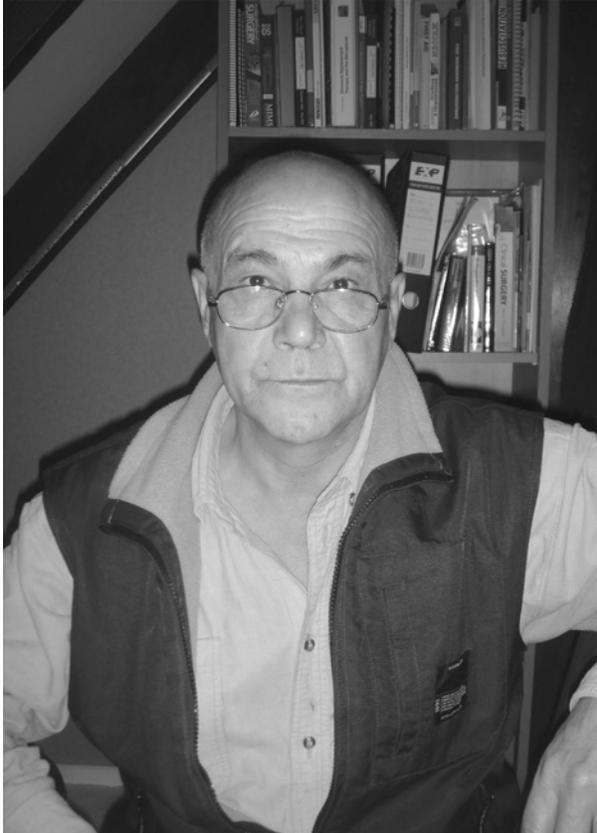


RUSTAM M. ARSLANOV

The Gravitational–quantum
theory of the Universe





**Rustam Makhmudovich Arslanov, 1955. PhD.
Honored with “Inventor of the USSR” medal.
Married with two daughters. Living in New Zealand.
Email: rustam.arslanov@gmail.com**

**I dedicate this book
to my wife Sara
and my daughters
Adilya and Aliya**

**The Gravitational – quantum theory
of the Universe**

Rustam M. Arslanov

Christchurch • New Zealand

2007

**First published June 2007
Copyright © Rustam M. Arslanov 2007**

ISBN 978-0-473-12366-6

This book is copyright © 2007. All rights reserved.

**Cover design by Sue Elliott
The Caxton Press**

**Printed by The Caxton Press
113 Victoria Street
PO Box 25088
Christchurch, New Zealand
Print.design@caxton.co.nz**

Dear Dr.Arslanov,

Thanks for sending me your reprint on “The Gravitational-quantum theory of the Universe”. Your ideas are certainly imaginative and interesting. It looks like you have put a lot of work into it.

Best of luck,

Barry Parker

Author of “Einstein’s Dream” and several other books on science

Contents

Preface	7
Part 1. The Universe	
Section 1.1. General	8
Section 1.2. Reduction of the internal sphere of the Universe	10
Section 1.3. The Big Bang	11
Section 1.4. The structure of the Universe	13
Part 2. Foundation of the theory	
Section 2.1. Space and Time	14
Section 2.2. Ultimate singularity and Big Bang	17
Section 2.3. Photons of space and substance, photons of radiation, electromagnetic wave of space of the Universe	21
Section 2.4. Speed, time, Planck's constant and the structural unit of the matter of the Universe	29
Section 2.5. Newton's law of gravity, the law of conservation of energy, Einstein's principle of equivalence of mass and energy and the Quantum theory	31
Conclusion	33
Appendix	34
References	35

Preface

The researches of the last years showed the following:

- I. Accumulations of galaxies move away from the centre of the Universe with acceleration

- II. The Universe consists of three forms of matter:
 1. Ordinary visible matter of the stars and planets - 4%
 2. Dark matter - 23%
 3. Dark energy - 73%

It is known that dark energy is situated on the periphery of the Universe and assures the Universe expands with acceleration.

Reference:

'Sharp new portrait of the infant Universe'. 11 February 2003. New Scientist.com news service (<http://www.newscientist.com/news/news.jsp?id=ns99993375>).

At the present time there is no a Unified theory of the Universe.

In relation to this I propose the Gravitational - quantum theory of the Universe, which seems to meet the requirements for a Unified theory of the Universe.

Theory for the first time:

1. Represents the new vision of the Universe's structure.
2. Defines: Ultimate singularity and Big Bang, space formation and space structure. Time.
3. Defines: photon of space and substance, photons of radiation and Electromagnetic wave of space of the Universe.
4. Unites: Newton's law of gravity, Einstein's principle of equivalence of mass and energy and Quantum theory.
5. Explains the phenomenon of independence speed of light from speed of light's source.

The theory is in accordance with: Newton's law of gravity, the law of conservation of energy, the principle of equivalence of mass and energy Einstein's theory of relativity and meets de Broglie's conception of wave-particle duality.

Rustam M. Arslanov

18 of March 2004

Part 1. The Universe.

Section 1.1. General

At the present time the Universe consists of two masses of matter in two spheroid shapes, where one of them is located inside another.

The proportion of the masses is approximately 27% and 73% (Fig.1).

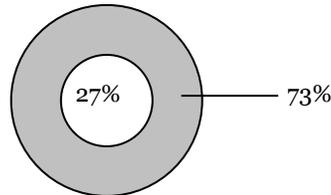


Fig.1

The internal sphere contains the ordinary visible matter (substance) and so called “dark matter”.

The external sphere is so called “dark energy”, which has an enormous mass and density (energy).

The matter of the internal sphere of the Universe is scattered into pieces, whereas the mass of the external sphere is single whole and monolith.

Amongst the material structures of the internal sphere of the Universe takes place the gravitational force according to Newton’s law of gravity.

Amongst the matter of the external sphere “dark energy” and the material structures of the internal sphere of the Universe, also takes place the gravitational force accordingly to the Newton’s law of gravity.

Thus the material structures of the internal sphere of the Universe experience on the themselves two gravitational coercions – internal and external (Fig.2).

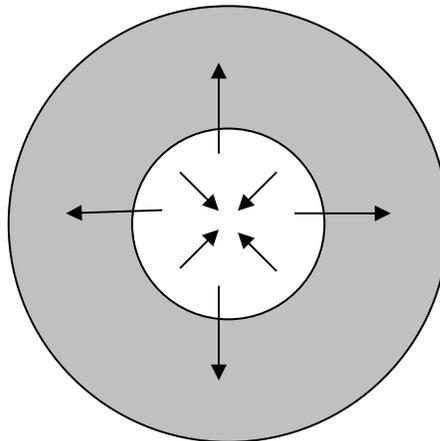


Fig.2

Since the mass of the matter of the external sphere is 73 % of the total mass of the Universe and the mass of the matter of the internal sphere is only 27%, then the gravitational force acting from the matter of the external sphere of the Universe is more than the summary internal forces of gravitational interaction of the material structures of the internal sphere of the Universe.

In accordance with the above, the matter of the external sphere of the Universe attracts to itself the material structures of the internal sphere, absorbs them, increasing by that its own mass and density (energy).

The gravitational force coming from the side of the external sphere of the Universe is constantly increasing.

The material structures of the internal sphere of the Universe move away from the centre of the internal sphere with acceleration. This creates the false impression that the internal sphere of the Universe is expanding.

In reality the material structures of the internal sphere are absorbed and the internal sphere of the Universe reduces with the decreasing of the mass and energy of the matter contained in it.

At the same time, the mass and density (energy) of the matter of the external sphere of the Universe is increasing and filling up the space released during the reduction of the internal sphere of the Universe.

Both these processes occur simultaneously.

Thus the internal sphere of the Universe is not expanding but reducing or more correctly being absorbed by the matter of the external sphere of the Universe.

At that moment, when the last particle of the matter of the internal sphere of the Universe will be absorbed by the matter of the external sphere, the Big Bang will occur and once again the internal sphere of the Universe will be formed and the formation process of the material structures inside it starts again (Fig.3). Everything begins at the beginning.

