate the noticeable actions of planets and stars on the Earth. Hence, there exist fields outside of this class. By definition, it is energy-free fields. Consequently, energy-free fields exist. Then, by definition, LRA-fields are the energy-free fields.

This conclusion is consistent with the conclusion of S. E. Shnoll (Shnoll, 2001): ". . . *The energy variation range for the processes under study equals tens of orders of magnitude. It is therefore clear that the "external force" that causes synchronous alteration of the histogram shapes is of the non-energy nature.*" - the end of citation. This conclusion is further supported by results of experiments conducted by famous astrophysicist N. A. Kozyrev. Using a telescope, N. A. Kozyrev registered the true position of the planets, stars and galaxies (Kozyrev, 1977, 2005, Kozyrev et al., 1978). The results of N. A. Kozyrev were confirmed by experiments of independent researchers in observations of the true position of the Sun (Lavrentiev et al., 1990a, 1990b). Since the true positions of the planets, stars and galaxies are determined, then some field propagate from the planets, stars and galaxies with the superlight velocity. However, in accordance with the relativity theory, the energy fields can not propagate faster than light. Hence, the energy-free fields propagate from the planets, stars and galaxies. The authors of works (Lavrentiev et al., 1990a, 1990b) put it prudently: *"there is the type of actions, out of the examination of the modern physics"*. According to the experiments of N. A. Kozyrev and his followers, the energy-free fields capable to overcome interstellar distances almost immediately. This is not surprising, since the special relativity theory (SRT) does not impose restrictions on the velocity of propagation of the energy-free fields. It is useful to not miss from a view, that known laws of physics do not forbid existence of the energy-free fields and energy-free actions.

The energy-free LRA-fields, by definition, do not transfer energy and do not transmit the energy to an object of their action. Then, according to SRT, they do not transfer also any momentum and do not transmit a momentum to an object of their action. Nevertheless, their actions exist. Hence, at first, it is non-force actions. Secondly, these actions should have an opportunity to switch on and off, regulate pumping-over of the energy to an object of the action from the environment, because more often the changes of the state and interior processes of the object demand the energy consumption or release. It may have far-reaching technological consequences. Hence, the problem arises - to research experimentally and to identify the mechanisms of the actions of the energy-free fields. In opinion of the author, it is useful to begin with laboratory experiments on the generation of LRA-fields as described in papers (Vasiliev, 2009a, 2009b, 2010). (Please, see below the elementary example of the energy-free action on the energetic process.)

How, in principle, could be the actions of LRA-fields carried out? Some promptings to the answer are contained in the S. E. Shnoll's and N. A. Kozyrev's ideas. S. E. Shnoll offer the hypothesis that an universal action on the histograms of the physically dissimilar processes is carried out through changes of the characteristics of space-time since *"the only thing common to such diverse processes - is the space-time in which they occur"* (Shnoll, 2001). If S. E. Shnoll is right, the LRA-fields are able to transfer the changes of the characteristics of space-time and to influence through these changes.

The similar thought was expressed earlier by N. A. Kozyrev, but only in respect of the changes of time. N. A. Kozyrev has putted forward the fundamental but until now controversial ideas about activity and physical properties of the time, the emergence of energy in variations of the time density, that changes of the physical properties of the time instantly run through the entire universe, about the essence of relationship between time, causality and irreversible processes (Kozyrev, 2005). N. A. Kozyrev came to his ideas on the basis of long research and understanding of astrophysical processes. The objective review of the work of N. A. Kozyrev can be found in paper (Margerison, 1959). The leitmotif of N. A. Kozyrev's ideas is active actions of the changes of the time physical properties on the course of physical processes. According to N. A. Kozyrev, these actions

