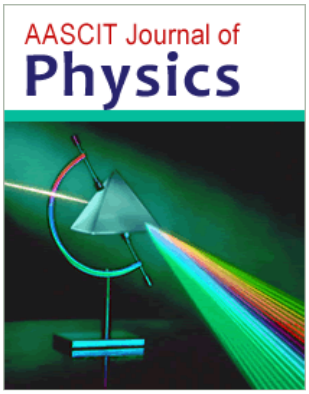
AASCIT Journal of Physics
2015; 1(4): 341-348
Published online August 10, 2015 (http://www.aascit.org/journal/physics)



Keywords
Conservation of Energy,
Expansion of the Universe,
Hubble Constant,
Cosmic Microwave Background (CMB),
Gravitation,
Quantum of Space,
Dark Matter

Received: July 14, 2015
Revised: July 27, 2015
Accepted: July 28, 2015

Physical Laws and a New Discrete Space Concept

A. I. Milanich[1, 2]

[1]A. Prokhorov General Physics Institute of Russian Academy, Tarusa, Russia
[2]Moscow Institute of Physics and Technology (MIPT), Dolgoprudny, Russia

Email address
iphiton@mail.ru

Citation
A. I. Milanich. Physical Laws and a New Discrete Space Concept. *AASCIT Journal of Physics*. Vol. 1, No. 4, 2015, pp. 341-348.

Abstract
In this article some problems in modern physics and cosmology was discussed. The inconsistencies between experimental astrophysical data and basic physical laws are revealed. A new concept of the quantum - discrete space, the defiance in the law of conservation of energy and limited radius of gravitational forces spread are discussed. The alternate sight on a nature of cosmic microwave background (CMB) is offered. The conclusions about a local range of the classical physical laws are made and the reasons for the benefit of is quasi-steady state model of our Universe are represented.

1. Introduction

It seems that it was created a new historical tradition: at the beginning of every century, physics has a conceptual crisis. Its fully concerns to present time, as today based on a new discoveries and new astrophysical data main concepts and principles of physics demand the deep revision. The biggest problem for modern physics is the results of some astronomical experiments arising before the science a number of very difficult questions. Some of these problems and inconsistencies are discussed in this article.

2. Quantum of the Space

The concept of an atom, as a «quantum» of substance, has appeared in antique Greece and Indian philosophy as a result of the abstract reasoning. Approximately, they looked like these: Let us mentally divide some substance in halves, and after then one half again we'll divide by 2 and so on. By dividing, many times we shall come to some limit – named as the atom.

By repeating this procedure for a space, we will come to a concept of the quantum of space as the limit of similar division. According to point of view of quantum mechanics all is quantized and the smaller sizes correspond to larger energies (what about the ancient philosophers did not know). Therefore from any reasons there should be a limit for division of length – minimum of possible distances or quantum of space (fundamental or minimal length etc), and an energy, corresponding to this quantum of space. Let us underline that we'll consider the quantum of the space not as «a rule», but as real existing material substance.

But if we'll try to evaluate a magnitude of this quantum of space, it will appear that physicists have no appropriate theory and even good mathematical tools, because science in implicity proceeds possibility of infinite division of a length. Everything that was made by physics it was a construction from the global constants some value (relations) with dimensionality of a distance, called the Planck length [1]:

$$L_p = (\hbar g/c^3)^{0.5} = 1.6\ 10^{-33}\ \text{см} \quad (1)$$

where c is the speed of light in a vacuum, g is the gravitational constant, and $\hbar$ is the reduced Planck constant.

So small size (10^{-35} m) conflicts to accumulated experience and common sense, as corresponds to very large (Planck) energy of the order ~10^9 J or the Planck mass of ~2 10^{-8} kg [1], though the periodic table of elements (Mendeleev's table) is limited by essentially smaller masses. If such large energy or masses really exist, it will be difficult not see them, but experimental nuclear physics does not register any similar phenomena.

This contradiction was resolved in unexpected manner. The observations of ɣ - sources in Universe sometimes give rather strange results. In September 16 2008 year was observed ɣ - flash (at a distance 10 billions of light years – was estimated by its red shift), and ɣ - rays with energy more than 100 MeV have delayed for 4,5 seconds from the ɣ - rays with energy 20 KeV - 2 MeV [2]. Let's keep without any analysis represented in the same work [2] not quite convincing explanation of this delay and consider an experimental result.

Character of delay corresponds to a concept of normal dispersion in optics (bigger refractive index for more «violet» photons). By assuming existence of dispersion for distribution of photons in vacuum as optical media, it is possible to use a well-known dependence for a refractive index [3]:

$$n^2 = 1 + \text{const}/ (1 - x^2) \qquad (2)$$

where $x = \lambda_0/ \lambda$, λ_0 - is some oscillator's length (i.e. length of quantum of space) and λ – is a wavelength of radiation.

