Burago Sergey Georgievich Dark matter in the structure of the universe

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Introduction

The modern science has agreed with the many paradoxes of physics and was satisfied with the correct quantitative interpretation of the phenomena and the many paradoxes of the physics. At the same time the nature of a number of the fundamentally important phenomena such as a gravity, the inertia force, the force interaction of the electric charges, and more, was not understood. There is no idea, which is uniting these phenomena. The universe in the image of astrophysics is empty and disjointed. The world appeared instantly as a result of a "big bang" of the "first atom". Then all objects of the universe should scatter in all directions, leaving an empty space after it. The "thermal death" must to occur as result it

In this book an attempt is made to prove that the basis of the gravity, the inertia force and the force interaction of the electric charges in the Universe is the existence of the dark interstellar gas (dark matter). In 1968 the idea of the existence of the invisible matter between the stars was confirmed by the American astrophysicists A.Penziasom and R.Vilsonom. They were awarded the Nobel Prize for the opening of CMB. Later it was discovered that it complies with the blackbody radiation at a temperature T = 2,75 K. This meant that in the universe there is the invisible dark matter, radiating the energy. It is evenly distributed in the space between the stars and constitutes 96% of the universe of matter. The share of the ordinary baryonic matter is only 4%. It is believed that a dark matter contains a large dark energy. The problem of the interaction of a dark matter and the ordinary baryonic matter there is no less interesting.

It is assumed that a dark matter is in a gaseous state and uniformly fills the Universe. All material body - from the stars to the elementary particles - constantly absorb a dark matter, which then is converted within the body of the baryon matter. When the new stars and the galaxies explode, the baryonic matter is broken up into atoms of dark matter partially or completely . Thus there is the eternal cycle of the matter and the energy. The internal energy of the dark gas is the dark energy of the cosmos. It's huge. The process of absorption of a dark gas by the baryon bodies from the surrounding space is the missing link in the knowledge of the world. It allows us to understand that the universe is eternal. Along with the phenomenon of the heat dissipation (hypothesis of Clausius about the thermal death) the powerful creative processes there is in the Universe. The supplier and regulator of the circulation of a matter and the energy is the dark matter that fills the Universe. The dark matter is primary, and baryon body and them a properties are secondary. The main parameters of dark matter was identified. It is shown that the gaseous dark matter has a high density. It is not have viscosity.

The absence of the void should be considered in terms of filling a space by invisible liquid or gaseous a medium which can be described in the criteria for the density, pressure, temperature, velocity, and through which the disturbance is transmitted. In this case we can work with these generic parameters at the solution of many problems. The gaseous dark matter, although it is made up of the infinitely small atoms, which are in constant motion, but due to a large concentration of them in any arbitrarily small volume can be considered as a continuous medium.

Each atom of a dark gas is have a mass and moving with a certain speed about the speed of a light and therefore, has a kinetic energy. The sum of the kinetic energies of all atoms of a dark gas per unit volume is the internal energy of the continuum of a dark matter in this volume. A gaseous dark matter to an even greater extent, than the conventional gases, is capable of self-organization in the form of various vortex structures, which act as the elementary particles, the atoms and the molecules that make up the material bodies of the Universe.

Naturally, the material bodies react with each other not only in the direct collisions, but at a distance through the field of a dark gas due to the fact, that strong and weak perturbations caused by bodies, transferred to another body. For quantitative detection of interaction of the baryon bodies with dark matter we can attract the mathematical apparatus of gas dynamics. In terms of the continuous gaseous medium it was possible to summarize all ideas about force interactions between the material bodies. It seems to us, this allowed to bring the dream of Einstein and other famous physicists about about **a Unified field**, generalizing the nature of a gravity with the electromagnetic interactions and by the laws of a propagation of light..

What is the difference between the dark matter and the baryonic matter? (Baryonic matter consists mostly of heavy elementary particles, neutrons and protons, and as well as the light particles-electrons, photons, etc.). Why are these two concepts in the book are divided? The dark gas is really exists independently of our consciousness? Without a clear answer to this question is impossible to construct a workable theory of the dark matter.

These differences are primarily in the fact that the a dark matter is primary, and the material bodies and their properties are secondary. The atoms, electrons, protons, neutrons and other elementary particles of a matter there are the self-contained a steady vortex flow (the vortexes) of a dark gas with liquid or solid the cores there is inside. The big energy of a dark gas creates by the currents of a dark gas into these vortices over billions of years. This energy arrives into the center of the vortex together with a dark gas.

In this theory the baryonic bodies is represented by a vortex gaseous structure. In the center this a vortex gaseous structure there is the liquid (or solid) dense core of a dark matter At the boundaries of the kernels the gaseous dark matter is turning in a liquid state and greatly reduces your volume. It provides a continuous process of the absorption of dark matter by the material bodies (on elementary particle level). The emerging in the process of the absorption of dark gas a radial flow to the centers of material bodies are responsible for the gravitational effect on the other material body, which trapped in this flow. The electromagnetic interactions are explained by the usual properties of the attraction-repulsion of the vortex structures, depending on the direction of the rotation of the vortices. It is known that the vortex structures in gas or liquid medium without viscosity there is forever. However, under certain circumstances they may occur, fade, split up and unite. That is, they behave like the ordinary material particles. The analogies can be extended further in the sense that the very rich fluid dynamics effects that let you play or simulate all the basic laws of the physics-based concepts of the interstellar gaseous medium dark matter.

In the book the possibilities is widely illustrated that the theory of a dark matter can give to for the study of various problems of the Universe. In this theory is proposed the decisions of a number of the philosophical problems of astronomy, such as the problem of the red shift in the spectra of "distant galaxies", the problem of the nature of "Big Bang", the problem of neutron stars and "black holes", the problem of the energy exploding space objects, the problem of the structure of spiral galaxies and a number of others. It is shown that inconsistencies in the interpretation of the optical experiments of Michelson, Fizeau and stellar aberration phenomenon, underlying the crisis of physics of the late nineteenth and early twentieth centuries, can be coordinated with each other without theory of the relativity of Einstein's. In the theory of dark gas, the physical meaning of the Lorentz amendment is revealed. It has been shown that it reflects the influence of the compressibility of a dark gas on the speed of light.

In this theory we are sought to ensure that the majority of our conclusions were confirmed by the comparisons with the available experimental and observational data and could be cross-checked. This, of course, will complicate the read of the book, but it will show to the reader the seriousness of the results. The value of the proposed dark matter theory is that in it from the same positions was yielded interesting results in diverse branches of science, such as, the theory of gravity, the theory of the electromagnetic fields, the astronomy, the theory of light and the phenomena of the microworld.