prevent the thermal death of the universe and occur due to the energy liberation at the changes of the time density. Is the energy conservation law violated in this case? It is still not clear. Margerison T. concludes (Margerison, 1959): "*It is too early to talk about whether the physical meaning of the new concept of time or whether it is a nonsense ... Kozyrev's own publications did not help to clarify the issue, since they lack of the clarity and detail. But regardless of whether the Kozyrev's hypothesis will stand the test of criticism or not, his approach to the problem is marked by novelty, which should stimulate the thoughts of physicists.*" Without going to the necessary debates about the ideas of N. A. Kozyrev, we mention the following. Almost instantaneous transfer of the actions follows from the foregoing experiments of N. A. Kozyrev and his followers. But N. A. Kozyrev denied involvement of any field in an almost instantaneous transfer of the actions. N. A. Kozyrev confirmed this using his own data that there is no transfer of momentum at the transfer actions studied him, whereas the physical field, as assumed in physics, always carries energy and momentum. Apparently so, N. A. Kozyrev has constructed an original structure of instant transfer of the action without any gradual, albeit almost instantaneous, transfer of the action. According to N. A. Kozyrev, the changes in the time density instantly pervade all space, since time itself instantly run through the entire universe. And then, variations of the time density accomplish their actions - the "interaction in the temporal aspect" in the terminology of the supporters of Kozyrev (Eganova, 2005). This structure is somewhat vague and not well understood. According to the author's opinion, this design is lame. In fact, the instantaneous penetration into the entire universe is not related to changes of the physical properties of time, but it is related to the mathematical coordinate system of space-time which is artificially imposed on the universe by researcher. The mathematical time of the mathematical coordinate systems of space-time (which has no physical properties) is instantly imposed by researcher on the entire universe (but does not run through it), of course, without intervention of any physical agent. Such lapping of the mathematical time does not mean that the physical properties of time, as the physical substance, instantly pervade the entire universe. For example, the mathematical time is applied instantly to the entire universe, but the changes of the metric of the space-time spread from their sources, not instantly, but gradually - with the velocity of the gravitational field propagation. But, just the above lame structure can be removed from concept of N. A. Kozyrev, without detriment to his other proofs and deductions in relation to his experimental material. For this it's enough to replace the "instant pervading" to the transfer of changes in the physical properties of time by LRA-fields. In fact, on the one hand, LRA-fields do not carry momentum, and therefore automatically overcome the above objection of N. A. Kozyrev against the participation of any field in the transfer of changes of the physical properties of time. On the other hand, LRA-fields are able to almost instantly overcome interstellar distances without violating the relativity theory that is required in the logic of N. A. Kozyrev. S. E. Shnoll has discovered the universal action of LRA-fields on the histograms representing macroscopic fluctuations of the rates of various physical processes. It is useful to note that from this point, universality of influence of LRA-fields on behavior of different processes themselves, i.e. on the average, does not follow in any way. Therefore, the response of the behaviour of the different processes themselves, i.e. on the average, to an action of everyone concrete LRA-field may be different. According to the developed physical model (Vasiliev, 2009a, 2009b), LRA-fields depend on external and internal movements of their sources, on its structure and processes occurring in it. In particular, changes in solar activity are the result of changes in the internal processes of the Sun. Hence, at the same time there are changes of LRA-field of the Sun and its influences to the Earth. Consequently, in addition to electromagnetic influences, there is also another mechanism of action of solar activity.

In contrast to magnetic storms, the latter mechanism should begin to act not two days after a solar flare (NOTE 6), but immediately - at the time of the solar flare or just before it, that is, during the preparation of the solar flare. It can be checked up, for example, by the medical statistics of exacerbations of diseases. The extensive multi-year investigations on the relationship between the health indices and solar activity have been conducted at the Institute of Terrestrial Magnetism, Ionosphere and Radio Wave Propagation of Russian Academy of Sciences (Troitsk, Moscow Reg., Russia) (Khabarova, 2002, Ragulskaja et al., 2001, 2003; Khabarova et al., 2003).

By consideration of the statistical relationship between the health indices and magnetic storms, it has been marked (Khabarova, 2002): "*Constantly the information appears about presence of the abnormal response for couple of days up to a magnetic storm, that in general contradicts to cause-effect relation of these events. Clearly, that the reaction incipient prior to the beginning of the magnetic storm is a reaction not on the storm. And what? The initial cause-effect relation is visible: flare - reaction. And what is farther? An ether, mysticism?*". Meanwhile, if one takes into account influences of LRA-field the Sun to the Earth, the cause-effect relation is restored. This relation should not be ignored, as the medical parameters, mentioned above, include the arrhythmia of hearts, the myocardial infarction, the insults down to a lethal outcome. As LRA-field of the Sun should be altered during preparation of flare, there should appear the precursors of the flares on the Sun in the

form of the anomalies of the LRA-field, like the appearance of precursors of earthquakes in the form of the signals of LRA-fields (Smirnov et al., 2008). Searching and identification of the precursors can be performed by means of monitoring of the LRA-field signals from the Sun with the help of detectors of the LRA-fields. Probably, not only LRA-field the Sun recovers the cause-effect relation. Recently the increase of the ionizing radiation during solar flares (in ultraviolet, X-ray and a gamma spectral band) was revealed. In result, the Sun produces enough appreciable magnetic variations on a surface of the Earth immediately at the moment of the flare, intensively radiating in a X-ray spectral band (Dmitriev and Yeh, 2008). Most likely, both the factors influence in different proportions in different situations.