From the value of delay 4,5 s and a distance 10 billions light years we can receive an estimation for $\lambda_0 \sim 10^{-20}$ cm [4] if the constant in the formula (2) not differs from unit too much. Such little sizes for λ_0 do not make another possibility for interpretation λ_0 as the unit of space's quantum structure, because physics does not know any other so small objects. So, this is numerical value for length of space's quantum and it is a good result, because it removes number of old problems (the large Planck energy, «zero» vacuum oscillations, de Broglie waves etc.).

However, proposed concept creates new problems. For example, now speed of light though is maximal, however depends on frequency of photons. Therefore main statement of a special theory of relativity (STR) about the maximalist speed of light requires clarification about the wavelength of a signal (maximum velocity have photons with «zero» frequency) and it is necessary take into account duration of a signal, its spectrum etc. The clarification about the velocity of the signals was published, for example, in article [5] independently to a concept of light dispersion in vacuum represented here.

The concept of the quantum-discrete nature of the space need to supplement by at least four postulates that: 1. a substance and space are interconnected, the substance is an integrated part of space and «boundary» (boundary condition) for its quantums; 2. «rotating» for quantum of spaces is possible and that is a minimal time – a quantum of time; 3. it is possible creation (or «birth») of new quantum of spaces. Probably, the losses (or «death») of quantum also exists, but a rate of creation should exceed a rate of losses for quantums. We will understand later why it is necessary; 4. Quantum of space is really existing object, instead of some «rules» in physics, for example, that the smaller sizes are possible, but it is forbidden etc.

It is similar as to return to early concept about the Cartesian ether, when a certain medium (ether) fills in all space, and the substance is a certain modification of ether. However, without division of substances on a light, ground etc. By the way, in modern models of loop quantum gravity was used a unity of space and substance too.

Let's name this «construction» of space the discrete model. Thus, the space (vacuum) consists from array of fixed size quantums of spaces wich are «touching» one another or a substance. In such space any atoms, the photons etc. are only «dislocations» and heterogeneities among the quantums.

In this discrete space model, the movement of any matter (not only photons) is impossible «outside» the space; many physical parameters (for example, matter wave) receive a «geometrical» sense here etc. But it is not classical ether, because it is impossible a penetration of an ether in a substance. Now space and substance (energy) are strictly interconnected and ether is not only some medium for propagation of photons. Because quantum of space with the listed properties is only the working hypothesis we shall not go deep into its properties without enough experimental results. Therefore, it is no reasons for detailing nature or construction of space's quantum, or to describe a full list of laws for boundary conditions.

Let's only say, that the represented quantum approach allow assuming existence of certain proportion between numbers of space's quantums in the Universe and denseness of matter (i.e. number of «dislocations»). It is similarity to usual crystals where impossible to make big ideal crystals without any dislocations.

Also the proposed model of discrete space possible to explain: a transmutation of particles and energy, wave–particle duality, Heisenberg's uncertainty principle, annihilation, mechanical movement with a constant velocity etc. So, the movement of any material objects in such space corresponds to coordinated modification of space's structure near to object's atoms and the laws of kinematics obtain some «geometrical» sense too. Now in Zeno's paradoxes we understand in what differs a fixed arrow from the same flying arrow (difference is in a structure of space surrounding arrows). But the main result is that it is possible to measure a distance in absolute values now simply counting to an amount of quantums between points.

The model of discrete spaces has experimentally observable conclusions, namely, the upper limit for energy of ɣ - rays (ɣ – photons). Hence 1: *Photon's energy can not exceed ~ 0, 5-1 PeV (~ 10^{15} eV)* and it is possible to check up. So, the photons of bigger energy are impossible in nature as

the photon consists from several space's quantums (photon has different properties and one quantum can not supply a different polarization and other). Let us underline, that modern physics have no similar restriction for a radiation, but it does not worse to search ɣ - rays with energy 100 PeV as proposed in article [6].

3. Expanding Universe and Lunar Laser Ranging

Still recently, it was possible to explain the Hubble's law (extension of the Universe) not only by deleting of stars and galaxies from us, but for example, by «tired light» [7] when the part of photon's energy loses at its long way in a space. An opinion exist that Hubble supposed such treatment of the red shift. But decisive argument for a point of view of expansion of the Universe were experiments on direct measurements of Hubble's constant by methods Lunar laser ranging (Moon deleting on 3,8 cm per year) and good coincidence of the constant 96,6 kms/s/Mpc (based on laser's results) [8] with conventional today value 67 kms/s/Mpc.