PART 1

The concept of dark matter is the key to understanding the laws of nature

Currently, in the scientific literature there is the statement that 96% of the total amount of the matter in the universe is the so-called the dark matter. It is uniformly fills the entire universe, and it can not be identified with the any observable celestial bodies. It was called the dark matter because it is invisible. No one has not seen in order to it was involved in the gravitational interactions between stars and star clusters. Its existence the astrophysics explains by causes of the background radiation of radio waves. This radiation is detected by radio telescopes at wavelengths of about 7.35 cm. Actually, it is unknown to nothing in addition. The share of the baryonic matter is not more than 4% of all matter in the universe (baryonic matter mainly consists of the heavy elementary particles, neutrons and protons).

In connection with this in the science the assumption gaining strength, that in the universe there are two kinds of a matter. One of them is the ordinary baryonic matter, and the other, the so-called a dark matter. There is the evidences and the objections to such a view of nature. To add the arguments in favor of evidence to the existence of a dark matter in the space between the baryon bodies, in this book we shall re-look at the experience of PA Cherenkov 1934 about the luminescence of very fast electrons due to γ-rays of the radioactive elements as they pass through the liquid. In 1958, to Cherenkov, together with Tamm and Frank was awarded the Nobel Prize in Physics "for the discovery and interpretation of the Cherenkov effect."

1.1 The Astrophysics about a dark matter

The history of the existence of dark matter is such. The American astrophysicists A.Penzias and R.Vilson had found in the horn receiving antenna of a radio telescope the weak nonvanishing background of the extraterrestrial by the origin. It had not dependent on the orientation of the antenna. This a radiation is called by the relic radiation. After its opening in 1968 to A.Penziasu R.Vilsonu and were awarded the Nobel Prize in Physics.

Later it was conducted systematic studies of the CMB at the different wavelengths of up to half a millimeter. The results yielded the dependence of the radiation energy from the wavelengths (fig.1.1.1). It turned out that this dependence corresponds to the blackbody radiation with a very low temperature 2,75 K, close to the absolute zero. As can be seen from fig.1.1.1, in the left part lies to the CMB spectrum of electromagnetic waves, and in the right part there is the radiation of the stars, including the Sun ($\lambda \approx 5 \cdot 10^{-8}$m). The cosmic microwave background spectrum is allocated to a relatively high intensity at its maximum.

Today, the cosmology tries to link the CMB with the concentration of the photons which had been emitted at an early stage of the universe after the "big bang". However, it was found that the average weight of these photons [15,16] per unit volume several hundred times less than the average density of baryonic matter $\rho = 10^{-27}$ kg/m^3. Moreover, the average density of a baryonic matter is the same for the entire observable Universe. This means that the distribution of a matter in the universe is homogeneous on the average on a large scale, and the Universe is homogeneous.

Рис.1.1.1

Thus, it appears that the CMB indicates only about the presence of dark matter, but it is not a dark matter. Indeed, as noted in [15,16], shortly after discovery of the CMB Soviet astronomer Shklovsky and American scientists Dzh.V.Fild and Dzh.L.Hichkok had noted the following fact. Back in the early 40s of the 20th century according to the observations of the spectra of interstellar they found that the molecules that make up the interstellar gas (cyanogen radicals CN), are in an excited state. The energy of this excitation corresponds to a temperature of about 3^o. Thus, it turned out to be that the interstellar molecules is by a thermometer, which was showing temperature of the CMB to astronomers .

In summary, we note that the observational astronomy showed the presence in the space a uniform distribution of dark matter. About it nothing else is known, except that it there is all over and reacts with the molecules of the interstellar gas, manifesting itself by blackbody radiation, corresponding to a temperature T=2,75o K. The experimental evidence has not been found to date, that a dark matter is subjected to the action of a gravity.

1.2 The effect of PA Cherenkov

In 1934 year PACherenkov first observed a glow extremely fast electrons, which was caused by rays of radioactive elements as they pass through the liquid. This the observation destroyed the concepts of physicists that only fast-moving an electron emits light. It became clear that this conclusion is valid until the speed of the moving electron V is less than the phase velocity of light. The phase velocity of light in the transparent material is C/n. Where n - the refraction index of substance. For the most transparent materials it is more than unit. Therefore, the electron velocity may to exceed the phase velocity and become a "super-light".

A feature of this luminescence is that it is distributed within the cone with an angle of half-solution ν and it is determined by the relatio

$$\cos\nu=(C/n)/V=C/nV. \tag{1.2.1}$$

The flux of the light is observed only in the direction in which the electron moves. In the opposite direction the light is not emitted. In the analysis of this phenomenon, the focus of physicists, apparently, was focused on the fact "superluminal" motion of the electron. This is understandable, since the appearance of "superluminal" velocity refuted the basic postulate of the theory relativity that the speed of light is limit of the speed of baryon bodies in nature.

The fact, that this speed exceeded the phase velocity of a light, rather than the speed of light in vacuum. It had reassured to scientists. So, today physics, as in many other cases, only stated a fact light emission by an electron, moving not accelerated but evenly. But the question left unanswered of why there is this glow. Why this a glow there is only against the motion of the electron and only within a cone of angle ν ?

1.3 The shock waves in a gaseous dark matter

We expect that a dark matter is a gas in ours further the studies. Therefore, it is possible to attract for of the further research the scientific potential of gas dynamics. Therefore, in the future, along with the term "dark matter" we will use the term "gaseous dark matter" and "dark gas". On this basis, we will gradually build up and expand the evidence base for the correctness of the chosen areas of the research. Based on this view, we will try to identify and justify the physical nature of the "PA Cherenkov effect".