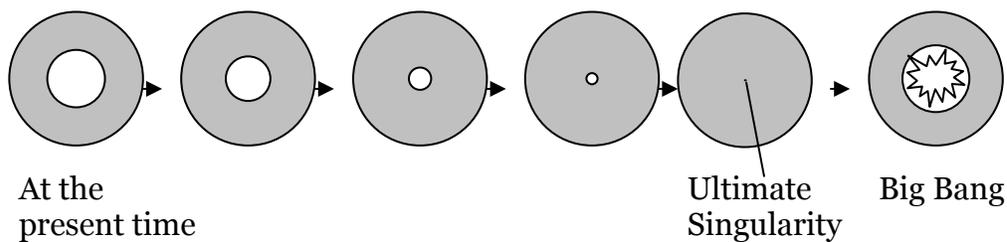


Fig.3

From stated above comes, that the part of the Universe where the ordinary visible matter is located (stars, planets, etc.) and where we live, is a sphere inside the enormous spheroid mass of invisible matter.

Section 1.2. Reduction of the internal sphere of the Universe

The material structures of the internal sphere of the Universe under the influence of the gravitational force of the matter of the external sphere of the Universe move towards the external sphere with acceleration. The density of the objects increases.

When there is a huge speed, the disintegration of the substance begins. As soon as speed accelerates the substance disintegrates sequentially into atoms, the atomic nuclei, elementary particles.

When their speed reaches the velocity of light, everything is transformed into photons. Photons are absorbed by the matter of the external sphere of the Universe.

It is necessary to define the following: this kind of photon is different from photons of radiation (see section 2.3, page 22; section 2.4, page 30).

The above stated doesn't contradict Einstein's theory of relativity and meets de Broglie's conception of wave-particle duality.

Thus, it seems to be that the matter of the external sphere of the Universe is an enormous mass of the photons, which are under enormous gravitational pressure. This mass of photons has an enormous density. This is an electromagnetic field of enormous mass and density (energy).

The matter of the internal sphere is absorbed by the photon mass of the external sphere by transforming the matter from the substance form into the electromagnetic form – photons (substance - atoms - atomic nuclei - elementary particles - photons).

Absorbing the matter of the internal sphere of the Universe, the increasing photon mass of the external sphere fills up the released space until it is filled up totally. The internal sphere of the Universe disappears. In the centre of the enormous spheroid photon mass in the place where the internal sphere used to be, forms the Ultimate singularity.

At that moment when the last photon of the internal sphere will be absorbed, the Big Bang occurs, and once again the internal sphere of the Universe will be formed, and the process of formation of the material structures inside it starts again (Fig.3).

Everything begins at the beginning.

Thus the total transformation of the matter of the internal sphere of the Universe from the substance form into the electromagnetic form – photons occurred. The transformation of the matter from one form to another occurred.

The above stated is in total accordance with: Newton's law of gravity, the law of conservation of energy, the principle of equivalence of mass and energy of Einstein's theory of relativity and meets de Broglie's conception of wave-particle duality.

From the stated above also follows that the structural unit of the matter of the Universe is the photon. This is confirmed by the following: when the annihilation of the elementary particles occurs, photons are formed, and also in cases of high energies from colliding photons elementary particles are formed.

Radioactivity is a natural example of partial transformation of matter, from the substance form, into the electromagnetic form – photons, and so on.

It is necessary to define again the following.

Structural unit-photon is not photon of radiation. It is particle-wave that has its own mass (see section 2.3, page 22; section 2.4, page 30).

The unexplained up to the present time the appearance of Maxwell's equations from Einstein's equations of field, reflect the process of transformation matter, from the substance form, into electromagnetic form – photons.

Black holes are also photon masses, only located inside the internal sphere of the Universe. They have enough mass and density (energy) to absorb substance. The process of absorbing of the substance by them also occurs by transformation of the matter from the form of substance into electromagnetic form – photons.

Section 1.3. The Big Bang

The photons in the photon mass of the external sphere of the Universe are under the enormous gravitational pressure, which is not concentrated in a single point until all material mass of the internal sphere of the Universe will be totally absorbed (Fig.4).

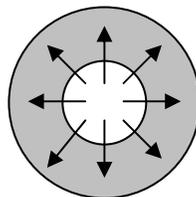


Fig.4

As soon as the matter of the internal sphere of the Universe will be totally absorbed, then in the centre of the photon spheroid mass the point is formed which experiences the force of the gravitational compression of the enormous mass of the photons. This point is called the Ultimate singularity (Fig.5).

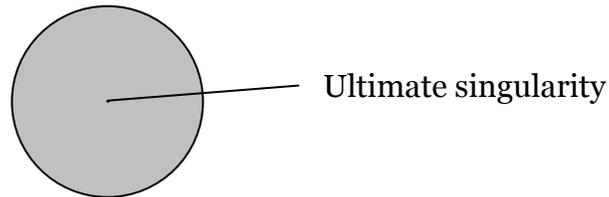


Fig.5

The enormous energy of the gravitational compression concentrated in the central point of the photon spheroid mass is transformed into energy of synthesis. The Big Bang occurs with the formation of the internal sphere of the Universe in which the synthesis of the substances from photons begins (photons - elementary particles - atomic nuclei - atoms - substance).

However, the greater part of the photons forms the photon masses inside of the internal sphere of the Universe, called black holes.

The Big Bang occurs instantly at the moment of absorption of the last photon of the internal sphere of the Universe. The new internal sphere of the Universe is instantly formed in the center of the enormous spheroid photon mass, which has enormous density (energy).

The matter of the internal sphere is formed from the mass of the photons the quantity of which seems to come from the principle of the golden section.

Thus as the result of the Big Bang the transformation of the matter from electromagnetic form (photons), into form of substance occurs. Transformation of one form of matter to another occurs.

The stated above is in total accordance with: Newton's law of gravity, the law of conservation of the energy, the principle of equivalence of mass and energy of Einstein's theory of relativity and meets de Broglie's conception of wave-particle duality.

Section 1.4.

The structure of the Universe

The Universe is an enormous spheroid photon mass, which has enormous density (energy). In the center of this mass there is another sphere (space), which was formed as a result of Big Bang.

Inside of this sphere (space) there is matter in two forms: 1) in form of photon cores of different mass called black holes; 2) in form of substance – ordinary visible matter (stars, planets and other objects). The summary mass of photon cores (black holes) is the greater part of the mass of matter of the internal sphere of the Universe.

The greater part of the whole Universe is represented by the enormous photon mass of spheroid shape, located around the internal sphere of the Universe.

Between the matter of the internal sphere of the Universe and the enormous photon mass of the external sphere of the Universe the gravitational force takes place, which causes the absorption of the matter of the internal sphere by the enormous photon mass of the external sphere of the Universe.

Absorption occurs by transformation of the matter from the form of substance into electromagnetic form – photons.

The proportion of the masses of the matter of the internal and external spheres of the Universe changes constantly. Photon mass of the external sphere is constantly increasing while the mass of matter of the internal sphere of the Universe is constantly decreasing.

The photon cores of the internal sphere of the Universe are located inside it, so that while being attracted to each other by gravitational forces among them, they resist the gravitational attraction of the photon mass of the external sphere of the Universe.

Around the photon cores, depending on size of their mass, accumulations of galaxies, galaxies, star-clusters are situated. Around the photon cores, which have greater mass accumulations of galaxies are situated. Around the photon cores with medium mass galaxies are situated. Around the photon cores with lesser mass, star-clusters are situated.

All photon cores have quite huge mass and density (energy), and they are able to absorb substance (stars, planets and other objects). Absorption occurs by gravitational attraction with transformation of the matter from the form of substance into electromagnetic form (photons).

This ensures the motion of the accumulations of galaxies, galaxies, star-clusters and planets inside the internal sphere of the Universe.

Apart from that, while absorbing substance, the photon cores of the internal sphere are increasing their mass and density (energy), increasing forces of gravitational attraction amongst them, increasing by that the resistance to rising gravitational attraction from the photon mass of the external sphere of the Universe.