From the experimenter point of view the Moon is the most ideal object for laser ranging, because an influence of a solar wind reduced by a huge mass of the Moon and its periodic movement both on and against the direction of the solar wind. In addition, the Moon has not own magnetic field, one side is constantly turned to the Earth by it and so on. It is important to underline too, that for lunar ranging there are no number of traditional sources of experimental errors, for example, red shift in gravitational fields [9] or usual Doppler shift.

By the way, about deleting of the Moon was known many years ago based on results of long-term astronomical observations and this deleting have determined more precisely - 3,82 $\pm$ 0,07 cm/years [10]. However, before now a phenomenon of deleting of the Moon explained by «tidal acceleration», though such explanation is doubtful, has an essentially qualitative character, and cannot be confirmed by authentic calculations. For example, this model neglects influence of continents of America and Africa on movement ocean's waves, but assumes some «displacement» (adjustment element) for maximum of tidal waves, what is impossible to calculate or even to evaluate. Really, the explanation of deleting of the Moon by tidal acceleration is primary based on conservation laws, as well as many years ago the diminution in time of Hubble's constant [11] in Friedmann's model of Universe was necessary for conservation of energy.

Unfortunately, today there is no possibility to compare results for laser ranging the Moon with any other space objects. For example, the expected increase in average radius of the Earth orbit with the same Hubble constant will be approximately 10-15 m per year what corresponds to lengthening of duration the year on 2-3 ms. But the Earth and the Sun are forming much more complicated orbital movement [12]. Besides the Sun and the Earth have there own magnetic fields, on Earth's orbit is influenced other planets, for example, Jove etc. As a result the Earth's orbit in a solar system have significant oscillations (experiments fixes changes in the Earth's orbit up to hundreds km) and hence it is difficult to divide influence of various factors on duration of Earth's year and even to evaluate reliability of different experimental results.

Probably it is necessary take into account additional modification of space's structure in gravitational fields of the Sun, because the gravitational lenses are observed in space and the gravitational distortion of local space properties can influence on a local velocity of the Universe expanding. Lunar laser ranging happens in gravitational field, instead of absolutely blank space and it may change the Hubble constant, but this supposition requires experimental checking.

To remove these problems and to receive biunique answers we require new, direct experiments with special satellites, or super precise measurements of distances, for example, between the Earth and Mars or other space objects.

4. Crisis in Physics and Expanding Universe

By accepting the fact of expanding our Universe, it is necessary to accept that all modern cosmological models are extremely mathematical models and in its background have no reliable experiments, except the fact of Universe expansion. Moreover, it is impossible to consider physically as authentic a carried out outcome an extrapolation of results the mathematical model on 13,7 billions years ago up to a moment of «big bang» both with «research» ns and seconds after blast moment. Furthermore, the theory of big bang is not the unique cosmological theory. The quasi-steady state model of expanding Universe [13] with continuously created matter deserves attention and though it is not ideal (because it includes a number of results not supported by experiments), but logically and sequentially explains majority of the cosmological phenomena (a cosmic microwave background radiation too).

Let us no compare or evaluate reliability and validity of different cosmological models, but based on an example of «dark matter» we will show some common problems in modern cosmology. For example, when someone say that the dark matter is necessary for explanation the movement of galaxies caused by a deficit of gravitational forces or for explanation of movement the photons in space (for gravitational lens). I can object: probably, other physical laws [14] or other models you need instead of a dark matter. Not quite correctly and thoughtlessly, to distribute the gravitational laws valid inside a solar system on essentially large scales.

Accounting of a gravitational lens [15] disregarding distributions (which we do not know) of interstellar gases (located near to galaxies), cause a doupt. The inhomogeneous gas lens or halo effect better explains existence of several repeating images, than the more homogeneous gravitational lens. Probable, in a real life both phenomena of lenses take

place. Therefore, it is impossible exactly to consider unequivocal correspondence of lens's effect with a gravitation lens only and with dark matter.

In earliest articles [16] a fast rotation of stars on a periphery of galaxies was explained as a discordance of an observable mass to Kepler orbits and was said about necessity updating Newton's gravitational laws [17] and only. For example, by changing a mass distribution or by adding invisible dust and gas it is possible to correct any movement. Also it is necessary take into account a phenomenon of expansion of the Universe that did not make in the old models.

In addition, it is not attract an attention today to a fact, that a dark matter concept assumes existence of certain hypothetical particles (WIMPs), but its existence contradicts to classical concepts of nuclear physics [14] and it is something like a «caloric» theory for 21 centuries. Something not detectable «exists» and was used, as caloric used for constructing of thermal machines before. Therefore, there are no reasons to refuse the nuclear physics (confirmed by numerous experiments) in favor to something experimentally not detected yet. Fortunately, such point of view begins to find more and more support now.