Indeed, as with any gaseous medium, the motion of the bodies in a gaseous dark matter at supersonic speeds should lead to the appearance before them of shock waves. Under the speed of sound is usually understood a velocity of propagation of a weak perturbations. Applied to gaseous dark matter (dark gas) the phrase "speed of sound" is meaningless, but retains its value the term "velocity of propagation of the weak disturbances". We denote the velocity of propagation of the small perturbations in a quiet dark gas through C_{a}.. If a space is filled not only a gaseous dark matter but yet by a liquid, this speed change becomes equal to the phase velocity of light C_a/n. It is known that in the limit on a very large distance from the ball the shock wave weakens, is degenerating into a line of weak perturbations, and the angle of the shock wave tends to the value of the angle of perturbation μ,. determined through the Mach number from the relation. This angle is defined in terms of the Mach number ratio (Fig.1.3.1)

Fig.1.3.1

Fig.1.3.1 shows the image of the ball as it moves through the air at supersonic speed. A curvilinear shock wave is showed. The angle of inclination of the surface of the shock wave to the direction of flight quickly decreases from 90^o in front of the ball up to a certain value β far away from the ball

$$\mathrm{Sin}\mu=1/M\ . \qquad (1.3.1)$$

With regard to gaseous dark matter, this ratio takes the form

$$\sin \mu = 1/M = (C_a/n)/V, \qquad (1.3.2)$$

where C_a / n - the phase velocity of propagation of a weak perturbations; V - a velocity of the electron.

According to wave theory Huygens' the light rays are a family of straight lines normal to the wave front. Such a wave front in case of the "superluminal" motion of the electron is a shock wave that bounds the domain of perturbations, caused by an electron. Therefore, the half-angle of the cone, inside of which is distributed the glow of Cherenkov, is the angle between the direction of motion of the electron and the directions of the two families of the straight lines, normal to the shock waves (fig.1.3.1).

Analyzing the glow Cherenkov, we may to note that at small sizes of the electron and a high speed of its movement was impossible to discern the structure of the bow shock wave in the vicinity of the surface of a flying electron. Therefore, in the experiment was recorded only feature associated with the spectrum of flow far enough from the electron, where the angle of the shock wave β is close to the corner of perturbation μ. On this basis, it is possible to determine the relationship between the angles ϑ and β as follows

$$\beta=90^{\circ}-\nu. \qquad (1.3.3)$$

Equation (1.2.1) is confirmed in practice well. Consequently, the ratio of (1.3.3) also will have been provided a real value for variables member, characterizing a gaseous dark matter. For example, for an electron moving in benzene $\nu = 38,5^{\circ}$ (n = 1,501). This allows you to define a very important characteristic of dark matter - velocity of propagation of small perturbations in a gas.

Indeed, putting an angle equal to $\mu \approx \beta$, we find from (1.3.3) angle perturbation $\mu = 51{,}5^{\circ}$. The Mach number of the moving electron, according to (1.3.2) is M = 1,278. His speed from (1.2.1) will be $V = C/(n \cdot \cos\nu) = 2{,}554 \cdot 10^{8}\, m/s$. Finally, from (1.3.2) we obtain the velocity of propagation of a small perturbations in the dark gas when the electron moves with a number of M = 1,278 , as $C_a = n \cdot V / M = 3{,}0 \cdot 10^{8}\, m/s$. Thus, the velocity of a propagation of small perturbations in the dark gas coincides with the velocity of light in vacuum

$$C_a = C = 3 \cdot 10^{8}\, m/s \tag{1.3.4}$$

It is important to emphasize that in the experience of the Cerenkov a glow was seen only in the direction of motion of the electron but it was absent in the opposite direction This indicates that the glow in the experiment of Cherenkov was generated by a shock wave in front of the electron rather than the spread of small perturbations in the dark gas. Otherwise, in the experience of the Cerenkov glow should have been observed also after a flying electrons, since nothing prevents such a proliferation of small perturbations in the gas media. In Cherenkov's experiment, the glow was observed only in the direction of motion of the electron and was not emitted in the opposite direction.

Apparently, the light perceived by the human eye through a sharp increase in pressure on the shock wave generated in the gaseous dark matter when it reaches the eyes. The mass of the gaseous dark matter entrained shock wave has momentum and can to put pressure on the barrier that absorbs a light. The human eye has its own threshold of sensitivity to a sharp increase in pressure and to power influence on the retina of the eye of a compressed cork of dark gas, that is moving behind the shock wave.

Thus, the experience of Cerenkov confirms the possibility of distribution in the gaseous dark matter of shock waves and therefore confirm the existence of the gaseous dark matter.

Part 2

The fundamental role of dark matter in the Universe. About the concept of "dark matter"

The universe is assumed to be filled with moving dark matter. Objects of ordinary baryonic matter (for example, elementary particles, solids, liquids, gases, planets, stars, galaxies) exist in the ocean of dark matter and are special mobile forms of dark matter. All baryons constantly absorb dark matter. On the surface of elementary particles, a phase transformation of gaseous dark matter into liquid or solid takes place state. This leads to a constant increase in the mass of baryonic matter. From these assumptions follows the law of universal gravitation. All the basic parameters of gaseous dark matter, namely, density, pressure, velocity, etc. are determined using the laws of continuum mechanics and available observational data. It is shown that the reserve of dark energy of the Universe (energy of dark matter) is very huge and dark energy plays an important role in the energy balance of all objects of baryonic matter, including galaxies, stars and planets.

The concept of "dark matter" appeared in science not from a good life. Not all scientists can come to terms with the absurd ideas of modern physics about the propagation of electromagnetic and light waves in empty space between bodies, in which not matter, but the of mathematical equations, vibrates. They are not satisfied by the idea of vibrates members of equations inside the incorporeal fields and acting as if by themselves by inertial forces. Surprisingly, positive and negative charges attract and repel other charges; as if by "pike's command." The statement of the theory of relativity about the constancy of the speed of light, the independence of this speed from the speeds of the radiation source and the reflecting surface, accepted by modern science, is also surprising. This dogma of Einstein's theory of relativity contradicts all human practice based on the principle of Galileo and Newton on the addition of velocities during the movement of any material bodies, including photons. (a photon of light is a material particle and its motion must obey these laws).

These fields and phenomena manifest themselves as quite real forces of interaction. Basically, they are described by mathematical laws. This is quite enough for the practical activities of mankind. However, the nature of these phenomena has not yet been clarified. Currently, many scientists are acutely aware of the falsity of modern ideas about space and time, they see a futile bias of modern research towards a purely mathematical description and, most importantly, an understanding of phenomena occurring in nature without their material content. Often, they try to determine the past, present and future of the Universe from equations, and not from observations, experiments and human practice.

I will allow myself to express some considerations about the concept of "dark matter". It should be considered as the concept of a continuous primordial medium, consisting of the simplest, indivisible elementary particles, not endowed with the properties of positive and negative charges, gravitational properties, magnetism, etc. Dark matter is a continuous gaseous medium without viscosity and friction, the elementary particles of which (the atoms of a dark gas should not be confused with the atoms of baryonic bodies) have, apparently, a spherical shape, are in continuous motion and collisions with each other. Collisions occur as in absolutely elastic bodies without loss of energy, in full accordance with the kinetic theory of gases.