The ability of LRA-fields almost instantly to overcome interstellar distances, does not mean automatically, that the energy-free fields may be propagated only with velocity over the speed of light, because of neither theoretical nor experimental indications are known up to now. The energy-free field, it is not excluded, can have different velocities. It seems that some experiments indicate to this fact. So, at the moment of the upper transit of the visual position of the Sun, the brief abrupt flashes of the actions to the mechanical and biological systems are revealed in experimental studies (Lavrentiev et al., 1990a, 1990b). Neither gravitational, nor electromagnetic fields can create similar single flashes generated by the culmination. In contrast, according to the physical model of LRA-fields (Vasiliev, 2008, 2009a, 2009b, 2010, 2011), just in the moments of culmination of the Sun, its LRA-field creates the single brief abrupt flashes of the actions. N. A. Kozyrev observed similar flashes of actions of Mars outside of its culminations and has indicated the place and time of observation (Kozyrev, 1977). Knowing the time and place of the observation, it is possible to calculate the flashes's times of the LRA-field's actions of Mars, using the physical model of LRA-fields (Vasiliev, 2008, 2009a, 2009b, 2010, 2011). The estimated time moments of the flashes of Mars coincide with the actual ones. Therefore, it is reasonable to assume, that the LRA-fields generate the single flashes mentioned above and there is some kind of LRA-fields which propagates approximately with the speed of light. This problem can be investigated through observations of series of similar flashes of the actions of celestial bodies, which are predicted by the physical model of LRA-fields (at passages of the celestial bodies through the series of the celestial sphere points predicted by the physical model). The existence of a refraction of the LRA-fields in the Earth's atmosphere can be investigated using high-precision observations of the abrupt flashes actions of the LRA-fields of celestial bodies at their rises and settings, since the apparent times of the rises and settings depend on the refraction to the greatest degree in comparison to the apparent times of the culminations.

The existence of the non-energy actions follows not only from S. E. Shnol's, V. N. Smirnov's, V. A. Zubov's experiments and A. Ya. Lezdinsh's works disclosing "the influences of planets on the Earth". Classical physics knows some non-energy actions, which do not change the energy of a process, but change the process development, i.e. they control the process. For example, there is a case when a force f is applied to a charged particle and this force is permanently perpendicular to the particle's trajectory. Because of the perpendicularity, the force f does not make work and does not transmit energy to the particle, but changes the particle trajectory, i.e. it changes the direction of the particle motion and, thus, it is driving the motion. To create the force f , the energy inputs are required, of course. These energy inputs depend on the technical scheme of the making of the force f . But, these energy inputs are not transferred to the particle. Therefore the result of the action of force f depends on the force f , but does not depend on quantity indicating the energy inputs, which, moreover, as it is easy to be convinced, may tend to zero at the constant force f by modifications of technical scheme of the making of the force f . The force f generates some acceleration of the particle, perpendicular to its current velocity. The acceleration of the particle and electrical charge generates the electromagnetic waves which are carry away some energy. Where is a source of this energy? In fact, the force f does not make work and does not change the quantity of the velocity and, hence, the kinetic energy of the particle. If we assume that the particle does not expend any energy on radiation of the electromagnetic waves, then the energy of the radiation is scooped from anything, that is excluded. Consequently, the particle expends a part of the kinetic energy to the radiation, that is, it has some deceleration, when it radiates. Hence, there is some force, braking the particle. But the force f does not brake the particle, it only turns the velocity of the particle. Hence, other force arises at the radiation - force of the reaction of the radiation, which brakes the particle. Due to the origin of this force of the reaction, there is the pumping-over of the kinetic energy of the particle in the energy of the radiated electromagnetic waves. The force f does not make any work, does not transmit any energy, but the force f switches on the mechanism of pumping-over of the kinetic energy in the energy of the waves. When the force f is switched-off, the acceleration caused by this force is stopped and, at the same time, the radiation caused by the acceleration is stopped also. This example shows in details non-energy handling in switching-on and switching-off of pumping-over the energy from one its kind to other. However, this example cannot be the precise analog of actions of the energy-free fields, since here the momentum is transmitted to the particle by the forcing

action at that, while the energy-free fields act, as mentioned above, without any energy and momentum transfer, since the energy-free fields are non-forcing fields. The precise analog, hardly, exists in the world of energy objects.