What we know exactly, what is confirmed by experiment and does not cause doupts? By discarding different cosmological models and by returning to «ground», it is possible to approve in a first approximation that all objects in Universe are deleted from each other with a velocity v (km/s)) proportional to a distance D (in Mpc - megaparsecs) between objects, with isotropic factor H, where H names the Hubble's constant:

$$v = HD \tag{3}$$

Within the framework of the concept of the quantum structure of the space, increased distance simply means increasing number of quantums. Therefore, in the Universe spontaneously generated new space's quantum with a probability proportional to their total number (hence volume). Under what conditions, why and how the creation (or loss) of quantums were happen - we do not know and consequently not discuss. May be the probability of creation is proportional to a density of matter, instead of a volume (denseness and volume are indirectly incorporated).

It is impossible to recognize valid the supposition of Friedmann model that a substance homogeneously filled in the Universe [11], because experimentally observed sharp localization of masses in galaxies and stars. Therefore, it is difficult to consider as correct an approximation of a homogeneous mass distribution in the Universe already on scales of a galaxy.

By deciding the equation (3) with an initial velocity, v_o we shall receive a solution for R from time t with fixed Hubble's constant:

$$R = R_o\exp(Ht) + v_o t \tag{4}$$

It means, that the Universe is exponentially expands in time with a growing velocity (correspondence to dark energy) and it have confirmed by the last experiments. Formally, the solution (4) was obtained with negligible gravitational interaction and in former cosmological models corresponds to a small density of substance.

The solution (4) has a property of an additivity for R, i.e. the law of the expansion is correct for $R = R_1 + R_2$ and other useful properties, but for physics this law is the catastrophe, because has disappeared a time invariance and was changed some symmetries!

So, it is well known that according to the Emmy Noether theorem [18] «homogeneities» in time correspond to a law of conservation of energy. But, in expanding Universe the velocity will increase by itself, the impulse is not saved, as the moment [19] is not saved too! Moreover, the concept of numerous Newton's inertial frame of reference has disappeared! All frames of reference connected to material objects move from each other let with small, but an acceleration. Therefore, all our physical laws are correct only on small distances, where it is possible to neglect the contribution of the expansion of our Universe! Hence 2: So, *the physical laws have a local character* now and are executed as more precise, as a region of space is less! In next parts, we shall evaluate an «error» for a conservation of energy law.

It is strangely enough, but the existence of special an observational frame of reference is already an experimental fact. An observational frame of reference «was attached» to cosmic microwave background.

Let us evaluate how the law of conservation of energy infringed for deleting Moon. From a an attraction force F between the Moon and the Earth and displacement ~ 3.8 cm per year (T - time) by substituting well known value for an average gravitational force between them, we shall receive an evaluation for a power W = Fa/T ~ 120-240 GW [19]. There are indicated the lower and upper values: minimum - 120 GW corresponds to approximation of conservation of angular momentum, maximum - 240 GW without this conservation. In real life it has an intermediate case and the conservation laws are infringed, but partially. When accuracy in lunar laser ranging will be several millimeters, we will may experimentally see this proportion.

This value of power is comparable with consumption electricity by Russia and it necessary to compare with tidal's power. However, before clarifications of the Earth model is necessary to do.

The Earth has a complicated structure (the crust of the Earth, the mantle and the Earth's core), but tidal acceleration having immediately influence only on movable terrestrial crust and acts slowing down rotations of not all Earth (other factors periodically cause acceleration of rotation), but namely its crust. Let us underline that it is impossible to explain experimentally observable acceleration in rotation of terrestrial crust [20] by tidal effects. Moreover, within the framework of conservation laws, the acceleration of rotation of the Earth up to the same duration of a day should corresponds to decrease a distance between the Moon and the

Earth exactly on the same several centimeters, but it does not observe. Therefore, such acceleration in rotation of the Earth is additional argument for separate movement of the crust of the Earth in respect to the mantle and the Earth's core

So, for estimations let us separate movement of solid Earth's crust and «liquid» mantle etc. The transfer of impulse and energy from Earth's crust to Earth's mantle and core is longer, «viscous» process and it is possible to neglect this. Therefore, we shall consider that tidal waves influence only on the crust, when Earth's mantle and core save there steady parameters of rotation in period of hundreds years.