The absence of a void in the space occupied by a dark gas should be considered in the sense of filling the space with such an invisible liquid or gaseous medium, which can be described by continuous analytical functions in terms of density, pressure, temperature, velocity, and through which the strong and weak indignations are transmitted. In this case, when solving many problems, it is possible not to consider the own structure of this environment, but to operate with these generalized criteria. A dark gas, although it consists of infinitely small atoms in continuous motion, but due to their significant concentration in any arbitrarily small volume, can be considered as a continuous medium.

Each atom of dark matter, having mass, moves at a certain speed of the order of the speed of light and, therefore, has kinetic energy. The sum of the kinetic energies of all dark matter atoms per unit volume is the internal energy of the dark gas continuum in this volume. This energy is enormous due to the huge number of dark matter atoms in this volume.

The medium of gaseous dark matter, to an even greater extent than ordinary gases, has the ability to self-organize, accompanied by phase transformations of a dark gas from a gaseous form to a liquid and solid form, similar to what is observed on Earth with water. Water, as we know, can exist in the form of vapor, of liquid and of solid ice. Around such a “solid or liquid drop of dark matter”, due to absorption and compaction of gaseous dark matter from the surrounding space, a radial flow to its center is realized. In this case, large volumes of gaseous dark matter transform into small volumes of dense liquid and solid dark matter.

Of course, dark matter has its own inherent properties. During the transition from the gaseous phase to the liquid phase, the volume it occupies does not decrease by a factor of hundreds, as in the case of terrestrial gases, but by 1017 times, and this transition takes not minutes, but billions of years. As a result, a huge mass of dense dark matter is concentrated in the nuclei of atoms. In this case, the density of baryon nuclei reaches a density of the order of 1018 kg / m3 (as in a neutron liquid. Let me remind you that the so-called neutron stars consist of a neutron liquid. They consist of neutrons and protons that do not have electron shells. The density of a neutron liquid is 15 orders of magnitude higher than the density of all earthly materials). It is quite understandable that a dark gas rushes from the surrounding space under the influence of high pressure to the vacant space near the nuclei of atoms of material (baryonic) bodies into the region of low pressure. This leads to the fact that around all material bodies there are radial flows of dark gas to their centers.

Radial flows to the centers of bodies are unstable and therefore curl up into vortices. We observe a similar picture every time we release water from the bath through the drain. The peripheral velocity of jets of dark gas near the nuclei (sinks) of atoms increases, and the pressure decreases. The higher the speed, the lower the pressure. If the temperature of the nucleus of an atom of a substance (proton, neutron) rises, the transition from the solid phase of dark matter to liquid, and then to gaseous will begin. We all know that a steam boiler can explode if plugged. gas occupies a much larger volume than the water from which it was formed. The destruction of the nuclei of atoms of baryonic bodies and the partial transition of dark matter from a liquid phase state inside the nuclei of atoms of bodies to a gaseous state can occur as a result of strong collisions of these nuclei with each other. This is observed in accelerators (for example, in the hadron collider), in atomic explosions and in nuclear reactions occurring in the interiors of stars. In this case, a large amount of energy is released, which spreads from the source in all directions in the form of weak and strong disturbances in the surrounding field of gaseous dark matter.

Thus, in order to explain the phenomenon of absorption of dark matter by material (baryonic) bodies, the theory of gaseous dark matter does not need artificial methods, such as attracting a “singularity” by relativists, through which the matter absorbed by stars-“black hole” and supposedly goes into other dimensions. It is based on human practice, for which it is not unusual for a substance to change from a gaseous phase to a liquid phase, and from a liquid phase to a solid and vice versa. The flow of a dark gas in vortices near solid or liquid nuclei absorbing it is realized due to the high energy of the dark gas field (it is practically inexhaustible). And this vortex flow spins the nucleus of atoms of baryonic matter. As a result of these processes, an endless cycle of matter and energy occurs in the Universe.

All material bodies, regardless of their size, including the Earth, absorb dark gas. Therefore, any bodies on its surface, also absorbing dark gas moving to the center of the Earth, experience gravity, because along with the mass they also obtained and momentum of force are also obtained. The dark gas near the Earth also has a velocity towards the center of the Sun. The amount of motion of the mass of dark gas absorbed by the Earth and proportional to its mass is transferred to the Earth and creates an attractive force between the Earth and the Sun. This force keeps the Earth in its orbit. Dark gas also moves towards the center of the Milky Way, forcing the solar system to move in its orbit around the center of the galaxy, etc.

This raises a fair question, why, creating the force of gravity, the oncoming flow of dark gas does not sweep away everything that exists on the Earth's surface as it moves in orbit around the Sun at a speed of 30 km/s? This question can be answered only by understanding that dark matter is a gas. And gas has its own laws of interaction with streamlined bodies. If the bodies are flown around by an inviscid gaseous medium without friction and with constant speed, then the d'Alembert-Euler paradox takes place that "bodies moving in a continuous medium in a rectilinear manner at a constant speed do not experience force from the flow". This paradox has been rigorously proven by two great mathematicians. This explains why there is no dark gas flow force that could sweep away all bodies and objects from the surface of the Earth.

So, the force of gravity is created by the movement of jets of dark gas towards the centers of all material bodies. These jets carry away any bodies caught in these radial flows by gravity to the centers of large bodies. The classical “theorem of impulses” allows, taking into account the indicated mechanism of interaction between material bodies and dark matter, to obtain a mathematical expression of Newton's law of universal gravitation. As in Newton's law, gravity turns out to be proportional to the interacting masses and inversely proportional to the square of the distances between them. There is always a point between two material bodies at which the speed of the dark gas is zero. At this point, gravity is also zero.

The vortices of dark gas around the nuclei of atoms (baryons) cause a forceful interaction between closely spaced atoms of a substance, allowing the atoms to unite into molecules and more complex structures. The same vortices, which arise near conductors with electric current and near space objects with metal cores inside, create electromagnetic fields. The nature of inertial forces is also easy to understand if you imagine how you plunged into the water along your neck and start moving along the bottom of the reservoir. It is very difficult to move. masses of water around you are involved in your movement. When you have reached a constant speed of movement, the inertial force of water resistance disappears. This movement is impeded only by much lower frictional forces. When you brake, the water picking up your speed pushes you in the direction of travel. This is how the forces that we call the forces of inertia act. They are caused by the masses of dark gas that surrounds any of us, and which are involved in our movement during the moments of acceleration and deceleration. There is no viscosity or friction in dark gas. Therefore, we do not feel resistance to our movement at a constant speed. It is clear that only a very dense dark gas can create real forces of gravity and inertial forces. In fluid dynamics, this phenomenon is associated with the concept of “added mass”. Actually, what we call the mass of bodies is the “added masses” of gaseous dark matter, involved in the movement of bodies during their acceleration or deceleration.