Thus, the substance (ordinary visible matter) of the internal sphere of the Universe is absorbed by photon cores inside sphere from one side and by photon mass of the external sphere of the Universe from another side.

It seems that exploding galaxies (radiogalaxies), located on the periphery of the internal sphere of the Universe, are galaxies in the process of disintegration of substance.

Even more distant quasars are galaxies in the process of transformation of matter from form of substance into electromagnetic form – photons.

The Einstein - Rosen bridges of first type reflect the process of transformation of the substance into photons and absorption it by the external sphere of the Universe.

The Einstein – Rosen bridges of the second type reflect the process of transformation of the substance into photons and absorption it by the photon cores of the internal sphere of the Universe.

Part 2. Foundation of the theory.

Section 2.1. Space and Time

Space

Space is an environment in which the material structures of the internal sphere of the Universe are situated (photon cores and ordinary visible matter).

It is a kind of electromagnetic field.

Space is dynamic, not homogeneous and constantly changes. Space is able to curve, to warp, change its density and energy, depending on factors (events) that take place at the definite moment of the time, in the definite place of the space. One changes of space cause others, new ones. Takes place cause and effect link.

In this electromagnetic field are inserted gravitational fields, formed by material structures of the internal sphere of the Universe between themselves on the one hand, and between matter of the internal sphere and photon mass of the external sphere of the Universe on the other hand (Fig.2).

Having changed itself, the gravitational field changes space. It is able to curve, to warp space, and change density (energy) of space, causing by that the appearance of new changes of the space.

Increasing density of the space in one place, causes appropriate decreasing of density in the other places of the space and vice versa. Everything occurs in accordance with the law of conservation of energy and the law of cause and effect link.

Thus, from the moment of appearance the space as result of the Big Bang, once begins in it, constantly takes place the process of occurring changes (fluctuations) in accordance with the law of conservation of energy and the law of the cause and effect link.

This process is inseparably connected with the space, and will continue until space will exist.

At the moment of total absorption the matter of the internal sphere by the photon mass of the external sphere of the Universe, both electromagnetic and gravitational fields unite in the single whole electromagnetic-gravitational field, in the center of which Ultimate singularity appears (Fig.5). Space disappears, time stops, and the Big Bang occurs (Fig.3).

As a result of the Big Bang, once again space (internal sphere of the Universe) will be formed, in which electromagnetic and gravitational fields will separate from each other, time flow begins, and formation of the material structures in space starts (Fig.2). Everything occurs instantly.

Time

Time is one of space's dimensions, and directly depends on the density of space, it is a derivative of space's density. The speed of time flow in space is inversely proportional to the density of this space.

The more density of space in the definite place, for example, in strong gravitational fields of large masses such as black holes, neutron stars, white dwarfs, large stars etc, the slower time flow in this place of space and vice versa.

The speed of time flow is inseparably connected with the speed of light in the space and is inverse magnitude to the speed of light: $t = 1/c$.

Absolute velocity of time flow and Absolute velocity of light are constant magnitudes for the whole Universe. Light spreads in space with constant Absolute velocity(**C**).

Space is not a homogeneous environment, there are places with more density and less density. For example, space around large masses (black holes, neutron stars, and white dwarfs) has more density, than space around ordinary stars.

More from that, density of space is always more near by any mass and decrease according to square of distance from the centre of this mass: $\mathbf{D} = \mathbf{M}/\mathbf{R}^2$ (where: **D** – is density of space, **M** – is mass, **R** – is distance from the centre of this mass).

When light spreads in the space, it passes through regions of space that have different density. Depends on the density of the space's region, through which light passes, light has different relative speed.

The more density of space in which light spreads, the more relative speed of light in this space and vice versa. At the same time, Absolute velocity of light is always constant. Relative speed of light depends on the density of space in which light spreads, and it is the derivative of space's density.

From stated above the following comes.

The more density of space, the more relative speed of light and less relative speed of time flow in this region of space: $\mathbf{D} = \mathbf{c}/\mathbf{t}$ (where: **D** – is density of space, **c** – is relative speed of light, **t** – is relative speed of time flow).

Since $\mathbf{t} = \mathbf{1}/\mathbf{c}$; then $\mathbf{D} = \mathbf{c}/\mathbf{t} = \mathbf{c}^2$.

The ratio of the density of space to the relative speed of light in this space, always equal the relative speed of light in this space: $\mathbf{D}/\mathbf{c} = \mathbf{c}^2/\mathbf{c} = \mathbf{c}$.

Fig.6 represents two regions of space with the same mass and different density: $\mathbf{D} = \mathbf{2D}_1$ then: $\mathbf{D}/\mathbf{D}_1 = \mathbf{c}/\mathbf{c}_1 = \mathbf{t}_1/\mathbf{t} = \mathbf{2}$.

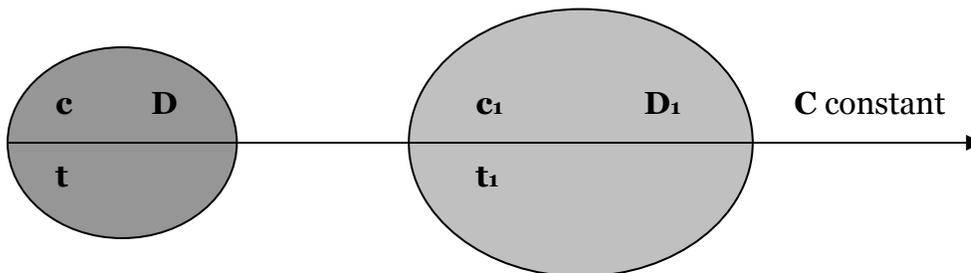


Fig.6 **C constant** – is Absolute velocity of light

Since space is an electromagnetic field, it has electrical and magnetic properties, this is permittivity of vacuum - ϵ_0 , and permeability of vacuum - μ_0 , where $\epsilon_0 = 1/\mu_0 c^2$.

The density of space is inverse magnitude of the product space's permittivity and permeability: $D = 1/\epsilon_0 \mu_0$.

Thus: $D = M/R^2 = c/t = c^2 = 1/\epsilon_0 \mu_0$.

From the above stated the following comes.

Space has five dimensions: density (energy), time (speed of light in it) and three ordinary dimensions.

The principal dimension of space is density (energy). All the other four dimensions of space depend on density of space and they are derivatives of density. When the density of space changes, then the other dimensions change as well.

At the moment of Ultimate singularity formation, all four dimensions contract into the density of Ultimate singularity.

Section 2.2. **Ultimate singularity and Big Bang**

Ultimate singularity

At the moment of absorption of the last photon of the internal sphere of the Universe, space disappears and Ultimate singularity is formed.

Ultimate singularity is a centre of the spheroid electromagnetic field (photon mass), which has enormous mass and density (energy).

In this field, the relative speed of light is infinitely fast, the relative speed of time flow is infinitely slow, and there is no space.

For photons that have enormous energy there is no place to spread because there is no space.

The density of photon mass, relative speed of light and relative speed of time flow in the Ultimate singularity become infinite.

This state can be expressed by expression: $D_\infty = c_\infty/t_\infty^{-1} = c^2_\infty$

where: D_∞ - is density of photon mass in Ultimate singularity
 c_∞ - is relative speed of light in Ultimate singularity
 $t_\infty^{-1} = t/\infty = 1/c_\infty$ - is relative speed of time flow in Ultimate singularity.

How it was noted above, $D/c = c$; then $D\infty/c\infty = c^2\infty/c\infty = c$.

From the above stated the following comes.

$$D\infty/c\infty = D\infty t\infty^{-1} = D\infty t/\infty = D/c = Dt = c.$$

This means that Ultimate singularity is the place where space and time are hidden and in which they appear again.

In Ultimate singularity, the whole energy of field and the whole force of gravitational compression of the enormous mass of photons are concentrated. Photons, which have enormous energy, can not spread in this field, because there is no space.