The significant part of tidal energy passes in thermal energy because of friction, but the part of energy can be transmitted to the Moon, as to a subsystem connected by internal forces. Let us evaluate losses of a tidal power based on slowing down of terrestrial crust rotation. In internet it is possible to find: a mass terrestrial crust M - 0,473 % from mass of the Earth or 2,8 10^{22} kg, radius of the Earth $\simeq$ 6371 km, and frequency of rotation the Earth ω is easy to calculate. We know that in 100 years period the duration of day is increased on about 1,7 ms [21] and it is possible to calculate Δω. Then dissipation of tidal power $W = 2/3\ MR^2\omega\Delta\omega/T \simeq$ 25 GW, that is on the order less than was required to be main process in deleting of the Moon.

It is a strong argument for the defiance the law of conservation of energy and defects in tidal acceleration model, even if we were mistaken in an estimation of dissipation power of tidal energy in 2-3 times. Despite it is ever possible to offer other model or substitute a total mass of the Earth, but even without phenomena of periodic Earth's rotation accelerations (of the terrestrial crust), it is equivalent to the statement about identity rotation for fresh and hard eggs.

Therefore, it is possible to assume that the expansion of the Universe is the main mechanism for deleting of the Moon with smaller contribution of tidal acceleration and the energy conservation law is really defaulted in our expanding Universe. If from a full power 120 GW to deduct the contribution of the tidal power ~ 25 GW, our estimations for the Hubble constant will decrease proportionally to a value ~ 75 km/s/Mpc. So, we can estimate an above discussed proportion as less than ~ 20% deposit of tidal acceleration in deleting of the Moon.

Violation of conservation laws is a serious problem for physics. At once arises a problem of applicability of the Hubble law to the space filled with a matter in a solid phase. Despite there are publications about «extension» of the Earth [22], the explanation of this extension of the Earth exclusively by Hubble's expansion is not correct because of a permanent stream to the Earth a matter from nearly cosmos. But nevertheless, if the extension is applicable and for volumes with matter, it is a serious argument for the benefit of a quasi-steady state model of the Universe [13], but due to the increased problem with energy conservation law!

By assuming, that all material objects «expand» too, but due to creation of additional mass with the same Hubble's constant, we shall receive a condition for a constant average density in the Universe:

$$dm/dt = m3H \tag{5}$$

Except a mass m placed in some volume, former labels are used here.

It is important to underline, that we nothing know about the volume (inside or at some distance) where was created the additional matter, but under the formula (5) is easy to calculate, that one ton of matter generates more than 600 W power, as permanently created atoms (near the main mass) and additional space. Most likely, the process of creation additional matter happens with essentially smaller Hubble's constant and dependent on a substance density, because apart from of new atoms should be created and a new space.

On scales of the Universe for a fixed average density ~ 3 10^{-31} g/cm^3 it is necessary the creation of only one additional atom of hydrogen in one cubic kilometer per 25 years! In parallel to creation of hydrogen, atoms with smaller probability can be created and other atoms: a deuterium, tritium (it begin to decay immediately), helium, lithium etc. and it is beginning of nuclear synthesis line. Because of all processes creation, synthesis and decay of different atoms, we receive the real chemical structure of our Universe today. Under condition of a constant average density of the Universe for each created nucleon at the same time was created about 5.5 m^3 of new space! Additional 5.5 m^3 volume – means enlarging of a kilometer edge of a cube less than on 2 microns per 25 years. Such Universe can ever expand with the mass and density constant in time. Let us repeat that condition of steady state at all not mandatory. The density of substance under of some conditions (yet unknown for us) could be locally increased or to decrease.

Something similar was proposed in [13] for quasi-steady state expanding Universe, but the obvious violation of the law conservation of energy has become for this model main contradiction and its end. Because the energy is not saved now, the quasi-steady state model [13] is possible again!

5. Gravitational Radius

The physicist-theorists knew the contradiction with a law of conservation of energy in expanding Universe for a long time [23] and they «easy» overcome it by simply changing equations. If to remain within the concepts of classical physics, it is necessary to recognize violation of different laws of conservation and not just energy. From a point of view in no inertial frames of reference, it is necessary to recognize the presence in the Universe of external forces proportional to a distance and acting on all objects (derivative from a velocity multiplied on its mass m):

$$F = m\,H^2R_o\exp(Ht) \tag{6}$$

By adding Newton's gravitational forces in equation (6) from point of classical view it is possible to estimate the maximal radius Rg for action of gravitational forces:

$$Rg = (gM/H^2)^{1/3} \tag{7}$$

where g - gravitational constant, and M - mass of a gravity centre.

The condition (7) corresponds to a twice more density in a comparison with a critical density of Friedmann's model [11], but now for inhomogeneous mass distribution! For distances more than radius Rg it is possible to neglect by the contribution of the gravitation.

By substituting parameters of the Sun for M, we shall receive it a gravitational radius Rg ~ 300 light years. On scales of the Universe, this is not too large distance, but it is a new idea that the radius of gravitational action is final now. At far distances we can neglect by attraction and gravitation has no more «integrate» all objects in the Universe at any distances. Hence 3: *The Universe has broken up* into the separate local areas fastened by gravitation, but mass in one region nothing «know» about masses in other far regions.

