

If Einstein is a man of genius(?!), then who am I – the one who has dared to refute his theory?

Sergey Petrovich Maslikov

E-mail: masserp57@mail.ru

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NEW VARIANT OF THE “BALLISTIC THEORY” BY WALTER RITZ

Though discarding the notion of the ether, Einstein’s Special Theory of Relativity (STR) de facto rests on the concept of the ether, since it applies mathematical apparatus of the Lorentz-Poincaré transformations intended to explain the negative result of the Michelson-Morley experiment in terms of stationary ether. Failing to understand and accept the above statement, the numerous opponents of STR are pertinacious in their efforts to develop the ether dynamics in every possible way. Intuitively feeling the inconsistency of STR, they still boldly refuse to admit that their efforts are nothing but shadowboxing. Eventually resulting in Einstein’s Special Theory of Relativity, this universal delusion first crept into the minds of the scientists in the late nineteenth century. Albert Einstein, who was an 8-year old boy at that time, was, after all, just one of the “victims” of this total delusion. The error is simple but intricately veiled – this is the only explanation of its mystical “invisibility”. This delusion became the “bed of Procrustes” for the natural sciences of the twentieth century.

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I. HISTORICAL ANALYSIS OF THE ERROR

As a point of reference, let us take the year 1887, when Michelson and Morley carried out their famous experiment intending to find out any impact of a light source moving through a fixed substance known as the ether. The ether, being the bearer of electromagnetic waves, might qualify to be considered a system of absolute coordinates. “Light is a wave motion. To think of such a motion without thinking also of a material ether seemed to the early physicists as preposterous as thinking about water waves without thinking of water... Physicists of the nineteenth century believed that the ether surely must behave like the air that rushes over a moving flatcar. How could it be otherwise? If the ether is motionless, any objects moving through it would have to encounter an “ether wind” blowing in the opposite direction. Light is a wave motion in this fixed ether. The velocity of light, measured on a moving object, would of course be influenced by such an ether wind” [2].

The result of the Michelson-Morley experiment was null, indicating the absence of the ether, and in this context, though null, the result was positive. The error is as follows: based on the experiment result, the conclusion asserts that the classical principle of velocity addition is not applicable and that the speed of light cannot be added to the speed of a source of light. The challenges are as follows: Where is the error? What are the evidences disproving this error?

Let us validate the above statement by the following demonstration: when the acoustic source rests in the airspace, the acoustic waves propagate from the acoustic source concentrically:

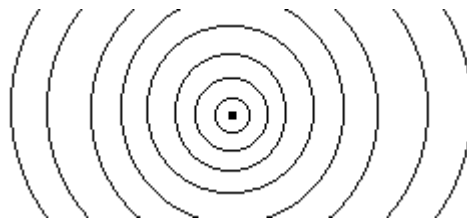


Figure 1.

If we consider propagation of acoustic waves from the moving source (or blown over by the wind, which is the same), the picture will be as follows:

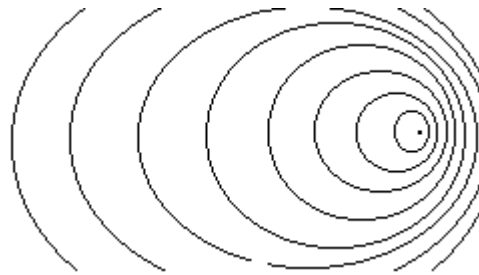


Figure 2.

Once the acoustic source reaches the supersonic velocity, the sound will lag behind the acoustic source:

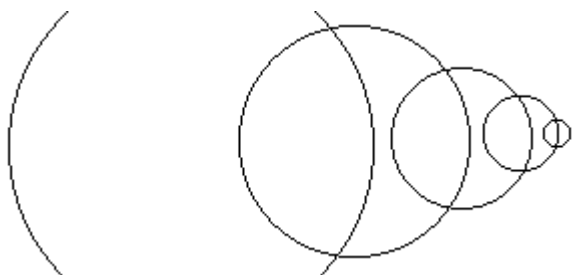


Figure 3.

It is clearly seen that the sound speed does not add to the speed of acoustic source. By applying this analogy between the airspace and the ether, we may conclude that if the ether really existed, it would be reasonable to assert that the speeds of light and light source do not add up.

Using their instrument, Michelson and Morley intended to find out something similar to that shown in Figure 2; instead, they permanently obtained the result corresponding to what is shown in Figure 1.

By the end of the nineteenth century, the undulatory (wave) theory of light was generally accepted; so the scientists were perplexed and confused. They exerted every possible effort to

explain the null result of the experiment in terms of the stationary ether. Based specifically on these assumptions, Lorentz and Poincaré created their system of transformation, thus proving impossibility of detecting the ether empirically, rather than proving its absence. As a result of the above factors, Einstein's Special Theory of Relativity became possible.

All concomitant circumstances were soundly presented by V.I. Boyarintsev, Ph.D., in his book “AntiEinstein” issued in 2005 (Publishing House OOO Yauza, pp. 170-189).

Though giving in-depth historical coverage of the issue, he fails to mention another alternative theory appearing at dawn of the twentieth century – so called “ballistic theory of light”. Walter Ritz, a Swiss scientist (Ritz’s Ballistic Theory, RBT), proposed the first variant of this theory.

With this in mind, I would like to express my confidence that only early tragic death of this prominent physicist prevented him from ultimately making a small addition to RBT – the one which would allow us to reject the validity of experiments and observations having resulted in premature repudiation of RBT. Neither physicists of the early twentieth century nor the next generations of physicists were able to fully understand this theory.

Let us keep in mind the following statement: “The ballistic theory was proposed in order to avoid the overthrow of concepts inevitably caused by acceptance of both STR postulates... RBT retained the principle of relativity, but rejected the postulate of constant light speed in any inertial reference system. ...RBT encountered certain difficulties while attempting to explain a number of phenomena, such as the Fizeau experiment, the Doppler effect (the Doppler shift), spectroscopic binary stars, etc. While discussing RBT with Robert S. Shankland, Einstein noted that he had thought about possibility of RBT yet even before 1905. However, he rejected this idea since he failed to build a differential equation having a solution that would provide the waves’ speed depending on a source movement... However, for a long time RBT was opposed to STR, since it did not require any radical revision of the basic concepts of space and time.” [8; pp. 113, 114]

The essence of RBT is as follows:

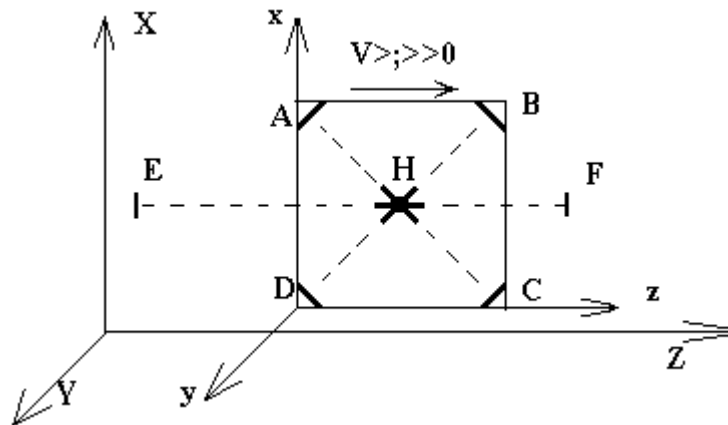


Figure 4.