We see every day around us the non-energy non-force action - control, but we are not aware of that. As a matter of fact, all physical natural processes occurring around us are controlled by physical laws of the Nature. This control does not require the expenses of energy. It occurs by some strange to us, non-force, non-energy way. Therefore, it is possible that the origins of the physical laws, completely incomprehensible to us today, lie in the space of non-energy physical objects.

Debates about the existence of the energy-free fields are desirable and took a place. There are supporters and opponents of the concept of LRA-fields. Surprisingly, but the opponents *a priori* asserted: any energy-free fields do not exist and cannot exist. The opponents did not bother themselves to prove the impossibility of existence of the energy-free fields, as if, it was not required to them, then everything was obvious for them without the proofs. The similar happens in a science more than once. For instance, eminent French scientist Lavoisier, the director of the Parisian Academy of Sciences, distinguished by extraordinary perseverance and precision in scientific researches, denied the possibility of falling meteorites, indicating: "Stones can not fall from the sky, because the stones are not present in the sky." Lavoisier's argument seemed convincing in his time, because the absence of stones in the sky seemed obvious. Incorrectness of the Lavoisier's conclusion and of the logic of our opponents result from the substitution of the proof by the evidence, from the substitution of the correct thesis "we never observed stones in the sky" by the incorrect thesis of "stones in the sky do not exist." Similarly at present, a correct thesis of opponents "we know nothing about non-energy fields" is replaced by opponents with the incorrect thesis "non-energy field does not exist". In like situations, researchers quite often without a trace forget the methodological remark of great Newton that the science knows only the drop from ocean of knowledge, outside of which an unexpected picture of the world can be opened.

On the process of development, science step on the same rake with an enviable constancy, hampering its progress by assuming that the momentary view is finally established and immutable. So, by the same reasons, at the same level of "scientific correctness", the science previously considered as immutable that the Earth is flat, that space is Euclidean only, that the mass of a body cannot depend on its velocity, that parallel lines cannot intersect, that processes can to be continuous only (non-quantum), that our space can be infinite only, and so on. Science is inertial. It resists to the introduction of novel views. However, inertia is necessary for science in order to not lose stability. Supporters of the new must look for answers to the objections of opponents. The inertia of science - this is normally, but only under condition when the counteraction to the new is accomplished scientifically correctly, at least, with the proofs in hands, without substitution of the theses, without substitution of the proofs by evidence, speaking briefly, without mere negation. The known Russian scientist I. S. Shklovsky has noted: the academic science makes more precise verity, but searching of new verity overstep the limits of academic science. Therefore, it is not always rationally to require that the searching of new verity would completely be inscribed in the academic science from the very beginning of the searching.

Sometimes in discussions about existence of the LRA-fields, the problem of the action of the LRA-fields on long distances was confused to the problem of instantaneousness of an energy transfer on distance. In particular, it was affirmed that the energy can propagate from its source with infinite phase velocity of waves. That is certainly incorrect in physical sense and in the sense of definition of the phase velocity.

3. Summary and Conclusions

The facts indicate to existence of LRA-fields. Within the restrictions of validity of the classical field theory, the energy conservation law and the special relativity (part 1), the existence of LRA-fields leads to a conclusion that LRA-fields are energy-free. The energy-free LRA-fields do not transfer a momentum and they are non-forcing fields. Nevertheless, the LRA-fields act on physical and biophysical processes by a non-forcing and non-energy manner, which is still unclear for us. There is a problem of searching and examination of the mechanisms of LRA-fields actions. The promptings to understanding these mechanisms are contained in ideas of S. E. Shnoll and N. A. Kozyrev. Their ideas (having bases in astrophysical examinations and in study of behavior of the Shnoll's histograms) prompt that the LRA-fields act by a transport of changes of the space - time characteristic or of the physical properties of time.

The special theory of relativity (SRT) does not impose restrictions on the velocity of propagation of the LRA-fields. According to the experiments, the LRA-fields are capable overcome interstellar distances almost instantly. Hence, the principal possibilities are unclosed for ultra-speed over long-distance communications. But this does not mean automatically that the LRA-fields can propagate only with the over-light velocity because

neither theoretical nor experimental indications to the propagation speed were found up to now. We can not exclude that the LRA-fields can have different velocities. It seems that some experiments indicate to that.