By applying the formula (7) for galaxy Milky Way we shall receive, that placed in its centre the black hole with a mass of 4.3 million masses of the Sun [24] restricts a radius of our galaxy by about 50 thousands of light years and it is perfectly coincides with an actual size of our galaxy. It is possible to assume that exactly the same effect restricts sizes and other galaxies too and their further growth. Probably, similar principles are forming spiral arm of galaxies etc.

Therefore, the formula (7) allows effectively «to weigh» gravity centers of different galaxies (proceeding from their sizes). It is only estimation and the actual mass distribution on the galaxy disk can slightly change numerical results, but the general concept saved.

6. Clarification of the Universe Model

Following trouble for physics cause by the fact that for expanding Universe at some distance R_u the velocity of coast away galaxies at some moment will be equal and after will overcome the speed of light. It is an event horizon and corresponds to:

$$c = R_u H \tag{8}$$

Most interesting is a fact that near event horizon the space (ether) also move near the light speed, so there are no relativistic effects here!

If R_u to measure in light years, than the distance R_u numerically will coincide with Hubble time equal T = 1/H (because the Hubble constant H has dimension of inverse time). In addition, the Hubble time by order of magnitude corresponds to the age of our Universe in all cosmological models (except quasi-steady state), but it is no more a time and it is a size in light years now.

Let us name R_u - as radius of Universe. It is important to underline, that even on an edge of the Universe (at event horizon), the maximum acceleration for our not inertial reference frame is equal cH and it is only $7*10^{-10}$ m/s^2. So small acceleration seemed cannot anything change, but this acceleration acts on huge masses and all physics should take into account these new realities.

The exceeding of speed of light is possible, for example, in inflation cosmological model, but only in the first moment after big bang. The observed by the astronomers exceeding the speed of light by some objects, it is the fact confirmed by many astronomical observations today. The messages about space objects moving with velocities more than the speed of light appear from time to time and even have an explanation [1]. These explanations always reduced to effect of screen (or light echo) and ever consist in that we are so lucky that at appropriate place some screen of special shape creates illusion of superlight movement after a flash. In all similar cases, it is not accepted to prove existence of such screens.

So, the phenomenon of V838 Monocerotis enclosed by red fog known. The star places from us at a distance 20 thousand light years. In January 2002 a powerful flash was fixed and a dust round a star has become to extend rapidly [25]. In 2004 by a space, telescope Hubble it was measured that over 2 years the radius of a fog was increased to 5 light years

Not to do «harm» to relativistic physics this effect of superlight velocity was explained by certain screen created by dust and it was illuminated by flash from a blast on ray's path from a star to the Earth. By the way, this screen should have the parabolic form and to be so successful located and oriented, that we see the spherical extension of a cloud! Next questions arise: Why screens of such inconceivable form are located and oriented so successful, that we see about linear velocity corresponding to the first Newton law. What is a probability of casual formation such a screen? What is the evidence for this screen existence? There is no answer…

The phenomenon of V838 Mon. more logically and simply explained by the theory of Universe quasi-steady state with creation of matter [13]. This theory has predicted local big bangs in different points at different moments of time. Hence, it is batter to apply the Hoyle etc. theory [13] than the theory of screens (light echo). In addition, it will be necessary to agree with a fact of ***l***ocal character of the Universe expansion and distinction of Hubble's constants in different points of Universe at different time, as the possibility of superlight velocities for extension of spaces in «blasts».

As defects of Hoyle's theory it is possible to indicate extremely detail description for creation of matter caused of Planck particle decay (such particle and its decay experimentally never observed), and other excessive detailing. Now the concept of the quasi-steady state of Universe deserves attention, because there is no the conservation of energy law and the main argument against the Hoyle theory has disappeared.

Therefore, it is necessary to assume that not only the quantums of space, but also the matter permanently created in the Universe. As a result new gas clouds will be created; flashing new stars etc. and all these processes were repeated again and again.

7. New Point of View on the Cosmic Microwave Background

What happens on distances more radius of the Universe?

On a distance R_u where the event horizon was formed, all stars and galaxies disappear for us because the photon cannot come to us. Thus, the cosmological picture of the world radically changes. The stars and galaxies constantly and exponentially run from us with an increasing velocity. As soon as their velocity exceeds the speed of light, they overcome event horizon and we cannot see them more. Hence 4: It means that *event horizon is local* too, and from another places you can see invisible for us stars and galaxies.