We have a six-barreled machine gun H, firing from all six barrels to targets A, B, C, D, E, F in a synchronous manner and at regular intervals of time. Targets A,B,C,D and the machine gun H are located in the x, y, z frame of reference moving with free velocity relative to the fixed X,Y,Z frame of reference with resting targets E and F.

The events occurring in the x, y, z frame of reference are similar to the testing scheme and the results obtained by the Michelson-Morley experiment, when bullet speeds and hit rates in relation to targets A, B, C, D are equal to each other and to shooting speed and shooting rate of the machine gun H. The bullet speeds and hit rates will be lower than the shooting speed and shooting rate of the machine gun in relation to the receding target E, and higher in relation to the approaching target F, which is due to the classical Doppler effect. Nothing will change if we take

the x, y, z frame of reference connected with the machine gun H as a fixed one, and the X,Y,Z frame of reference with E and F targets as the one moving with free velocity in the direction opposite to the one reviewed earlier.

It is clearly seen that the speed of photons (bullets) and the speed of the light source (machine gun H) or an observer (targets E and F) add up, and that both events, i.e. the result of the Michelson-Morley experiment and the Doppler effect, follow the classical velocity addition law.

It should be noted that RBT is a corpuscular theory, since such mechanism of the light propagation may only be implemented by particles, and nothing but a machine gun can be used to draw a parallel with the light source. That is why RBT unequivocally rejects the ether. However, not all the physicists have a clear idea of this, as we see from the below statement: "...there were some efforts to "save" the ether theory. Walter Ritz proposed the "ballistic hypothesis" assuming that the speed of light depends on the movement of the light source..." [7; p. 140].

When overlapping figures 2 and 4 at the points of the sources of radiation, it becomes obvious that the Michelson-Morley experiment would be a simple criteria in selecting the preferred theory (which one is more "real" – a bullet or sound, a particle or a wave), subject to peer confrontation between the corpuscular and the wave theories of the nature of light.

That is exactly the way one should argue. Instead, what we have is a weird metamorphosis: the experience argues for RBT, while the conclusion that the speed of light and the speed of the light source do not add up would be fair for the ether theory. Likewise, the rejection of the ether is unambiguous in RBT, but STR, while seemingly rejecting the ether, retains this concept de facto, since it fully adopts the mathematical apparatus of the Lorentz-Poincaré transformations. The latter was called up to "save" the ether concept by introducing the renowned paradoxes that have also been fully inherited and developed by STR.

II. ON THE QUALITATIVE ADDITION TO THE "BALLISTIC THEORY" BY W. RITZ[©]

If the Doppler effect for light follows the classical velocity addition law, with the result that we can see the blue light as the red light and vice versa, one may assume that the entire EM spectrum, ranging from the radio waves to the gamma-rays, may be observed due to the fact that the photons (initially) feature speed differential, i.e. **EM dispersion irrespective of optical density of a medium and a vacuum (NDEMI)**. There is a strict correspondence between the photons with strictly defined energy levels and their relevant speeds. This addition radically alters the RBT effects..

Optical dispersion in optically dense media (air, water, glass, etc) should be considered as a direct effect of the NDEMI existence. Besides, RBT implies the existence of the photon rest mass (see Chapter VI); hence, the full photon energy may be equal to the sum of its kinetic energy ($E_{\text{kin}} = mv^2/2$) and other energies that also may be proportional to the $\underline{n}^{\text{th}}$ power of speed.

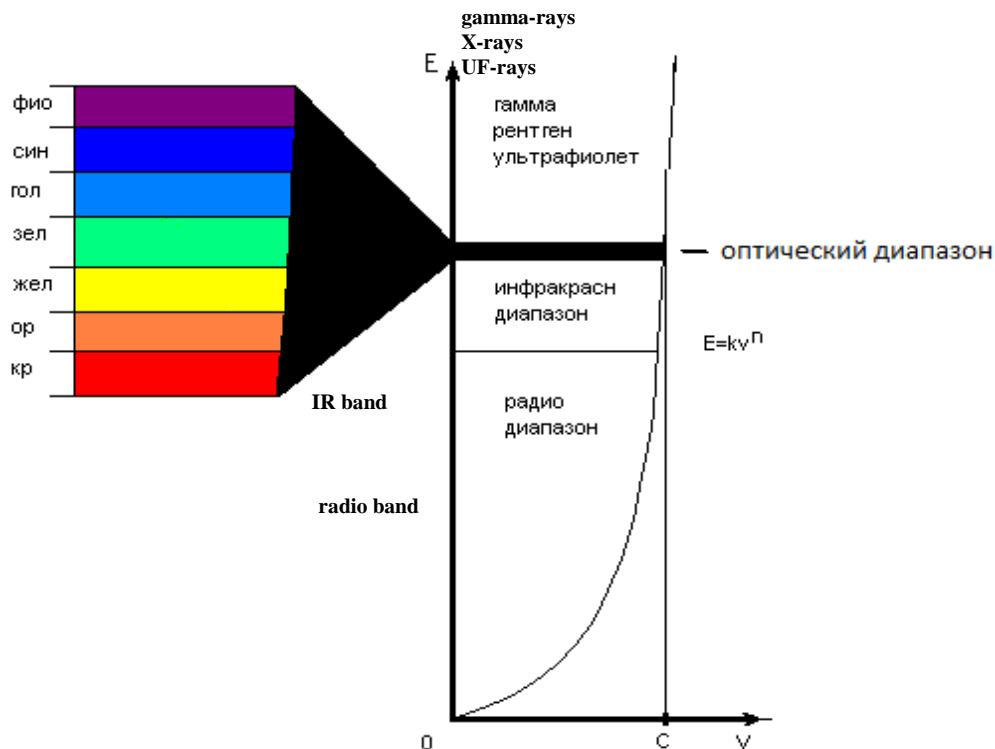


Figure 5.