2.1 Interaction of baryonic and dark matter

In this book we follow to modern concepts about dark matter which fills the space between material bodies (objects of baryon matter). Modern knowledge about dark matter and dark energy are very poor. The dark matter is considered as a special kind of material continuous medium with its own properties. Properties of gaseous dark matter are defined later. It is assumed all baryons permanently absorb dark matter. The dark matter is converted from a gas into a liquid state, and then into the solid state, that is, it turns into baryonic matter. Under certain conditions the baryons break down into atoms of dark matter. So there is a perpetual cycle of matter and energy in the Universe.

Phase transitions of dark and baryonic matter are the missing link in understanding the Universe. These transitions allow us to understand that the Universe is eternal, that along with the phenomenon of energy dissipation (the hypothesis of Clausius heat death) in the Universe exist powerful processes of creation. Dark matter and dark energy (energy of dark matter) are providers and regulators of the perpetual cycle of matter and energy. Dark matter is primary, while baryonic bodies and their properties are secondary.

Farther it is demonstrated that continuum mechanics is suitable tool for study of dark matter and dark energy as well as interaction between baryon and dark matters. The process of absorption of dark matter from surrounding space is the necessary condition of the baryonic matter existence. If this condition is violated then the baryon particles are splited into atoms of the dark matter. For baryonic particle the intensity of absorption the dark matter is characterized by the magnitude of the specific flow rate

$$q = \frac{dm_e}{dt} . \tag{2.1.1}$$

Here dm_e is the mass of gas dark matter that absorbed in time dt. Assume for simplicity that baryonic object has a spherical boundary. Due to continuity and central symmetry of flow we conclude that only the radial velocity is not equal to zero $V_{re} \neq 0$ and that a mass flow rate of gas for the sphere of radius r [9,10,11] is

$$q = -\ 4\pi r^2 \rho_e V_{re} , \tag{2.1.2}$$

where ρ_e is a density of gaseous dark matter. It is assumed that density ρ_e is constant because radial velocity of flow V_{re} is much less than the velocity C_{a0} of propagation of weak disturbances in gas dark matter (velocity C_{a0} is close to the light speed in vacuum $C_{a0} = C = 3\times 10^8 [m/s]$). From Eq.(2.1.1) the expression for radial velocity of gaseous dark matter follows

$$V_{re} = -q / 4\pi\rho_e r^2 , \tag{2.1.3}$$

here minus sign indicates that the velocity V_{re} is directed to the center of particle of baryon matter.

Assume that the mass flow rate $q\ [kg/s]$ during absorption is proportional to the mass of body that absorbs the gaseous dark matter

$$q = \frac{dm_e}{dt} = \alpha m , \tag{2.1.4}$$

where $\alpha\ [1/s]$ is the coefficient of mass flow rate of gaseous dark matter.

During absorption the mass of baryonic matter grows. Assume that the mass flow rate of absorption, regardless of chemical nature of baryonic matter and regardless of its physical state, is proportional to new mass formation rate

$$\frac{dm_e}{dt} = k\frac{dm}{dt} , \tag{2.1.5}$$

where k is the rate of mass formation. This is a constant. Its value does not depend on the chemical composition and physical state of baryons. We'll define it later. We replace the left-hand side of this equation, taking into account (2.1.4), by αm

$$\frac{dm}{dt} = \frac{\alpha}{k} m . \tag{2.1.6}$$

After integrating this expression, we get a very important law of nature. He shows how the masses of baryons throughout the universe increase over time due to the absorption of dark matter. All baryons obey this law, from elementary particles, atoms, molecules to planets and stars

$$m = m_0 e^{\frac{\alpha t}{k}} \quad . \tag{2.1.7}$$

The value m_0 represents the mass at the starting point in time $t = 0$. The coefficients α and k will be determined later. Taking into account the equations. (2.1.3) and (2.1.4) the radial velocity can be found as

$$V_{re} = \alpha m / 4\pi\rho_e r^2 \quad . \tag{2.1.8}$$

The minus sign on the right side is dropped.

2.2 The law of the universal gravitation Newton

Based on the above ideas about the interaction of dark and baryonic matter it is possible to get the theoretical solution to the problem of gravitation. Consider the flows of dark matter near two baryons that have masses M and m. Let the absorption flows have mass flow rates Q and q respectively (Fig. 2.2.1). Let r is the distance between bodies.

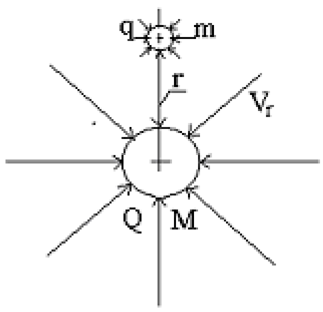

Fig.2.2.1

Adsorption flows satisfy to principle of superposition because velocities are negligible compared to the speed of light and the dark matter has no viscosity.

The mass qdt is the mass of dark matter absorpted by small body during time dt. The velocity of this mass V_{re1} in absorption flow in area the large body is

$$V_{re1} = Q / 4\pi\rho_e r^2 . \tag{2.2.1}$$

The momentum of this mass $V_{re1}qdt$ in absorption flow towards the large body is lost due to the action of force $Fdt = V_{re1}qdt$ with which the flow of absorption towards the body M acts onto the body m. Therefore this force is defined by the following formula

$$F = \frac{Qq}{4\pi\rho_e r^2} . \tag{2.2.2}$$

From Eq. (2.1.4) we get $q = \alpha m$, $Q = \alpha M$ Hence

$$F = \frac{\alpha^2}{4\pi\rho_e}\frac{Mm}{r^2} . \tag{2.2.3}$$

Same arguments with the same result may be used regarding the absorption flow towards the little body m and its action onto the big body M because for potential flows the principle of superposition of streams is valid.