According to modern concept the Hubble's constant does not depend on a direction and the size (age) of the Universe is about identical in any directions. As a result, we always are placed near to «centre» of the expanding Universe (we are near the centre of an observational frame of reference) and that corresponds to a high degree of homogeneity for cosmic microwave background.

In proposed here quasi-steady state Universe model the cosmic microwave background corresponds to transition of stars and galaxies through event horizon and converting radiation in a microwave range due to Doppler shift near to speed of light. As well know, a characteristic velocity of galaxies in an observational frame of reference is by order ~100 km/s and average temperature of star is about 10^4 ^oK degrees. Therefore, it is possible based on Doppler formula to estimate a microwave background temperature for stars overcoming the event horizon. It is ~3^o K and it well coincides to temperature of cosmic microwave background $2{,}7^o$ K.

In any way, the given supposition requires experimental checking and it can be checked up. It is known, that about 10% of galaxies moves in direction to us with a velocities exceeding an effect of expansion of the Universe and we see not a red but violet shift. If in a cosmic microwave background will appear new object (galaxy or rest of super nova «jump» to us over the event horizon) or the former objects will disappear, it possible to consider as evidence for proposed model. Hence 5: There *should be a local modification of a microwave noise when a local point with higher* (it is impossible in the Big Bang theory) *or lower temperature changes* with a temporary scale tens years or century. The usual modification of a cosmic microwave background map will happen in large times 100 thousand - 1 million years (it is an average size of galaxy in light years and also is a characteristic time for overcoming event horizon).

Other, faster anomalies of a cosmic microwave background in an acoustic range investigated today. In any case, the study of anomalies in cosmic microwave background comes on a new level [26] now and the new surprises are waiting us.

It is possible to compare maps of cosmic microwave background simultaneously and from two different points were placed on significant distances (map should be slightly differ), but it is even more complicated for realization experiment in next few centuries.

8. Discussion and Conclusion

Let us summarize. The new model of discrete Universe is proposed and some tentative estimation were executed. So, for the first time was estimated length of space quantum. The critical points of view on existing models of the Universe, on dark matter and concept of tidal acceleration of the Moon was represented. We do not need the Big Bang theory more and can propose alternative model of descrete Universe for explanation all facts. In any cases in expanding Universe: physical laws and gravitational forces are local, expanding cause violation of conservation laws, new concept of discrete space with creation of matter and space can explain cosmic microwave background etc. Probably, it is necessity adjustment of some base principal in modern physics and not basic like a dark matter. And in any cases main statements of a special theory of relativity (STR) need correction. To confirm or to refute the concept of discrete spaces some astrophysical experiments are proposed.

Certainly, the new precise experiments and new astronomical observations are required. Fortunately, humankind has rather high-power of tools today for this purpose and already huge number of inconvenient questions was stored. Therefore, it is time for physicists to search the answers. I hope that unbiased analysis of astrophysical data will give us new conclusions and occasion to muse about the justice of existing cosmological models and area of applicability of the base physical concepts and laws.

I do not assert that all in this article is an absolute true, but I call to search the experimantal answers. I am sure, that extremely mathematical approach threatens to physics with it transition in a category of scientific fiction.

Acknowledgments

I would like to express many thanks to scientists of A. Prokhorov General Physics Institute of Russian Academy and MIPT and first of all to V.G. Mikhalevich, D. Yu. Tsipenyuk, A.V. Maksimychev, V.G. Zhotikov and other scientists for useful discussions and support.

References

[1] S.G. Rubin *The system of our Universe* (Fryazino.: Vek 2, 2006).

[2] S. Razzaqu, C.D. Dermer, J.D. Finke *Delayed GeV Emission from Ultra-High Energy Cosmic Ray Acceleration and Radiation in GRB 080916C* in: Proceeding of the 31st ICRC, (ŁODZ, 2009) p. 1-4.

[3] D.V. Sivulhin *Optics v.4* (Moscow: Fizmatlit, 2005) p. 550

[4] A.I. Milanich *Quantum of Space* in: Proceeding of the 56st Scientific conference, section general and applied physics, (Moscow – Dolgoprudny - Zhukovsky, 2013) p. 115

[5] Yu. L. Ratis *Dispersion and Absorption of Electromagnetic Waves in Physical Vacuum* Computer's Optics: т. 31, №3, 93-104 (2007).

[6] N. Gupta *PeV Gamma Rays from Interactions of Ultra High Energy Cosmic Rays in the Milky Way* arXiv: 1110.5257, v.1 24 Oct. 2011

[7] Ya. B. Zeldovich, I.D. Novikov *Whether Explanation of Red Shift by Extension of the Universe is Unequivocal? A Structure and Evolution of the Universe* (M.: Nauka, 1975).