Firstly, the power dependence, i.e. when a slight change in speed results in significant change in energy, allows us to understand why the existence of the NDEMI has not been demonstrated so far. The fact is that, within the limits of extremely narrow visible band, the difference between the speeds of red and blue lights is relatively insignificant. Besides, the experiments on terrestrial measurements of the speed of light average out the effects of all parameters; in contrast, it is required to extend the measurement range as much as possible (**which would provide the direct check of STR**). Secondly, this fact allows us to obtain the considerable effect of electromagnetic waves transformation at relatively low speeds. The proof of the NDEMI existence will be a deciding factor in the controversy between RBT and STR, since in STR the speed of light in a vacuum is constant and does not depend on the photon energy.

As mentioned earlier, RBT retains the principle of relativity. That is to say, any source of light moving with a uniform speed, should be considered as a separate inertial frame of reference, inside of which measurements of the speed of radiation, e.g. in yellow sodium D-line, will have the result similar to that obtained by measurement within any other inertial frames of reference moving with any difference in speed and direction of movement relative to the frame of reference in question; all other factors being equal. Needless to say, there is no such thing as the absolute frame of reference in the context of RBT.

Furthermore, it becomes obvious that the radio-frequency range provides a channel of communication, which is by no means a “speedy” one. Thus, an even more intriguing question arises: how can highly developed civilizations across the universe interact and exchange information? (What I mean here is search for signals from extraterrestrial civilizations in the framework of the SETI project). Meanwhile, it should be noted that **electromagnetic signals, when sent over long distances, should not be frequency modulated, as the NDEMI will cause distortion of the received signal proportionally to the distance between the transmitter and the receiver.**

III. ON CONCLUSIVENESS OF EXPERIMENTS AND OBSERVATIONS

“...possibility of selecting between the theories in question is based on the first-order experiments, but with open optical path. Such variant might be implemented by means of astronomical observations of binary stars. Willem de Sitter, the Dutch astronomer, will scrutinize this issue in 1913.

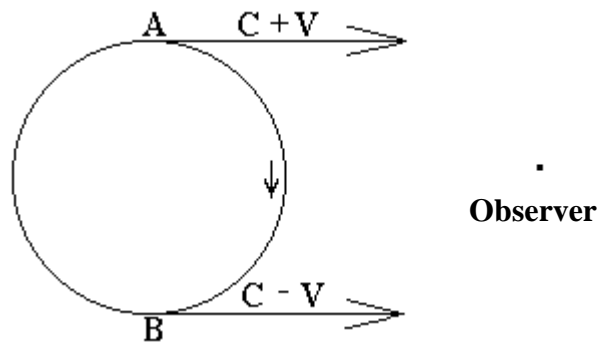


Figure 6.

If the Ritz theory is correct, then the light moving from the star in the “A” location (i.e. approaching the Earth) reaches the Earth after the time period equal to $l/c+v$ following the emission, and from the “B” location (i.e. receding the Earth) after the time period equal to $l/c-v$ (l – the distance to the Earth). If “T” is a period of half-rotation, then the interval between two observations on the Earth will be $T + (2lv/c^2)$ for the star moving from B to A, and $T - (2lv/c^2)$ for the star moving from A to B. If the star moves at larger speeds, both members of the sum are of the same order, so the star movements visible from the Earth will demonstrate deviations from Kepler’s laws. The absence of such visible deviations would be a testimony contrary to the hypothesis of addition of the star speed to the speed of the light it radiates.” [8; pp. 115,116].

If the NDEMI does exist, then it is impossible to observe any deviations in the constant radiation spectrum, since some frequencies are substituted with the other ones. However, while observing the binary stars, one should take note of the following phenomenon:

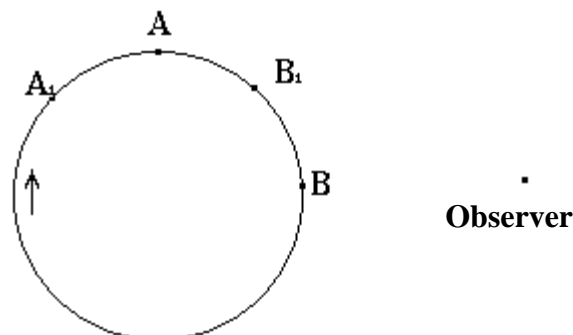


Figure 7.

If we observe maximum blue spectral line displacement in the violet part of the optical band (the “A” point), then, due to the effect of the NDEMI, the red light emitted from this point will not reach us yet, and displacement of the lines of the red part of the optical band will correspond to the star speed at the “A₁” location. If there is no displacement of the lines in the violet part of the optical band (the “B” point), displacement of the lines in the red part of the optical band will still be blue (the “B₁” point). It is fair to note that this phenomenon may not be a decisive factor in the controversy between RBT and STR, due to the presence of a gas between the star and the observer; and the effects similar to those previously reviewed may be explained by the “usual” light dispersion in the optically dense media.

Further, as we could see from the RBT model reviewed herein, it intrinsically includes the Doppler effect. Hence, any references to difficulties encountered by the RBT model while explaining the above phenomenon, might relate to the following:

«...if the displacement velocity is directed at the ϑ angle to the straight line connecting the source of light and the observer, then only the radial (R) component should be taken into

consideration, i.e. $v \cos \vartheta$. Then:
$$\nu = \nu_0 \left(1 \pm \frac{v \cos \vartheta}{c} \right)$$
 . It is clearly seen that if $\vartheta = \frac{\pi}{2}$, then $\nu = \nu_0$, i.e. in the classical theory the transverse Doppler effect is zero... the second-order Doppler effect, if considered from the relativistic point of view, gives to the frequency, when observed transversely to the movement direction, a value... Thus, experimental evidence of the existence of the non-zero transverse second-order Doppler effect would serve as a concurrent validation of Einstein's Time Delay Formula (TDF).” [8; pp. 44, 124]

This statement is incorrect; and the second-order Doppler effect does occur within the RBT as well. To prove it, let us consider the experimental design in terms of RBT:

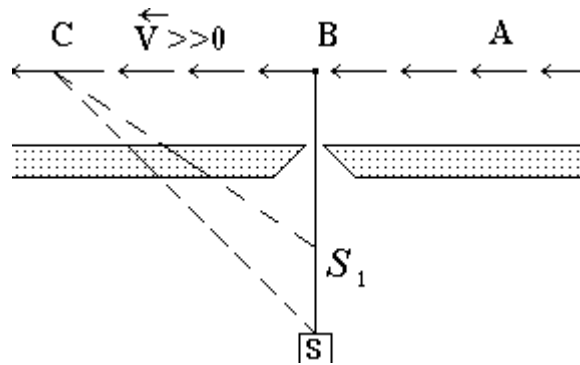


Figure 8.