The idea of supporters of N. A. Kozyrev about the "*interaction in the temporal aspect*", as a rule, is sharply negated by the scientific community. It essentially promotes to negation of the innovative physical ideology of N. A. Kozyrev as a whole. For some reasons (part 2), the chain of the fundamental reasoning of N. A. Kozyrev should be and can be improved by replacing the link "*interaction in the temporal aspect*" to the idea of the transport of changes of the physical properties of time by the physical LRA-fields. The given replacement, at first, happens without damage to other substantiations, deductions and views of N. A. Kozyrev. Secondly, such replacement supposes almost instantaneous transport of the physical properties changes of time without infringements of SRT and without the momentum transfer as it is required for the physical ideology developed by N. A. Kozyrev and for the co-ordination with the results of his experiments.

According to the long-term extensive examinations of the statistical interrelation between the health indices and the activity of the Sun, the cause-effect relation is lost in the moments preceding to appearance of magnetic storms. The account of the actions of LRA-field of the Sun to biological objects recovers the cause-effect relation. According to the physical model of LRA-fields (Vasiliev, 2009a, 2009b), during preparation of solar flares there should appear the precursors of the flares on the Sun in the form of the anomalies of LRA-field, like the appearance of precursors of earthquakes in the form of the signals of LRA-fields. Searching and identification of the flare precursors can be realized by means of monitoring of signals of the LRA-field of the Sun with the help of the LRA-fields detectors.

The existence of LRA-fields leads to a certain correlation of terrestrial processes to the configuration of celestial bodies. But also there is a correlation of the terrestrial processes with a number of many other factors (with electromagnetic, gravitational, mechanical, chemical, etc. actions). Therefore, the only correct way to use the correlation with the configuration of the celestial bodies will consist, in opinion of the author, in its integration with other correlations. For example, the method of the short-term prognosis of place, time and magnitude of strong earthquakes (A. Ja. Lezdinsh, part 1) is effective in practice because it uses not only the correlations with the positions of the planets, the sun, the moon relative to Earth and relative to the local horizon plane but also the correlations with the seismological factors. It is unambiguously established empirical fact that the method is ineffective when the correlations with seismological factors are neglected. On the other hand, other methods of the short-term prognosis of strong earthquakes, where the correlation with the configuration of celestial bodies is not used, meanwhile lag behind the A. Ja. Lezdinsh's method in practical efficiency that was supported by five years' comparative approbation.

In general, by analogy with the results of the research and mastering of electromagnetic fields, and taking into account the unusual nature of LRA-fields, it is reasonable to expect that the research and mastering of the LRA-fields lead to the creation of unusual new technologies (of communications, medicine, industrial process control, etc.) for which a special paper should be devoted. Undoubtedly, many-sided debates of the problems concerning to this paper are desirable. It is also useful to explore every possible alternative explanations of the actions of planets and stars outside the limitations described in part 1.

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Notes

Note 1. Developed by Kurchatov Institute of Atomic Energy and MEPhI (Moscow).

Note 2. The detector has directedness.

Note 3. In order to calculate correctly the gravitational actions of the planets on the Earth, it is necessary to take into account the fall of the Earth's in the external gravitational field. The Earth moves in a "vacuum", and it is nothing prevents falling of the Earth. If the external gravitational field is homogeneous (constant) on the Earth, then this field is not perceptible at the Earth (as we do not feel the gravitational attraction inside the freely falling elevator). However, due to a very weak inhomogeneity (small gradient) of the external field at the Earth, the external gravitational field acts very weak on the earthlings. As an indivisible body, the Earth falls freely as a single whole in the external field with some averaged acceleration A_{AV} of free fall. Due to the weak gradient, a

little different acceleration A of the free fall corresponds to the different points of the Earth, because the external gravitational field operates slightly different at different points of the Earth. An earthling or device at the Earth may feel only this very small difference ($A_{AV} - A$) produced by the weak gravitational influence of the external field to the earthlings. An object at the Earth is affected by a acts the external gravitational force equal to the absolute magnitude of the difference ($A_{AV} - A$) multiplied to the mass of the object. This force and should be compared with the force of attraction to an experimenter. All this, naturally, is taken into account in the theory of tides, which repeatedly tested experimentally.

Note 4. Developed by Institute of Theoretical and Experimental Biophysics, Russian Academy of Science.

Note 5. The author can not agree with the explanations given in works (Zubov, 2007; Zubov et al., 2010), but believes that their experimental part deserves of attention and development to a systematic scientific observations.

Note 6. Two days is a time of the solar wind plasma propagation from the Sun to the Earth.

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