Photons are electromagnetic waves, and they have all the properties of waves, they are able to get into the state of superposition relative to each other.

At the moment of absorption of the last photon of the internal sphere of the Universe, all photons of the Universe come into the same phase of the oscillation in direction to the centre of the Universe – Ultimate singularity.

In this centre, diametrically opposite photons come into the state of antiphase superposition relative to each other (state of standing waves) and penetrate into each other.

Now they have a place to spread. They spread inside each other in opposite directions (Fig.7).

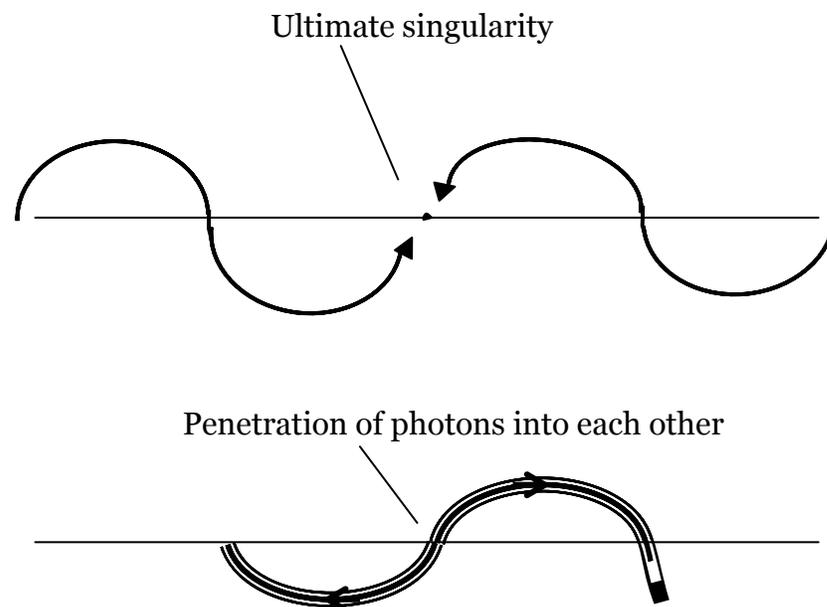


Fig.7

The action of force of gravitational compression of enormous mass of photons occurs only once and instantly. So photons spread inside each other in opposite directions with the constant speed – velocity of light (c).

Ultimate singularity formation and Big Bang occur simultaneously at the moment of absorption of the last photon of the internal sphere by photon mass of the external sphere of the Universe.

As a result of this, instantly forms the internal sphere of the Universe – space, and instantly time appears (Fig. 8).

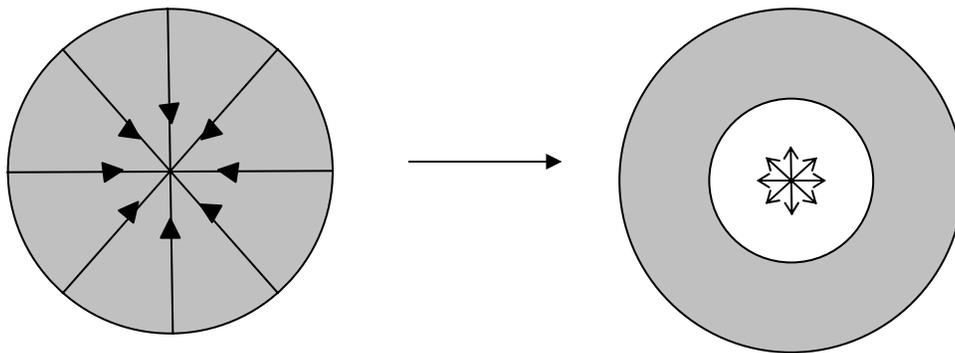


Fig.8

Big Bang

The Big Bang is a wave process, the result of which space is formed.

The Big Bang occurs instantly at the moment of Ultimate singularity formation, instantly space forms.

The base of Big Bang is the properties of photons (electromagnetic waves) penetrate into each other in accordance with the principle of the superposition of waves.

More from that, diametrically opposite photons penetrate into each other not even in superposition state, but in antiphase superposition state, which is most propitious state for spreading photons into each other (state of standing waves).

Thus the space is spreading inside each other in opposite directions photons, which are in the state of antiphase superposition relative to each other and in state of interference and superposition relative to others such photons.

The speed of photon's movement is constant, because the force of gravitational compression which caused this movement acted only once and instantly.

Spread inside each other in opposite directions, photons interfering with others such photons and form zones of constructive interference and destructive interference (heterogeneity), in which the formation of visible matter (substance) and black holes occurs.

Thus, from the moment of appearance of space as the result of Big Bang, once begins in it, constantly takes place the process of occurrence the changes (heterogeneity), in accordance with the law of conservation of energy and the law of the cause and effect link.

This process is inseparably connected with the space, and will continue until space will exist.

Fig.9 represents diagram of Big Bang.

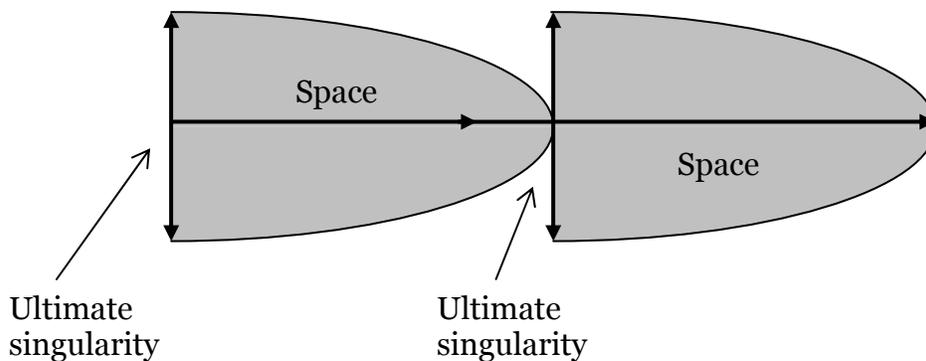


Fig.9

Section 2.3. Photons of space and substance, photons of radiation, electromagnetic wave of space of the Universe

Photons of space and substance

First of all it is necessary to define the following.

Photons of space and substance and the photons of radiation are different electromagnetic waves.

Substance forms from photons of space and substance. Any mass, eventually is a mass of photons of space and substance - electromagnetic mass.

Photons of space and substance spread inside each other in diametrically opposite directions with a constant speed (c), and they are in particular state of antiphase superposition relative to each other (state of standing waves). This state is most propitious for spreading photons inside each other.

In zones of interference with other such photons of space and substance, depends on conditions that are formed in these places of space in definite time, photons of space and substance can get out of antiphase superposition state relative to each other, remaining in the state of coherence and superposition relative to the space and to each other.

These photons also have constant speed (c), and they can be in forward motion or revolve. Also they can change direction of their forward motion or direction of their rotation to any direction depending on the formed conditions.

Speed of rotation of photons of space and substance on its axis is always constant (c), and it equals their speed of forward motion (c), so they are always in the state of coherence and superposition relative to the space and to each other.

Stated above is represented by Fig.10.

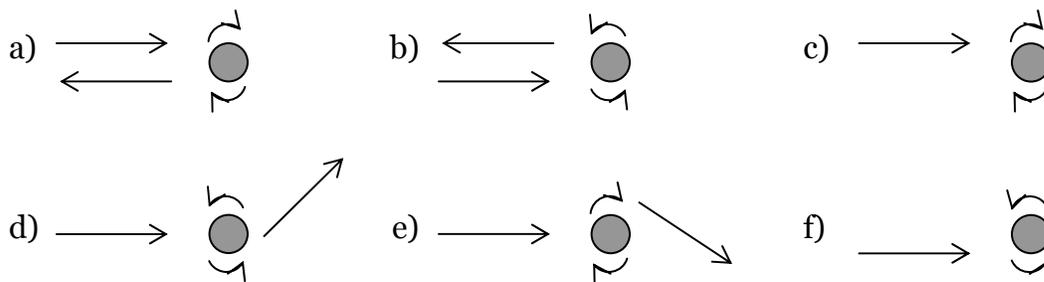


Fig.10

From photons, which revolve at the speed of light (c), substance forms. Photons with opposite spin are attracted to each other, photons with the same spin repel each other (Fig.11).