Emitting particles are traveling from A to C at the speed $V \gg 0$. The axis of the “S” spectroscope is located at the right angle to the direction of the moving photon-emitting particles.

The second-order Doppler effect occurs as a result of the fact that the photon emitted in the “B” point should move in the particle-emitting frame of reference at the BCS angle, in order to reach the spectroscope “S”. Legs of the BCS triangle are proportional to the speeds; and the “BS” speed vector (direction and speed of the photon in the frame of reference of the “S” spectroscope) is a sum of the “BC” vector (vector of speed and direction of travel of the emitting particle) and “CS” vector (vector of speed and direction of travel of the photon in the frame of reference of the emitting particle). Therefore, it is obvious that the photon speed, as well as its energy, will have lower values in the observer’s frame of reference as compared with the actual values. The CS to BS ratio is proportional to the displacement of the observed spectral line. This phenomenon is nothing but a special case of aberration of light, discovered and explained by James Bradley in 1725-1728.

If the emitting particles have two emission lines (e.g. blue and red), then, as the result of the NDEMI, slower red photon should move at the BCS_1 angle in the frame of reference of the emitting particle; consequently, the red line displacement will be greater, as the CS_1 to BS_1 ratio is greater than the CS to BS ratio.

In the frame of STR, the speed of electromagnetic waves in a vacuum is constant and does not depend on the photon energy. Hence, the BCS angle (and, consequently, the displacement of spectral lines) should be the same for both the red and the blue photons. This instrument may have a very small footprint; and the experiment conducted in the high vacuum might be considered as the decisive experiment in selecting between RBT and STR.

Other experiments and observations, having resulted in premature repudiation of RBT, might be explained in a like manner, provided that artificial restrictions imposed on STO in terms of the speed of electromagnetic waves and material bodies are removed.

IV. SOME ARGUMENTS IN FAVOR OF NDEMI

The Universe is a unique laboratory, and the literature in astronomy abounds in facts that might well be considered from the point of view of the NDEMI existence. However, the absence of the “guiding” idea and the goal-oriented search prevented the scientists to correctly comprehend the phenomena observed.

Generally speaking, the emissions of a radio antenna, a candle and an X-ray apparatus are the same. By superposing the Doppler effect, and taking into consideration the power dependence between the photon energy and its speed, one might assume that, if moving at a relatively high speed from the source of the visible light, we will observe it as a radio source rather than the optical source (or as an X-ray source – if we move towards it).

Therefore, here we encounter one of the most striking revelations of the Universe: all those radio galaxy “monsters”, quasars and other anomalous-emission objects are nothing but usual galaxies, with optical emissions transforming (as a result of the Doppler’s effect) into other emissions, depending on the speed and direction of travel of these objects relative to the observer. That is to say, the observer located in the frame of reference of a radio galaxy, a quasar or the famous “exploding” M-82 galaxy, will observe our Galaxy as a radio galaxy, a quasar or the “exploding” galaxy respectively. Furthermore, it is necessary to consider the internal dynamics and the angle of travel of an object in relation to the line of sight of the observer. Since the object motion, say, in the direction from the observer, will lead to the “stripping” effect, i.e. in the optical band we will observe deeper and deeper layers of the structural elements of galactic nucleuses (quasars). Alternatively, the movement towards the observer will “hide” the structural galaxy elements in the “mist” of diffuse radio/microwave emission of the halo galaxies appearing in the optical band (e.g. gigantic elliptic galaxies with excessive X-radiation). Based on the above, we may draw a conclusion that the entire Universe, despite the blackness of the night sky, is permeated by and filled with the *Light* in all its richness and multifaceted manifestation. This is the solution to Olbers’ paradox. In its “modern” version, it states that if the universe is infinite, and so is the number of stars and galaxies uniformly distributed in an infinitely large space, the sky should be completely white and shiny, making the sun disk practically invisible. Now we see that this statement would be true if all the emitting objects in the Universe had been stationary.

It should be noted that many facts come along challenging the Big Bang theory – the one assuming the “Big Bang” that birthed the universe about 15 billion years ago. What is more, the mechanism of the gravity forces proposed by the author (see Chapter VIII) assumes that the infinity of the Universe, both in time and in the three-dimensional space, is one of the prerequisites of its existence. In defining the radiative power and distances to radio galaxies, etc, one should be guided by the mean values of ordinary galaxies rather than Hubble constant, while taking into consideration the NDEMI, internal dynamics and the angle of movement to the line of sight of the observer: “In the Coma cluster, as well as in other constellations, an extremely weird effect could be observed, with the radio components of radio galaxies in the constellations being distorted...” [5; p. 34]. Fig. 9 shows this effect for the NGC 1265 radio galaxy in the Peruses cluster.