Thus, equation (2.2.3) defines the force with which each of the bodies through the intermediate medium of dark matter acts onto another body. Conclusion is valid for any number of baryons. Comparing this formula with Newton's law of universal gravitation

$$F = f\,\frac{Mm}{r^2} , \tag{2.2.4}$$

where $f = 6.7\times10^{-11}[Nm^2 / kg^2]$ is the gravity constant [5], conclude that

$$f = \alpha^2 / 4\pi\rho_e \ . \qquad (2.2.5)$$

From formulas (2.2.1), (2.2.2) and (2.2.3) it follows, that the gravity force acceleration is

$$g = \alpha V_{re} = \frac{\alpha^2}{4\pi\rho_e}\frac{M}{r^2} = f\,\frac{M}{r^2}\,. \qquad (2.2.6)$$

Taking into account (2.2.6) for gravity force we may write

$$F_g = mg = m\alpha V_{re}\,, \qquad (2.2.7)$$

in which g is the acceleration in the SI system (acceleration can also be expressed through the parameters of the flow of gaseous dark matter. $g = \alpha V_{re}$)

Formula (2.2.7) establishes a bridge between the parameters of baryonic matter and dark matter. Dark matter is the primary matter, ("prom-matter", from which the baryonic matter of the world around us is created); speed of jets of dark matter; the force is directed in the direction of speed.

We find the density ρ_e of dark matter in a gaseous state from (2.2.5)

$$\rho_e = \alpha^2 / 4\pi f \ . \qquad (2.2.8)$$

The radial velocity to the centers of baryonic bodies can be written using formulas (2.1.8) and (2.2.5) in the following form

$$V_{re} = \frac{f \cdot m}{\alpha \cdot r^2} \ . \qquad (2.2.9)$$

2.3 Definition of generalized parameters of dark matter

The star absorbs dark gas. Therefore, the photons of light emitted by the star must overcome the incoming stream of dark gas in all radial directions. It is like sailing upstream of a river. If the swimmer's speed is not more than the speed of the water, he can swim for as long as he wants, but not move forward against relatively shores. Taking these considerations into account, we conclude that a star ceases to be visible when the radial velocity of the gas of dark matter on its surface becomes equal to the speed of light: Such a star will turn into a “black hole” and disappear from the field of view. This condition can be written using expressions (2.1.8) and (2.2.5) for the radial velocity on the surface of any star in the form

$$V_{re0} = fm/\alpha r_0^2 = C\,, \tag{2.3.1}$$

Where $f = \alpha^2 / 4\pi\rho_e = 6.7\times 10^{-11}[Нм/кг^2]$ is the gravitational constant.

We use this formula to calculate the mass flow rate of gaseous dark matter through the surface of baryons $\alpha\ [1/s]$. From formula (2.3.1), we see that the highest radial velocity of gaseous dark matter on the surface of a star can be expected for very dense stars with high mass and small dimensions. Stars "white dwarfs" are suitable for this purpose, including the densest Wolf star -457 (mass $m = 1.01\times 10^{30}[kg]$ and radius $r_0 = 0.7\times 10^6[m]$) [3]. This star is about the same size as Earth. But its mass is a million times the mass of the Earth, but only half that of the Sun.

For star Wolf-457, according to equation (2.3.1), the coefficient $\alpha = 0.46\ [\mathrm{s}^{-1}]$. This is the threshold of invisibility. But since this star is visible, it is clear that α is somewhat larger. It is possible that there are denser visible stars in the Universe that have not yet been found. If we imagine that in the same volume of “white dwarf” Wolf-457 with a radius of $r_o = 0{,}7\times 10^6[m]$, the mass is twice that of the star Wolf-457, namely, $m_o = 2{,}02\cdot\times 10^{30}$ [kg], the flux coefficient of gaseous dark matter in accordance with the formula (2.3.1) takes the value α = 0.92 [s-1]. This value is close to one. Therefore, we take as the coefficient of mass flow rate of gaseous dark matter through the surface of all baryonic bodies of the Universe

$$\alpha = 1\ [s^{-1}]\ . \tag{2.3.2}$$

If α is equal to one, the speed of a jet of dark gas on the surface of Wolf-457 is approximately half the speed of light $V_{re0} = fm / \alpha r_0^2 = 1,36 \times 10^8 m / s$. Today astronomers do not find denser stars. Apparently, they became "black holes" and became invisible.

The cost α=1 [s^{-1}] and formula (2.1.4) $q = \frac{dm_e}{dt} = \alpha m$ lead us to a completely unexpected understanding of the baryon mass of bodies. From these formulas it follows that the flow of dark gas through the surfaces of baryons was equal to the mass of baryons. Although we call the masses of baryons and the mass of a dark gas in the same dimension, in fact they are different concepts, although they are related to each other. It becomes clear that all baryon masses grow with time. This increase in mass cannot be understood as a purely mechanical addition of the absorbed mass of the dark gas to the mass of the absorbing body.

Nevertheless, there is a physical process by which the absorbed large masses of dark gas are in turn converted into a very small baryonic mass of bodies, thereby increasing their ability to absorb dark gas from the surrounding space. Thus, further study of the relationship between the consumption of dark gas $\frac{dm_e}{dt}$ absorbed by baryons and the low rate of formation of a new baryonic mass per unit time is needed. Let's consider this issue in more detail. The value $\alpha = 1\,[\mathrm{s}^{-1}]$ allows you to calculate the density value of a calm dark gas (gaseous dark matter) using (2.2.5)

$$\rho_e = \alpha^2 / 4\pi f = 1.19 \times 10^9 [кг / м^3]. \qquad (2.3.3)$$

Note that formulas (2.2.5) and (2.3.3) describe the physical nature of Newton's gravitational constant. This constant is inversely proportional to the density of gaseous dark matter, i.e. are uniquely related to the properties of dark matter.

For completeness, let us estimate the pressure p_e of the dark matter gas. Gaseous dark matter is an ideal monatomic gas. It is characterized by the density

ρ_e and has the speed of propagation of small perturbations $C_{a0} = 3 \cdot 10^8 [m/s]$ (it is equal to the speed of light in vacuum). Then, in accordance with the laws of gas dynamics [8,9,10,11], for the pressure we obtain

$$p_e = \frac{\rho_e \cdot C_{a0}^2}{\chi} = 6.426 \cdot 10^{25} [H / м^2] \ , \qquad (2.3.4)$$

where $\chi = \dfrac{i+2}{i} = \dfrac{5}{3} = 1.67$ is the adiabatic exponent, $i = 3$ is the number of degrees of freedom of a dark matter gas atom.