Fig.11

Depends of number of photons of space and substance and their combinations, from them elementary particles of substance forms. As the mass of the particles of substance increases, then their wave's properties decrease.

It is necessary to define again, that photons of space and substance and photons of radiation are different electromagnetic waves.

As mentioned above, the density of space defines by formulas:

$$\mathbf{D} = \mathbf{c}/\mathbf{t} = \mathbf{1}/\epsilon_0\mu_0 = \mathbf{c}^2; \text{ then: } \mathbf{c}/\mathbf{t} = \mathbf{c}^2; \text{ from that comes: } \mathbf{t} = \mathbf{c}/\mathbf{c}^2 = \mathbf{1}/\mathbf{c}$$

(where: \mathbf{D} – is density of space, \mathbf{t} – is speed of time flow, \mathbf{c} – is speed of light, ϵ_0 and μ_0 – are permittivity and permeability of vacuum – space).

For the photon of space and substance, time is its period (\mathbf{T}_{ph}), which as for any wave defines by formula: $\mathbf{T}_{ph} = \mathbf{1}/\mathbf{v}_{ph}$. Then: $\mathbf{T}_{ph} = \mathbf{1}/\mathbf{v}_{ph} = \mathbf{1}/\mathbf{c}$.

From that comes: $\mathbf{v}_{ph} = \mathbf{1}/\mathbf{T}_{ph} = \mathbf{c}$ (where \mathbf{v}_{ph} – is frequency of photon of space and substance).

For the photon of space and substance:

$$\mathbf{E}_{ph} = \mathbf{m}_{ph}\mathbf{c}^2 = \mathbf{h}\mathbf{v}_{ph} = \mathbf{h}\mathbf{c}; \text{ then: } \mathbf{m}_{ph} = \mathbf{E}_{ph}/\mathbf{c}^2 = \mathbf{h}\mathbf{v}_{ph}/\mathbf{c}^2 = \mathbf{h}\mathbf{c}/\mathbf{c}^2 = \mathbf{h}/\mathbf{c}.$$

From that comes: Planck's constant $\mathbf{h} = \mathbf{m}_{ph}\mathbf{c}$; and angular momentum unit $\mathbf{\hbar} = \mathbf{h}/2\pi = \mathbf{m}_{ph}\mathbf{c}/2\pi$ (where \mathbf{m}_{ph} – is mass of photon of space and substance).

Planck's constant – is impulse of photon of space and substance: $\mathbf{h} = \mathbf{m}_{ph}\mathbf{c}$.

It is necessary to underline the following new formulas:

1. **Energy of photon of space and substance: $\mathbf{E}_{ph} = \mathbf{h}\mathbf{c} = \mathbf{m}_{ph}\mathbf{c}^2$**
2. **Mass of photon of space and substance: $\mathbf{m}_{ph} = \mathbf{h}/\mathbf{c}$**
3. **Planck's constant: $\mathbf{h} = \mathbf{m}_{ph}\mathbf{c}$.**

Photon of space and substance is the structural unit of the Universe.

From the above stated the following comes.

The number of photons of space and substance ($\mathbf{n_m}$), from which mass (\mathbf{m}) of substance is formed, defines by the formulas:

$\mathbf{n_m} = \mathbf{m}/\mathbf{m_{ph}} = \mathbf{mc}/\mathbf{m_{ph}c} = \mathbf{mc}/\mathbf{h}$ (where: $\mathbf{m_{ph}}$ – is mass of photon of space and substance, \mathbf{c} – is speed of light).

Energy of this mass (\mathbf{m}) can be defined by formulas:

$$\mathbf{E} = \mathbf{mc}^2 = \mathbf{hcn_m} = \mathbf{m_{ph}c^2n_m}.$$

The photon of space and substance is a particle-wave that has minimal possible properties of the particle and the maximum possible properties of the wave in the Universe.

The mass and wavelength of this particle-wave is the least in the Universe, where as the frequency is the greatest in the Universe.

In accordance with de Broglie's conception of wave-particle duality the following comes: $\lambda_{ph} = \mathbf{h}/\mathbf{m_{ph}c} = \mathbf{m_{ph}c}/\mathbf{m_{ph}c} = \mathbf{1}$ (where: λ_{ph} – is wavelength of photon of space and substance, $\mathbf{m_{ph}}$ – is mass of photon of space and substance, \mathbf{c} – is the speed of light, \mathbf{h} – is Planck's constant).

The photon of space and substance is the structural unit of the Universe, and its wavelength is unit as well and equal **one** ($\lambda_{ph} = \mathbf{1}$).

From this comes: $\mathbf{c} = \lambda_{ph}/\mathbf{T_{ph}} = \lambda_{ph}\mathbf{v_{ph}} = \mathbf{1v_{ph}} = \mathbf{v_{ph}}$ (where: $\mathbf{T_{ph}}$ – is period of photon of space and substance, $\mathbf{v_{ph}}$ – is frequency of photon of space and substance, \mathbf{c} – is the speed of light).

Photon of space and substance has frequency equal to the speed of light (\mathbf{c}), and its period (time) is equal $\mathbf{1/c}$.

Speed (\mathbf{V}) is defined by formula: $\mathbf{V} = \mathbf{L}/\mathbf{t}$ (where: \mathbf{L} – is distance, \mathbf{t} – is time).

Photons of space and substance are moving in the space inside each other with the speed of light or revolving at the speed of light (no distance).

From that comes: $\mathbf{c} = \lambda_{ph}/\mathbf{t} = \mathbf{1/t}$; and $\mathbf{t} = \lambda_{ph}/\mathbf{c} = \mathbf{1/c}$; where wavelength of photon of space and substance becomes its distance.

Speed of photon of space and substance (speed of light) in the space determines the flow of time in it.

Photons of radiation

As mentioned above, photons of space and substance and photons of radiation are different electromagnetic waves.

Photons of radiation that we know, as electromagnetic waves of different frequencies are disturbances in the electromagnetic wave of space, which are repeated over a definite period of time (T). Frequency of these disturbances defines the kind of electromagnetic radiation: $\nu = 1/T$.

Photons of radiation are disturbances in the wave of space, which move at the speed of light (c), and consists of photons of space and substance (Fig.12).

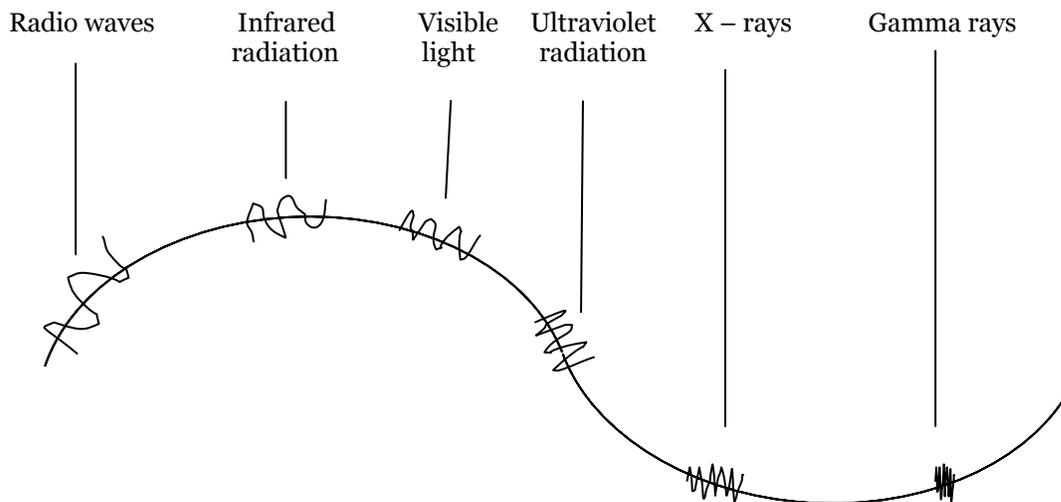


Fig.12

Since the photons of space and substance are spread inside each other in opposite directions and in all directions, disturbance occurs simultaneously in all the electromagnetic waves, which are located in the place where disturbance occurs at the moment of this disturbance's occurrence.