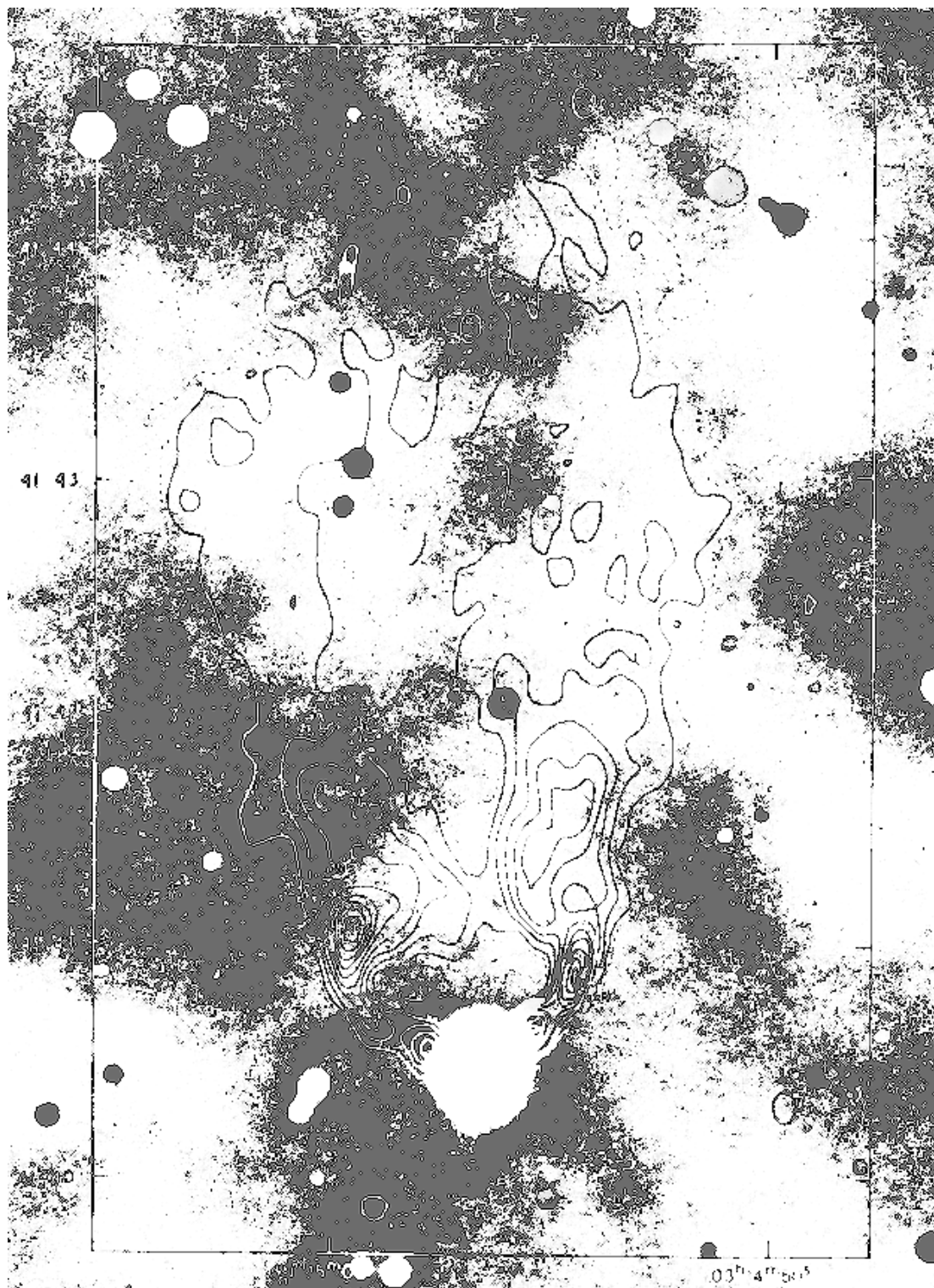


Figure 9.

The NDEMI allows to get an insight into the facts like the one referred below: “On August 3, 1975, a unique source of X-radiation flared in the constellation of Monoceros (the Unicorn) A-0620-00. Although scarcely noticeable at first, it grew brighter and brighter, and in five days its radiance surpassed the glitter of Scorpius X-1, the brightest X-ray source in the sky ... the A-0620-00 source could at last be identified with a very feeble star located rather close to the Sun. Spectral examinations of this star, conducted for several months following the X-ray burst, seem to throw some light upon the nature of the temporary X-ray sources... If the X-ray radiation were

the result of any explosion processes, then the emission lines would appear in the star's spectra. As for A-0620-00 source, such lines appeared only two months later..." [4; p. 77].

Let us suppose that the explosion did occur, i.e. we have a short-term event, the reflection of which across various bands of the electromagnetic spectrum stretched over a long period in relation to a remote observer due to the NDEMI effect.

Further, "...generally speaking, the X-ray burst of a burster should be accompanied by the optical flash... Synchronized observations of bursters in the X-ray and the optical bands started in 1978. Three bursters, 4U1735-44, 4U1837+04 and 4U1636-53, featuring stable emissions, were selected for that purpose. The optical flashes were actually detected. They precisely repeated the bursts observed in the X-ray band, the only significant difference being the time delay... The rapid burster truly lived up to its reputation as "a mysterious burster" (this object is eclipsed - S.M.). In April and September 1979, a series of observations was conducted in the infrared band, detecting rapid flashes – six flashes in April (2.6 hours of observation) and two flashes in September (5.3 hours of observation). The peak luminosity of the IR flashes was about 10^{30} Watt – just 10 times less than the luminosity of the flash observed in the X-ray band (if any X-ray flashes occurred at that time at all). The point is that this important question still remains unanswered, as no observations of the rapid burster were performed in April and September. In August, when the observations were performed, the flashes came one after another until August 23, when the source finally blinked off. In most cases, the flashing activity was followed by months of "silence"; so no X-ray observations were performed in September, assuming that the flashes would not occur. Why did the IR flashes occur?... Thereafter, despite all efforts, no more IR flashes of the rapid burster were detected. Observations were performed on repeated occasions – both independent and synchronous with the X-ray observations, with no result at all... The similar situation happened with the radio flashes. In the same year of 1979, radio telescopes were pointed towards the rapid burster three times (in April, August and September), each time detecting the flashes. The peak luminosity was less than the luminosity of the IR flashes – about 10^{27} Watt. Once again, the attempts to understand whether the radio flashes correspond to the X-ray flashes failed. In April and September, no X-ray observations were conducted at all. In August, a series of observations was performed (with the source being in the active phase). However, on August 20, when a radio flash was recorded, no X-ray observations were performed. Synchronous X-ray and radio observations were conducted on August 13 and 14. Only X-ray flashes were recorded. Later on, multiple synchronous observations were performed, but no more radio flashes occurred. Like many other questions related to bursters, the question whether the X-ray flashes are connected with the flashes observed in other bands still remains unanswered. [1; pp. 133, 134]

And one more fact to consider: the brightest optical supernova, named Supernova 1987A, flashed in the Large Magellanic Cloud in February 1987. It could be observed with the naked eye. The question is whether this phenomenon may be connected to another one. More specifically: "On March 5, 1979 (8 years before the optical flash - S.M.) several satellites recorded an intense flash of high-energy X-rays... It turned out that the radiation came from the source in the region coinciding with Supernova remnant N49 (SNR) in the Large Magellanic Cloud. It is unlikely that we have just an accidental coincidence of coordinates; and one would be tempted to attribute this flash to a neutron star (a Pulsar) located in the region of SNR. If this assumption is correct, it turns out that ...the amount of energy released is 3×10^{36} J! Usually, gamma-ray bursts release less energy (10^{31} - 10^{32} J). If the above amount of energy were released during the burst recorded on March 5, 1979, the source would be located at the distance of 100 pc from the Sun, rather than in other galaxy. One has to choose between two options: either a usual flash, in the close proximity to the Sun, by mere coincidence projected on Supernova N49, or a flash of a neutron star in the remote remnant of the supernova. If so, it is unique in terms of

energy release. Unfortunately, nothing of this kind was observed on the X-ray sky, and the mystery of the flash remains unveiled till date. [1; p. 201].