[8] A.I. Milanich *Direct Measurement of Hubble Constant from a Distance to the Moon*, Applied Physics and Mathematics: №1, 26-28 (2014).

[9] D. Sanwal, G. G. Pavlov, V. E. Zavlin, & M. A.Teter *Discovery of Absorption Features in the X-Ray Spectrum of an Isolated Neutron Star* Astrophys. J.: v.574, 61-64 (2002).

[10] A. Dove, S. Robbins, C. Wallace *The Lunar Orbit Throughout Time and Space* in: ASTR 5835 - Planetary Seminar, September, p. 79 (2005).

[11] Ya. B. Zeldovich, *Theory of Expanding Universe Created by A.A. Fridman* UFN: v. 130, №3, 357-390 (1963).

[12] V. Dehant *On the nutations of a more realistic earth model* Geophys, J. Int.: v. 100, 477-483 (1990).

[13] F. Hoyle, G. Burbidge, J.V. Narlikar *A Quasi-Steady State Cosmological Model with Creation of Matter* The Astrophysical Journal : 410, 437-457 (1993).

[14] Salvatore Capozziello, Tiberiu Harko, Tomi S. Koivisto, Francisco S.N. Lobo, Gonzalo J. Olmo *Galactic Rotation Curves in Hybrid Metric-Palatini Gravity* Astroparticle Physics : 50-52, p. 65–75, (2013).

[15] Patrick L. Kelly, Steven A. Rodney, Tommaso Treu, Ryan J. Foley, Gabriel Brammer, Kasper B. Schmidt, Adi Zitrin, Alessandro Sonnenfeld, Louis-Gregory Strolger, Or Graur, Alexei V. Filippenko, Saurabh W. Jha, Adam G. Riess, Marusa Bradac, Benjamin J. Weiner, Daniel Scolnic, Matthew A. Malkan, Anja von der Linden, Michele Trenti, Jens Hjorth, Raphael Gavazzi, Adriano Fontana, Julian Merten7, Curtis McCully, Tucker Jones, Marc Postman, Alan Dressler, Brandon Patel, S. Bradley Cenko, Melissa L. Graham, and Bradley E. Tucker *Multiple Images of a Highly Magnified Supernova Formed by an Early-Type Cluster Galaxy Lens* arXiv:1411.6009 v2, 24. Nov - 2014

[16] F. Zwicky *Die Rotverschiebung von extragalaktischen Nebeln* Helvetica Physica Acta : v.6, p. 110–127 (1933).

[17] M. Milgrom, *A Modification of the Newtonian Dynamics as a Possible Alternative to thr Hidden Mass Hypothesis* The Astrophysical Journal: 270, p. 365-370 (1983).

[18] Emmy Noether, *Invariant Variation Problems* arXiv: physics/0503066v1 8 Mar - 2005

[19] A.I. Milanich *Expanding Universe and Physical Laws* in: Proceeding of the 57st Scientific conference, section general and applied physics, (Moscow – Dolgoprudny - Zhukovsky, 2014) p. 110

[20] Lambeck K. *The Earth's Variable Rotation: Geophysical Causes and Consequences*. – Cambridge: Cambridge University Press, p.79 (1980).

[21] F.R. Stephenson, L.V. Morrison *Long-term fluctuations in the Earth's rotation: 700 BC to AD 1990* (London: Phil. Trans. Royal Soc. Ser.A, 2012), p.165.

[22] W-B. Shen, R. Sun, W. Chen, Zh. Zhang, J. Li, J. Han, H. Ding, *The expanding Earth at present: evidence from temporal gravity fieldand space-geodetic data* Annals of Geophysics: 54, 4, p. 436-453 (2011).

[23] N.V. Mitskevich *Physical Fields in General Theory of Relativity* (M: Nauka, 1969).

[24] S. Gillessen, F. Eisenhauer, S. Trippe, T. Alexander, R. Genzel, F. Martins, T. Ott *Monitoring Stellar Orbits Around the Massive Black Holes in the Galactic Center* arXiv: 0810.4674 v1, 26 Oct 2008.

[25] W.B. Sparks, H.E. Bond, M. Cracraft, Z. Levay, L. A. Crause, M.A. Dopita, A.A. Henden, U. Munari, N. Panagia, Sumner G. Starrfield, B.E. Sugerman, R.M. Wagner, R.L. White *V838 Monocerotis: A Geometric Distance from Hubble Space Telescope Polarimetric Imaging of its Light Echo* arXiv: 0711.1495 v2, 13 Nov 2007

[26] G. D. Fleishman, Q. J. Fu, G.-L. Huang, V. F. Melnikov, M. Wang *Discovery of unusual large group delay in microwave millisecond oscillating events* A&A : 385, p. 671-685 (2002).