Thus, disturbance occurs simultaneously in the huge number of electromagnetic waves of space, and it spreads in all directions at the speed of light (c).

This phenomenon explains the independence of the speed of light from the speed of light's source.

Photon of radiation has impulse of photon of space and substance, but has its own frequency.

Energy of photon of radiation is defined by formulas: $E = h\nu = m_{ph}c\nu$
 (where: Planck's constant $h = m_{ph}c$ is the impulse of photon of space and substance, m_{ph} - is mass of photon of space and substance, ν – is own frequency of photon of radiation, c – is speed of light).

Photon of radiation does not have its own mass, and exists in the movement at the speed of light (c).

Electromagnetic wave of space of the Universe

Since photons of space and substance are structural units of the Universe, they form electromagnetic waves of space of the Universe. Electromagnetic wave of space has the greatest wavelength and the lowest frequency in the Universe.

To explain this, have to return to the conditions which are formed in the Universe at the moment of the Ultimate singularity and the Big Bang occurrence – at the moment of absorption of the last photon of the space and substance.

At that moment the force of gravitational compression and the energy (density) of the Universe are distributed in such a way that their magnitudes are inversely proportional to the square of distance, from the centre of the sphere of the Universe – Ultimate singularity (Fig.13).

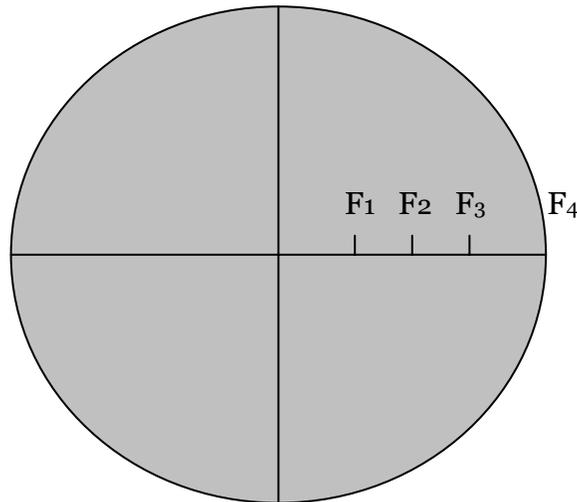


Fig.13

According to this, the energy of photons, their frequency and wavelength are different, depending on the distance from the centre of the sphere of the Universe – Ultimity.

The maximum possible these magnitudes become in the zone, which is spherical mass of photons, inside the sphere of the Universe. From this mass of photons the space of the Universe forms.

The mass of photons, from which space is formed, seems to be defined by the principle of the golden section: $m_1/m_2 = M/m_1$ (where: $M = m_1 + m_2$ - is the mass of photons of the whole Universe, m_1 - is the mass of photons of the external sphere of the Universe, m_2 - is the mass of photons of the internal sphere of the Universe - space). Because this proportion is everywhere in Nature (Fig.14).

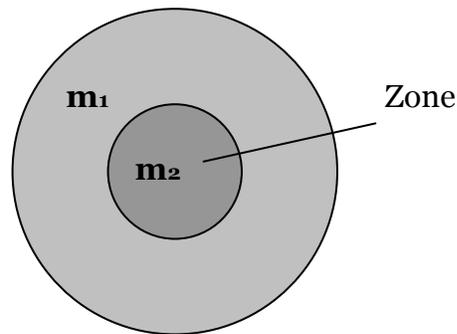


Fig.14

In this zone for all photons of space and substance the same conditions are formed. All photons in this zone have the same energy, period, frequency, wavelength and speed (c), more or less of which, in these conditions, to have is impossible.

So, at the moment of the Ultimate singularity and the Big Bang occurrence, all photons in this zone are in the same phase of oscillation, which is directed towards the centre of the sphere of the Universe - Ultimate singularity.

At this moment, diametrically opposite photons of this zone instantly come in the state of antiphase superposition relative to each other, and spread inside each other in opposite directions. Instantly the space of the Universe forms (Fig.15).

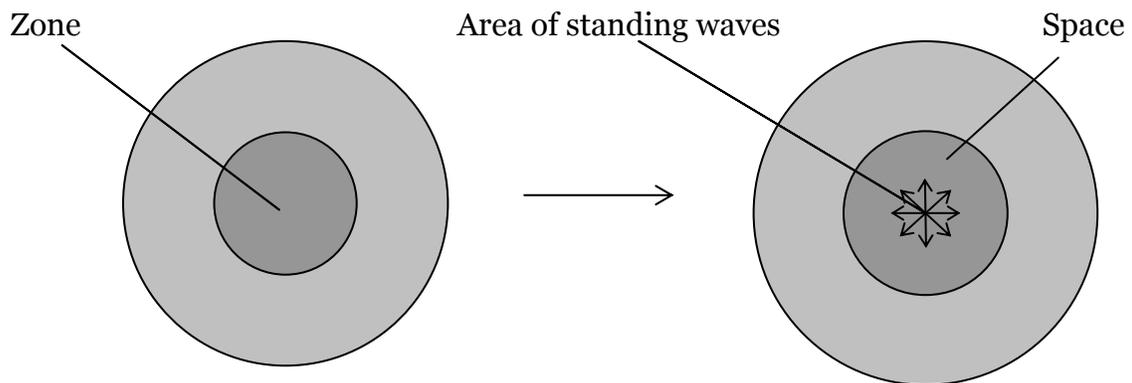


Fig.15

As the frequency of each photon of space and substance is the maximum possible and wavelength is the minimum possible in these conditions, then in totality, diametrically opposite photons, single whole form – electromagnetic wave of space of the Universe.

Electromagnetic waves of space of the Universe have the lowest frequency and greatest wavelength in the Universe. Period of these waves (from the moment of space formation), is a period of time, between two Big Bangs, this is the age of space of the Universe (Fig.16).

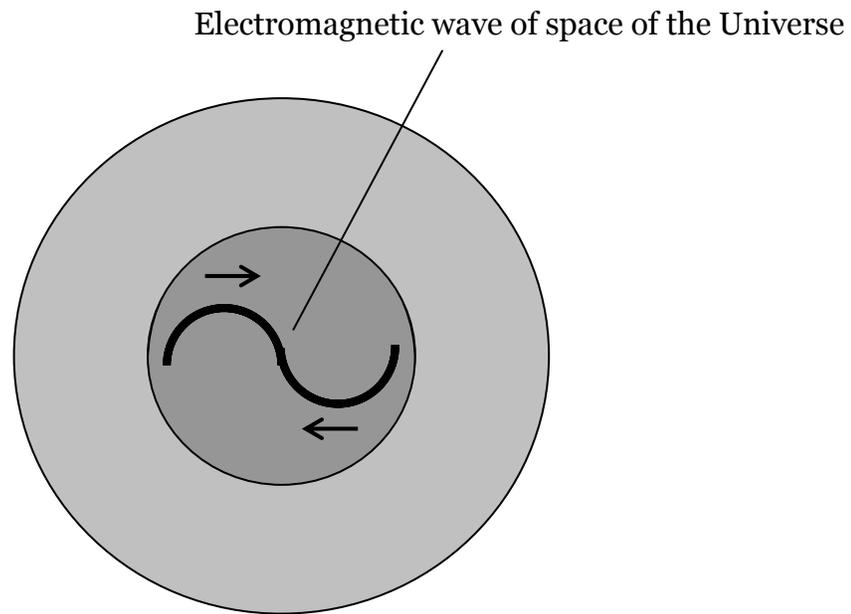


Fig.16

Space of the Universe where we live is isolated and has no borders, because from the moment of its formation, space is constantly reducing its size.