V. ON DISTANCE MEASUREMENTS IN THE UNIVERSE USING THE NDEMI

The NDEMI allows us to figure out the root cause of systematic errors in the extraterrestrial navigation and location of the planets, offering very simple and rather promising approach to distance estimation in the Universe. By defining the exact value of the emission speed of basic spectral lines, we are able, by measuring the travel-time difference between the arrival time of the signals and the time of a short-term event (and, in some other cases, the time of a star flash), using two calibrated frequencies, calculate the distance to an object using the following formula:

$$X = \frac{T \cdot C_1 \cdot C_2}{C_1 - C_2}$$

X – the distance to the object under observation

T – time difference between the arrival time of the signals

C_1 – speed of the first signal

C_2 – speed of the second signal

VI. KEY EFFECTS OF THE BALLISTIC THEORY[©]

Within the limits of Special Theory of Relativity, we cannot catch out the photon to give the problem thorough and careful consideration. With this restriction removed, we must assume that one of the well-known particles acts as the photon. **The processes of emission and absorption of photons, photoelectric effect, annihilation of electron-positron pairs, gamma rays giving birth to electron-positron pairs and many other phenomena are consistently indicative of the electron. That's it – the Mysterious Mister X!!!**

The process of the electron transformation into the photon may be similar to the following one: let us imagine an unbound electron in the space as an arrow traveling straight ahead in the observer's frame of reference:



Figure 10.

Moving in its orbit in the atom of an element, the bound electron is oriented strictly tangentially, i.e. the arrow (the electron) has an additional angular momentum depending on the radius and the travel speed:

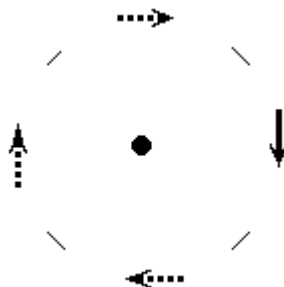


Figure 11.

In this case, one can imagine the photon as the electron stripped-off from the orbit for some reason, traveling in a straight line, but retaining additional angular momentum:



Figure 12.

In the context of the electron and the photon affinity, the experiment conducted by Frank and Hertz is very demonstrative: “The experiment is much the same as the experiment of Kirchhoff and Bunzen, the only difference being mercury atoms instead of sodium atoms, and a variable energy electron beam focused on the mercury atoms, instead of a sun beam. By doing so, Frank and Hertz observed a fascinating phenomenon: as long as the energy (velocity – S.M.) of the electrons was free, the number of electrons passing through the mercury atoms was equal to the number of electrons in the initial electron beam. However, as soon as electron energy reached the defined value (the experiment value was 4.9 eV, or 7.84×10^{12} erg), the number of electrons in the transmitted beam decreased drastically due to the electron dispersion caused by the mercury atoms. Meanwhile, a bright violet line at 253.6 nm wavelength was flashing in the mercury vapor; and the energy of a quantum with such a frequency can be easily calculated... $= 7.82 \times 10^{12}$ erg, i.e. it is practically the same as the consumed electron energy” [6; p. 82] In this case, the electrons, upon reaching the resonance speed, became indistinguishable from the photons, as detected by the mercury atoms; and being dispersed, the electrons acquired some additional rotational momentum while transforming to the photons.

A new question arises: the electron is negatively charged, the photon is neutral. Is it logical? Here we once again encounter the law of unity and struggle of opposites. One should assume (and it was actually assumed...) that the electron traveling backwards in the observer’s frame of reference, is perceived by the observer as a positron, i.e. the sign of a particle charge is characterized by a defined orientation in the observer’s frame of reference. In this case the photon is a successive electron-positron transformation (rotation) (see Figure 12). Just as there are no one-valued magnetic monopoles, so there is no one-value electric charge. A distinctive feature of this photon state of the electron (one of the tree electron states) is that it allows the electron to “withdraw into its shell”, without “noticing” the rest of the Universe. In such a case, interactions with other particles occur only in resonance states at matching speeds, travel directions and other characteristics. This is the underlying reason for the existence of sharp spectral lines (both emission and absorption lines), the Mossbauer effect and so on. One should also assume that the micro-cosmos particles (specifically electrons), interact with each other following the same classical laws, and by means of the particles so small that, if compared with the size of the electron, the latter would be as large as the galaxy (“reons”, the term introduced by Semikov, see articles in “Inzhener” magazine, 2005-2009). We perceive these particles as physical fields, super-fluid ether, etc. Such an approach will allow to reconcile numerous seemingly contradictory theories (super-fluid ether, etc) with the findings of this paper.

If the electron is really able to demonstrate such properties, then we have closely approached to the solution of such mysteries as “antimatter” and “hidden mass” in the Universe, direct relationship between the matter and the energy (the energy is a radiant state of matter, the matter is the energy in a bound state – S.M.), the Great Mystery of photosynthesis (environmentally-friendly renewable energy source), as well as a number of other phenomena observed in micro- and macro-cosmos.

Indeed, having such a triune nature, the particle might qualify to be considered a “universal building brick” of the Universe, a reference element for any measurements and an elementary macrocosmic “Art of Creation”.

VII. ON THE STELLAR ENERGY SOURCES

Let us imagine a stationery universe implementing the condition for Olbers' paradox (see Chapter IV), i.e. when the bright star-covered sky makes the Sun invisible. Based on this visualization, the stars may be compared with the mirror balls reflecting the surrounding universe. This implies that the sources of energy of stars are not necessarily inside the stars themselves.

Likewise, one may assume that the stars in the real universe absorb and transform the energy, re-emitting everything that comes from outside, rather than consume their own energy. This process should depend on a star's location in the Universe (specifically, in a galaxy). Let us imagine the galaxy as a fire that burns out, with red-hot coal particles glowing in the center. If we take two similar coal particles and shift one of them to the edge of the fire, it will soon extinguish, having exhausted its internal energy. Meanwhile, the coal particle in the center of the fire will glare for a rather long time, exchanging energies with its "neighbors".