The observational astronomy has convincingly shown [3] that dark matter interacts with interstellar gas molecules (radical cyanogen CN) and causes the phenomenon of cosmic background radiation with temperature:

$$T_e = 2.75 \ [^o K] \qquad (2.3.5)$$

Let's take this temperature as the temperature of the dark matter gas. Thus, we now have approximate values of the main parameters of the dark matter gas: density, pressure and temperature.

The internal energy of a unit mass of gas U_o is related to the flow velocity V_e by the energy equation known in gas dynamics for isentropic flows, which we write for a dark gas flow:

$$\kappa U_{oe} + V_e^2/2 = V^2_{max}/2 = const. \qquad (2.3.6)$$

It is seen from this equation that with an increase in the flow velocity, the internal energy decreases, passing into the kinetic energy of the ordered flow and vice versa. Here V_{max} **is the maximum possible velocity of gas outflow into the void. Let us substitute in equation (2.3.6) the value of the internal energy per unit mass of dark gas** $U_{oe} = i \cdot C^2 / 2 \cdot \kappa$**. As a result, the value of V_e=0 is determined from the condition that in calm ether at V_e=0, the speed of C_a is equal to the speed of propagation of weak disturbances in quiet ether C_{ao} = 300000 km / s**

$\mathbf{V_{max}=\sqrt{i}C_{ao}=519615\ км/с=5,19615\cdot 10^{8}м/с}$. (2.3.7)

From formula (2.3.6) it follows that at $V_e=V_{max}$ the local velocity of propagation of weak disturbances is C_a=0. This means that in a dark gas flow moving with the maximum possible speed V_{max},, the chaotic motion of dark gas atoms stops. As a result, the transmission of weak disturbances stops. When the flow reaches the velocity V_e=C (the speed of light in emptiness or in a calm dark gas), the propagation velocity of weak disturbances remains quite large: $C_a=0,812C_{ao}$=244800 km / s.

2.4 The law of growth of the mass of baryonic bodies

To determine the coefficient of the mass formation rate k, let us turn to the phenomenon of the secular acceleration of the Moon. It is known [21] that among many celestial motions that fully correspond to celestial mechanics, there are several cases of discrepancy between the observed and calculated motions of celestial bodies. One of these unexplained phenomena is the so-called secular acceleration of the Moon. Comparison of ancient observations of solar eclipses with new observations showed that the moon is now moving slightly faster than before. Every 100 years, the Moon moves forward against the calculated position by 10" or at a distance of about 18,6 km. Only part of this acceleration, about 6", is explained by the theory of gravity, and the remaining 4" (ΔS_{100}) are present due to an unknown reason [21]:

$$\Delta S_{100} = 7.45\ [km] = \ 0.745\times 10^{4}[м]. \quad (2.4.1)$$

The moon is accelerating due to the increase in the earth's mass over time. Let's show it. Assuming that the Moon's orbit is circular, we write down the equality of the forces acting on the Moon (gravity and centrifugal force):

$$mV^{2} / r_{opbit} = fmM / r_{opbit}^{2}, \quad (2.4.2)$$

where m and M are the masses of the Moon and Earth, r_{opbit} is the radius of the Moon's orbit, f is the gravitational constant. From this equation we find the orbital velocity of the Moon: $V = \sqrt{fM / r_{opbit}}$. Taking into account the growth of the Earth's mass (formula (2.1.7)), we get the law of the Moon's acceleration:

$$V = \sqrt{\frac{fM_0}{r_{opbit}} e^{\frac{\alpha t}{2k}}} \approx \sqrt{\frac{fM_0}{r_{opbit}}} \left(1 + \frac{\alpha}{2k} t\right), \tag{2.4.3}$$

where M_0 is the mass of the Earth at the initial moment $t = 0$. This relationship means that over time, the orbital speed V must increase in order to keep the Moon in its orbit. From (2.4.3), the additional increment of the Moon's path due to its orbital acceleration can be written in the form:

$$\Delta S = \frac{1}{4} \frac{\alpha}{k} \sqrt{\frac{fM_0}{r_{opbit}}} t^2 \ . \tag{2.4.4}$$

For $M_0 = 5.98 \times 10^{24} [kg]$, $r_{opbit} = 3.844 \times 10^8 [m]$,

$t = 100\ [years] = 3.15 \times 10^9 [s]$ we get

$$\Delta S_{100} = 2.52 \times 10^{21} \alpha / k\ [m]. \tag{2.4.5}$$

Due to the proximity of the Moon to the Earth in its motion, we can seen such deviations . But such deviations cannot be detected in observations of more distant astronomical objects. Given the reliability of the data on the motion of the moon, we use equations (2.4.1) and (2.4.5) to determine the ratio α / k and rate of mass formation k :

$$\alpha / k \ = \ 2.97 \times 10^{-18}\ [1/c], \tag{2.4.6}$$

$$k \ = \ 3.36 \times 10^{17}. \tag{2.4.7}$$

The values of the coefficients $\alpha = 1[c^{-1}]$ and $k = 3.36\times10^{17}$ allow us to return to the law (2.1.7) of the increase in the masses of baryons in the Universe as a function of time. Table 2.4.1 shows the results of calculations of the ratio of the masses of baryons at the considered moment of time to the mass at the initial moment of time in the range from 1 billion years to 20 billion years. All elementary particles, atoms, molecules, as well as planets and stars, including our Earth, obey this law.

Note in passing that the value $\alpha / k = 2.97\times10^{-18}\ [1/c]$ is equal to the Hubble constant. Apparently, the redshift in the spectra of distant galaxies is not due to the scattering of galaxies and the expansion of the Universe, but due to the increase in the weight and size of a photon of light from galaxies on its way to Earth.

Table 2.4.1

Time (billion years)	1	2	3	3,5	5	10	15	20
$m/m_o = e^{\frac{\alpha}{k}}$	1,1	1,2	1,33	1,38	1,61	2,59	4,17	6,62

When solving this problem, a wide variety of stars and the processes occurring in them must be taken into account. It is known [15,16] that along with an increase in body mass due to the absorption of dark gas, stars also emit large masses. So the sun through corpuscular radiation loses $7\times10^{14}[kg/year]$ while the loss of mass due to radiation $1.5\times10^{17}[kg/year]$.

The corpuscular radiation and electromagnetic radiation are characteristic properties of all stars. Apparently, the intensity of corpuscular radiation is proportional to the intensity of light radiation, that is, the luminosity of the star.