More from that, the size of space reduces at twice the speed of light (**2c**), because diametrically opposite points of space's sphere are moving towards each other at the speed of light (**c**).

At the same time and at the same speed, the area of standing waves inside of space's mass increases its size during the first half of existence of space and decreases its size during the second half of existence of space (Fig.17).

The area of standing waves is the place where substance is formed.

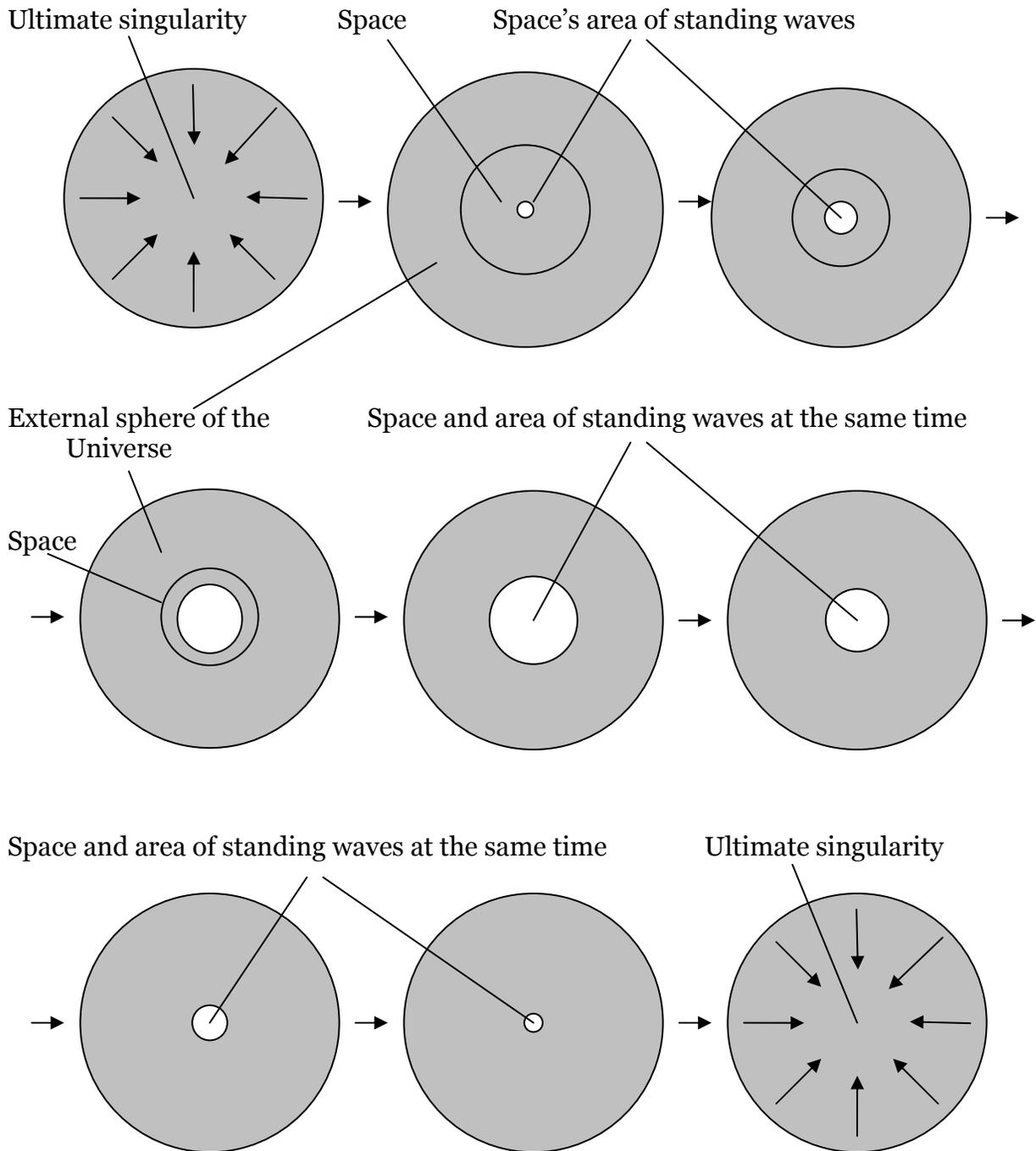


Fig.17

The Universe is opened inside itself by space. The Universe is closing and opening at the moment Ultimate singularity and the Big Bang occurrence.

The Universe is a self-organizing electromagnetic system.

Section 2.4.

Speed, time, Planck's constant and the structural unit of the matter of the Universe

This section represents a different solution to prove the new measurement for time of the moving body and to prove the existence of the photon of space and substance.

Every moving body has its own speed and its own time.

Own time of the moving body is inverse magnitude to the speed of this body:

$$\mathbf{t} = \mathbf{1/v} \text{ (where: } \mathbf{t} \text{ – is time, } \mathbf{v} \text{ – is speed).}$$

The more own speed of the moving body the less (slower) own time of this body. Speed defines time.

This is in total accordance with Einstein's theory of relativity.

Measurement for a speed is $\mathbf{m/s}$, consequently correct measurement for a time of the moving body has to be $\mathbf{s/m}$ (where: \mathbf{s} – is second, \mathbf{m} – is meter).

The meter is unit of length. Modern definition of meter is: the meter is the length of the path traveled by light in vacuum during a time interval of $1/299\,792\,458$ of a second (The 17 th General Conference on Weights and Measures, CGPM, 1983).

From this comes the following.

The real unit of time is the inverse magnitude to the speed of light:

$\mathbf{t} = \mathbf{1/c} = \mathbf{1/299\,792\,458\ s/m}$ (where: \mathbf{t} – is time, \mathbf{c} – is speed of light). It is the time of the path traveled by light in vacuum the length interval of one meter.

This is time of our space of the Universe.

The speed of light in the space of the Universe determines the flow of time in it.

Definition of second can be: the second (\mathbf{s}) is the time of the path traveled by light in vacuum the length interval of $299\,792\,458$ meters (\mathbf{m}).

In the case of the resting body, measurement for time is (\mathbf{s}) second not $\mathbf{s/m}$, because there is no movement, and nothing to measure by the (\mathbf{m}) meter. Resting body hasn't its own time.

Time of the resting body is the time of inertial system, to which resting body belong.

In the case of Earth, time of the resting body is determined by the Earth's movement around its axis and around the Sun. It is not the own time of the resting body. Time of the resting body is the Earth's own time.

Measurement for the Planck's constant (**h**) is **J·s** (it is product of work and time) and can be expressed by expression: **J·s = N·m·s = kg·m·m·s/s² = kg·m²/s**.

From this expression we can see, that Planck's constant (**h**) represents something that contains mass inside itself (**kg·m²/s**). But something is not correct in this expression because measurement by **kg·m²/s** does not make sense.

Not correct measurement for a time of the moving body.

In this not correct expression was used measurement for a time of the resting body, whereas have to use measurement for a time of the moving body. Measurement for a time of the moving body is: **s/m** (where: **s** – is second, **m** - is meter).

Thus correct measurement for the Planck's constant (**h**) is expressed by expression: **J·s/m = N·m·s/m = kg·m·m·s/s²·m = kg·m/s**.

Now everything is correct: **h = mc (kg·m/s)**.

It does mean, that Planck's constant is **impulse** of particle-wave, which has the least mass in the Universe and which is in the state of movement at the speed of light.

Mass of this particle-wave is: **m = h/c = 2.210 x 10⁻⁴² kg**.

This particle-wave has minimal possible properties of the particle and the maximum possible properties of the wave in the Universe.

From this particle-wave space and substance are formed and it is structural unit of the matter of the Universe.

I have named this particle-wave the **photon of space and substance**.

From stated above comes the following.

The number of photons of space and substance (**n_m**), from which mass (**m**) is formed, defines by formulas: **n_m = m/m_{ph} = mc/m_{ph}c = mc/h** (where: **m_{ph}** – is mass of photon of space and substance, **c** – is speed of light, **h** – is Planck's constant).