One should consider the degree of absorption of a cosmic-ray flux coming down on a star. The spectrum range (dispersion) of this cosmic-ray flux is so wide that it falls outside the coverage and detection limits of all currently available instruments. It is not improbable that such particles may penetrate cosmic bodies while weakly interacting with them. In such a case the degree of absorption will demonstrate a direct relationship with the stellar mass. It has been ascertained that the amount of energy radiated by Jupiter, the largest planet of the solar system, exceeds the amount of solar energy consumed, and if we could increase the mass of Jupiter, even through cold matter, we would be able to observe, with the increase in the mass, the birth of a new star.

VIII. ON MECHANISM OF GRAVITY FORCES

Having made one more step away from the abovementioned, we may directly pass to the mechanism underlying the effect of gravity.

"... An intriguing fact to note is that, despite the advances of our civilization, some scientific challenges that arose in the earliest days of science still cannot be resolved... Gravity is one of the numerous phenomena in physics that manifests itself quite explicitly, but its root cause and mechanism still lie outside our cognitive boundaries. To explain the gravity mechanism, many hypotheses have been proposed, but none of them appeared to be satisfactory. The following explanation of the gravity effect seems to be interesting. Suppose there is a great number of particles moving in space with huge speed in various directions. When absorbed, they pass their impulse to an absorbing body, e.g. the Earth. Since the number of particles in all directions is equal, all the impulses are counterbalanced. If there is another body, e.g. the Sun, then the particles approaching the Earth from the side of the Sun are partially absorbed while passing through it; as a consequence, the number of particles coming from the Sun is less than the number of those coming from the other side. Consequently, there will be a force (an impulse) on the Earth that is directed toward the Sun. In this case the force "pushing" the Earth to the Sun will be inversely proportional to the square of the distance. Ever since Newton's times, this pattern of the mechanism of gravity has been repeatedly proposed in various modifications. However, this approach is rather challengeable. The point is that the Earth making its revolution around the Sun will experience more collisions with these hypothetical particles from the front rather than from the back – in the same manner as a man running under the rain gets wetter from the front. The Earth will get more impulses from the front than from the back, thus inevitably experiencing the secular deceleration of its rotational speed. The calculations prove that in case of such deceleration, the Earth would have come to a stop long time ago. [3; p. 29].

This gravity mechanism is quite viable. The cosmic-ray particles with a wide range of dispersions ("permeability") might as well be the particles causing gravitational interaction. This

approach eliminates the need for searching for any hypothetical “gravitons”. The secular deceleration may be removed by making the following assumption: the effect of rather low-energy particles (slow particles) is greater. The degree of permeability of a particle with certain energy will be inversely proportional to the mass of a body interacting with this particle. Based on this principle, one may assume that the particles attacking from the front may get more “penetrating”, i.e. decreasing the energy return, while the particles bumping from behind are getting more “sticking”, i.e. increasing the energy return. It results in compensated effects of particles moving in the same and in the opposite direction, and no “braking” effect occurs. When assuming such mechanism of gravity, one should define a phenomenon that may hide the genuine power of the gravity forces, being one of the manifestations of “permeability” in cases when the relative weakness is determined by the genuine power.

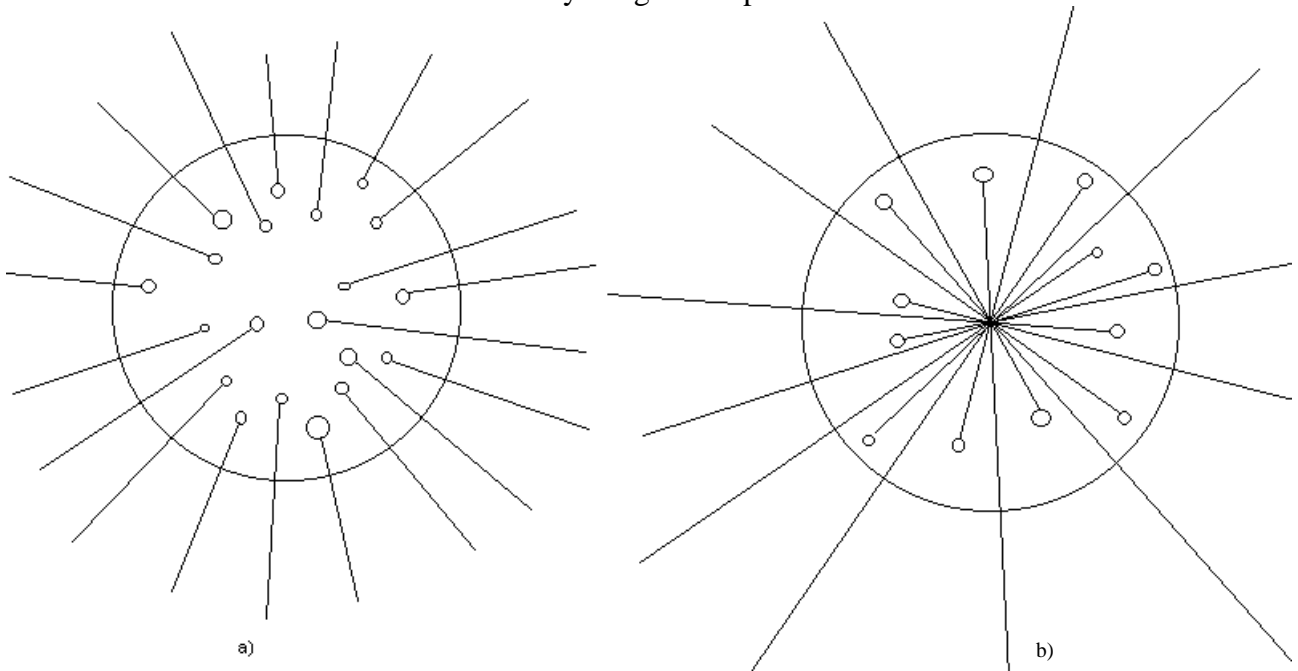


Figure 13.

Particles of the “first order” transmit their movement impulse until they penetrate half the depth of a cosmic body, causing the body contraction (fig. 13a), while the second-order particles that transmit their impulse having penetrated half the depth of a matter, will oppose the contraction (fig. 13b). In each specific case, this segregation into the first- and the second-order particle interactions, depends on the mass of a cosmic body interacting with these particles.