Mass of photon of space and substance is: **m_{ph} = h/c = 2.210 x 10⁻⁴² kg**.

Consequently:

- 1) for the electron: **n_e = m_e/m_{ph} = 4.122 x 10¹¹**
- 2) for the proton: **n_p = m_p/m_{ph} = 7.57 x 10¹⁴**
- 3) for the neutron: **n_n = m_n/m_{ph} = 7.58 x 10¹⁴**.

Section 2.5.
**Newton's law of gravity, law of conservation of energy,
 Einstein's principle of equivalence of mass and energy and
 Quantum theory**

Acceleration of gravity (\mathbf{a}_m) of mass (\mathbf{m}) towards to mass (\mathbf{M}) is expressed by expression: $\mathbf{a}_m = \mathbf{F}/\mathbf{m} = \mathbf{GM}/\mathbf{R}^2$; from that comes: $\mathbf{F} = \mathbf{GmM}/\mathbf{R}^2$.

As stated above in the previous sections, the density of space (\mathbf{D}), defined by mass (\mathbf{M}) is expressed by the expression: $\mathbf{D} = \mathbf{c}/\mathbf{t} = \mathbf{M}/\mathbf{R}^2 = \mathbf{1}/\epsilon_0\mu_0 = \mathbf{c}^2$ (where: \mathbf{c} – is the relative speed of light in this space, \mathbf{t} – is the relative speed of time flow accordingly).

Consequently:

- 1) $\mathbf{a}_m = \mathbf{F}/\mathbf{m} = \mathbf{GM}/\mathbf{R}^2 = \mathbf{GD} = \mathbf{G}/\epsilon_0\mu_0 = \mathbf{Gc}^2$;
- 2) $\mathbf{D} = \mathbf{a}_m/\mathbf{G}$;
- 3) $\mathbf{G} = \mathbf{a}_m/\mathbf{D} = \mathbf{a}_m \epsilon_0\mu_0 = \mathbf{a}_m/\mathbf{c}^2$.

Then:

- 1) $\mathbf{F}/\mathbf{m} = \mathbf{G}/\epsilon_0\mu_0 = \mathbf{Gc}^2$;
- 2) $\mathbf{F} = \mathbf{Gm}/\epsilon_0\mu_0 = \mathbf{Gmc}^2$.

From that comes: Gravitational constant $\mathbf{G} = \mathbf{F}/\mathbf{mc}^2 = \mathbf{F}/\mathbf{E}$.

The Newton's law of gravity can be expressed by following expression:
 $\mathbf{F} = \mathbf{ma}_m = \mathbf{GmM}/\mathbf{R}^2 = \mathbf{Gm}/\epsilon_0\mu_0 = \mathbf{Gmc}^2 = \mathbf{Ghcn}_m = \mathbf{Gm}_{ph}\mathbf{c}^2\mathbf{n}_m$.

And the law of conservation of energy can be expressed by expression:
 $\mathbf{E} = \mathbf{mM}/\mathbf{R}^2 = \mathbf{m}/\epsilon_0\mu_0 = \mathbf{mc}^2 = \mathbf{hcn}_m = \mathbf{m}_{ph}\mathbf{c}^2\mathbf{n}_m$.

Where: \mathbf{n}_m – is number of photons of space and substance from which mass (\mathbf{m}) is formed, \mathbf{m}_{ph} – is mass of photon of space and substance.

From these expressions follow, that there are no contradictions between Newton's law of gravity, the Einstein's principle of equivalence of mass and energy and Quantum theory.

**“The transformations of bodies into light and light into bodies
 submits to the laws of Nature, which seems to be amused by these
 transformations”.**

Isaac Newton, “Optics”, 1704.

From “The Gravitational-quantum theory of the Universe” comes the following.

1. The speed of light in free space is independent of the motion of its source (see page 24).

This is in accordance with the special theory of relativity.

2. The size of space of the Universe reduces at twice the speed of light (**2c**) because diametrically opposite points of space’s sphere are moving towards each other at the speed of light (**c**), see page 27.

This is in accordance with the classical law of addition of velocities.

It means that the speed of light in free space is independent of the motion of its source, but depends on the motion of the observer.

Well theoretically grounded the Michelson-Morley experiment, cannot practically prove the independence of speed of light in free space of the motion of the observer because:

1. There is the huge difference between the speed of light (299 792 458 m/s) and the speed of Earth’s movement (30 000 m/s).
2. Distances that were used to catch so tiny a shift of the Earth relative to the light beam by changes of interference pattern are not enough. To catch such tiny shift like this, we have to use the cosmic distances of thousands or millions kilometers, that is impossible to do in the conditions of Earth.

More from that, have to use two different inertial systems (reference frames), where one of them is Earth. It is also impossible to do in the conditions only of the Earth.

Postulation of independence of speed of light in free space of the motion of the observer, made artificial contradictions between special theory of relativity and Galilean relativity, Newton’s law of gravity, Quantum theory.

Also it made artificial contradictions inside the special theory of relativity between its first and second postulates and more from that, between special and general theories of relativity.

This postulation has been blocking the development of Einstein’s theory of relativity for 100 years already.

“The Gravitational-quantum theory of the Universe” is the theory of relativity too, and it is in accordance with all the above stated theories except the second part of second postulate of special theory of relativity (about observer).

Conclusion

The Universe is a self-organizing electromagnetic system, in which constantly occurs the process of transformation of matter from electromagnetic form into form of substance and vice versa.

Rustam M. Arslanov

18 of March 2004

Appendix

Measurement for the Planck's constant (**h**) is **J·s** (it is product of work and time).

Measurement for the Joule (**J**) is **N·m**.

Measurement for the Newton (**N**) is **kg·m/s²**.

Measurement for a time (**t**) is **s** (second).

Measurement for the Planck's constant (**h**) can be expressed by expression:

$$\mathbf{J \cdot s = N \cdot m \cdot s = kg \cdot m \cdot m \cdot s / s^2 = kg \cdot m^2 / s.}$$

Something is not correct in this expression because: **h = m_{ph}c**; and has to be measured by **kg·m/s**.

Not correct measurement for a time of photon of space and substance (**t**).

From the Gravitational-quantum theory of the Universe comes the following.

For the photon of space and substance time and speed are inverse magnitudes relative to each other: **t = 1/c** and **c = 1/t** (where: **t** – is time, **c** – is speed of light).

Measurement for a speed of photon of space and substance is **m/s**; from this comes, that the correct measurement for a time of photon of space and substance is: **s/m**.

Thus, correct measurement for the Planck's constant (**h**) is expressed by expression:

$$\mathbf{J \cdot s / m = N \cdot m \cdot s / m = kg \cdot m \cdot m \cdot s / s^2 \cdot m = kg \cdot m / s.}$$

Now everything is correct: **h = m_{ph}c (kg·m/s)**.

Planck's constant – is impulse of photon of space and substance.

References

1. Hawking, S.W. "Black holes and baby universes and other essays." "London: Bantam Press, 1993.
2. Hawking, S.W. et al. "The future of spacetime". New York: William Norton, 2002.
3. Jones, Edwin R. and Childers, Richard L. "Contemporary College Physics". Addison-Wesley Publishing Company, Inc., 1990.
4. Parker, Barry R. "Einstein's dream: the search for a unified theory of the universe". New York: Plenum Press, 1986.
5. Parker Barry R. "The vindication of the big bang breakthroughs and barriers". New York: Plenum Press, 1993.
6. Parker, Barry R. "Chaos in the cosmos: the stunning complexity of the universe". New York: Plenum Press, 1996.
7. Parker, Barry R. "Quantum legacy: the discovery that changed our universe". Amherst, N.Y.: Prometheus Books, 2002.
8. "Sharp new portrait of the infant Universe". 11 February 2003. NewScientist.com new service (<http://www.newscientist.com/news/news.jsp?id=ns99993375>).
9. The 17 th General Conference on Weights and Measures, CGPM, 1983.