All the bodies in the Universe (to one extent or another) are the sources of the particles and consumers capturing the particles in question. It is interesting to note that, within this gravity mechanism, the attraction between any two proximal bodies that have mass arises as the result of the “repulsion” of these masses by a huge amount of the remote cosmic masses. This amount is huge but ultimate, since any selected point in space has its own “range of interaction”; and any masses outside this range have no effect on this point. Likewise, the trunks and crowns of the trees, though merging into one continuous expanse even in a thin forest, are finite and hide everything that is further along the line of sight. Such gravity mechanism may be implemented subject to infinity of the Universe, both in time and in space (see above). By this, we resolve the Seeliger paradox asserting that: “If we assume that the Universe is infinite and filled with various material bodies in such a way that one can obtain certain average density of substance in the Universe, and if Newton’s law of gravitation is universal, then one can calculate the force of gravitational attraction of all masses in the Universe in any given point. Such calculations were performed by Seeliger, with the result that this force of gravitational attraction is proportional to the radius of the Universe. But the Universe is infinite, and so is its radius. Hence, the force of

gravitational attraction in a given point is infinite. But it is not so. Therefore, Newton's law is not applicable to the entire Universe. Alternately, this law is inaccurate". [3; p. 36].

Based on some simple arguments, one may assume that the majority of particles in the intergalactic space are high-energy particles (in most cases being the "second-order" particles), and the intergalactic space is a place where cosmic bodies "evaporate". While in the "furnaces" of galactic centers, shielded from the high-energy radiation by the outer layers of masses, such processes as protostar birth and the growth of protostellar masses occur, as a result of concentration and condensation of cosmic rays. With the increase in the distance from the galaxy centers, weakening of the "first-order" gravity component, strengthening of the "second-order" gravity component, and increase in the own "intrinsic pressure", the small-sized protostars with large masses start to shape themselves into stellar or (further) planetary systems. [9] Cepheids, pulsars, bursters and any other objects of short-term radiation in the Universe demonstrate the characteristic features of such division.

An interesting question arises, whether "G", the gravitational constant, is actually constant. In fact, within such gravity mechanism, the gravitational (Newtonian) potential will also depend on the location of a cosmic body in the space of the Universe or a galaxy. "There are no categorical reasons to believe that the value of "G" gravitational interaction coefficient in the law of universal gravitation, is totally constant. If we assume the secular variation of "G", then, with the decrease in "G" value, the force of gravity interaction "F" will also decrease, and the masses making up the Earth should decrease in density while increasing in terms of volume. Alongside with cosmological assumptions, the idea of the Earth expansion was developed by geologists Hilgenberg, Edien and Heezen. In case of the Earth expansion, all its layers, including the upper crust layer, undergo various deformations. The inner layers of the Earth, being in a plastic state due to high pressures and temperatures, do not experience any residual stresses and discontinuities at such a slow expansion. The substance undergoes plastic deformation. By contrast, stress accumulation occurs in the outer, crystalline crust, resulting in ruptures that cause crust fractures... Distribution of earthquake epicenters coincides with the location of crust fracture areas... Some quantitative calculations of the Earth expansion in accordance with the secular decrease in the gravitational constant G were performed by D.D. Ivanenko and M.U. Sagitov. These calculations are based on the assumption that initially the Earth's surface was equal to the surface of the continents, i.e. amounted to 38% of the surface of the present-day Earth... the hypothesis of the secular cosmological decrease in the gravitational constant G and the related phenomenon of the Earth's expansion explain the modern surface distribution of the continents and oceans, if we assume the initial existence of the unified continental landmass on the Earth". [3; pp. 141-143]

Stability of radioactive elements seems to be another interesting issue. More specifically: if there is an interdependence between the half-life of the radioactive elements and the gravitational constant (an assumption that seems rather likely), and if the radioactive elements are able to demonstrate more stability in strong gravitational fields, then one should assume that the Earth's rocks may be significantly older than the rock ages calculated by means of the currently accepted half-life periods. Could the substances that are currently stable in a specific area of space become radioactive in the future, or in other area of space, e.g. in intergalactic space? What will happen to a star if the gravitational constant value changes too rapidly? Could this phenomenon result in such phenomenon as supernova outbursts, etc? There are lots of questions giving full scope to researches and investigations.

IX. ON THE MECHANISM OF INERTIAL FORCES

Inertial forces are one of evidences for the above-proposed principle of the most effective interaction between the masses of objects and the slow particles causing gravitational interactions.

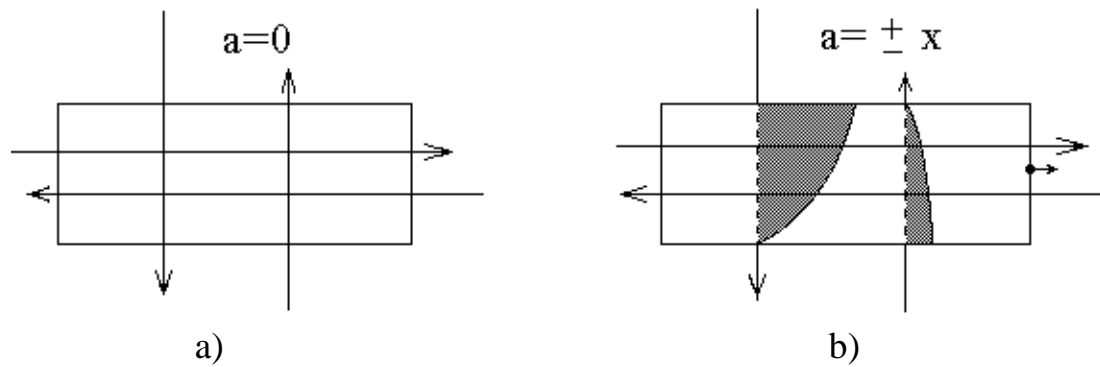


Figure 14.

When a body is in its state of rest (or in uniform motion, which is equivalent to the state of rest), then the tracks of cosmic ray particles penetrating the body are straight (see fig. 14a). If the body accelerates uniformly, then the tracks of particles in the body will curve in a direction opposite to the direction of acceleration (see fig. 14b), i.e. the particles will have a low-speed component of the opposite direction that opposes acceleration. Just as the ship pushes its way through the water while the river ferry that pulls itself along on fixed chains attached to each bank of the river, exhibits resistance to the water flow with its board. The track length and the radius of its curvature proportional to the counterforce will depend on the speed and the direction of travel of the cosmic ray particle. Hence, any particles moving in the opposite directions, in the same directions and at small angles to the direction of acceleration, as well as high-energy particles (those moving upwards, see the figure above) will have less effect. Rotation, another type of accelerated motion, does not contradict to the inertia mechanism under consideration.

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