Thus, the loss of mass, as well as its accumulation, are roughly proportional to each other. For the most massive stars, the rate of mass loss can be very high.

For example, the bright Wolf-Rayet supergiant emits $2\times10^{25}[kg / year]$, that is, 10 orders of magnitude more than the Sun, and receives (2.1.6) $1.8765\times10^{21}[kg / year]$. That is, this star currently emits 10000 times more mass than it receives [15,16].

We recall that baryonic bodies absorb gaseous dark matter from the surrounding space in accordance with equation (2.1.5) $dm_e / dt = kdm / dt$. From the equation. (2.1.5) it follows that the rate of absorption of the mass of the gas of dark matter is many times greater than the rate of formation of the baryon mass. Over time, a large mass of dark matter gas creates a very small amount of baryonic mass. We obtain the relationship between these masses by integrating the equation. (2.1.5) and setting the integration constant equal to zero

$$m = \frac{m_e}{k} \quad . \tag{2.4.8}$$

The mass of "dark matter" m is considered the mass of a dark gas, measured in terms of the mass of baryonic matter familiar to humans. According to this formula, the density of dark gaseous matter can also be determined in the usual units adopted for the density of baryonic matter. To do this, we must reduce the density of dark gaseous matter ρ_e by a factor of k

$$\rho_e^* = \rho_e / k = 3.54\times10^{-12}[g / sm^3] = 3.54\times10^{-9}[kg / m^3]. \tag{2.4.9}$$

This is the average density of gaseous dark matter in the Universe, written in terms of the density of baryonic matter. Formula (2.4.9) is a bridge between dark matter (pro-matter) and baryonic matter-the world of things and objects around us.

2.5 About the Big Bang theory

The obtained law of growth of the mass of baryonic bodies makes it possible to answer the main question of the existence of the universe, how the universe lives, develops, dies and revives again, and how the term "Big Bang" should be understood in this context.

Initially, let us consider the history of the Big Bang theory and attempts to modernize it from the idea of □□the explosion of a hypothetical elementary particle with incomprehensible properties that occurred 15 billion years ago to the idea of the explosion of outer space itself between of distant galaxies. This explosion, according to the Big Bang theory, gave birth to the Universe. As a result of the explosion, baryonic matter, space and time were formed. The formed galaxies began to scatter in different directions, signaling to Earth by the redshift in the spectra obtained by astronomers. Let us show the weaknesses of this theory. Then we will offer for consideration our idea of this problem.

2.6 The modern ideas about "Big bang"

At present, astrophysics claims that our universe was formed as a result of the "Big Bang". This belief arose from astronomical observations of distant galaxies, in the spectra of which a large redshift was observed, which meant an increase in the wavelength of light reaching from these galaxies to an observer on Earth. Hubble's law related the increase in wavelength to the distance to these galaxies. Based on Doppler's law, physics has linked the cosmological redshift in the spectra of distant galaxies with their divergence from each other, including from an observer on Earth [15,16]. Hubble's law is written as

$$\Delta\lambda / \lambda = H^* \cdot L = H \cdot t \,, \qquad (2.6.1)$$

where $H \approx 3\cdot 10^{-18}[1/s]$ is the Hubble redshift constant, $H^* = H / C \approx 10^{-26}[m^{-1}]$. $L[м]$ is the distance between the galaxy and the observer on Earth, the time the light travels from the emitting galaxy to the Earth. In addition, the belief that the Big Bang occurred in the distant past is confirmed by the detected relic radiation and gravitational waves that have reached our time after the explosion.

There are two points of view on what the Big Bang was. According to the first of them, known as Gamow's Big Bang theory (1946), a superdense elementary particle exploded about 15 billion years ago. Our Universe was formed from the explosion products. Since then, it has been continuously expanding and as a result, galaxies scatter and signal this with a redshift in their spectra. Over time, with distance from an observer on Earth, the expansion rate increases.

As it approaches the edge of the visible universe, the wavelength of light increases significantly faster than predicted by Hubble's law. For the discovery of the accelerated expansion of the Universe, the authors of this discovery were awarded the Nobel Prize in 2011. The question remains, in what form the matter and energy were inside this superdense elementary particle before the explosion? It is considered incorrect to ask what was around this particle before the explosion and where to is the Universe expanding? Since space and time in the universe also arose from the Big Bang. At the same time, it is believed that protons, neutrons, positrons, electrons and other long-lived elementary particles formed 15 billion years ago and have survived unchanged to this day.

The second point of view arose from the inconsistency of ideas about the explosion of a kind of "cosmic egg", which was the explosion of the largest nuclear bomb. This point of view boils down to the assertion that "space" exploded, not a material object. At the same time, the authors of this idea do not bother themselves with explanations of what, in their opinion, is "space" and what can explode in empty space? The authors of these ideas need to reckon with the fact that today astrophysics considers space as empty, at best filled with electromagnetic radiation. Within observable space, astronomers observe explosions of stars, but they do not observe explosions of space between stars.

According to the second point of view, the expanding space carries the galaxies with it. As a result, galaxies scatter and, in accordance with the Doppler law, signal this by expanding the length of the light wave. At the same time, the mechanism of interaction of material objects with space has not been developed. Sometimes the authors and supporters of the expansion of space agree to the fact that space expands, and the galaxies remain in their places and do not scatter. They argue that the cosmological redshift has nothing to do with the Doppler effect and do not bother to explain what, in this case, causes the redshift in the spectra of distant galaxies? Therefore, the second point of view is no better than the first.

2.7 The updated Hubble's Law.

Our proposed work has a different point of view on this natural phenomenon. We believe that the reason for the emergence of ideas about the expansion of the Universe lies in insufficient knowledge of the properties of light. Astrophysics does not know what happens to a quantum of light during its long motion, measured in billions of light years, from a distant star to an observer on Earth through space filled with gaseous dark matter. The knowledge gap allows for various interpretations of this phenomenon, including those discussed earlier. Now in physics and cosmology, it is believed that the atoms of baryonic matter were formed as a result of the Big Bang. Since then and to this day, these atoms have survived unchanged in their original form. In contrast to these ideas, we have a different point of view on this phenomenon of nature. Our ideas are based on the idea that baryonic bodies, up to the smallest ones, constantly absorb dark matter from the surrounding space and, as a result, increase their mass, in accordance with our earlier obtained in the law (2.1.7):

$$m = m_o \cdot e^{\frac{\alpha \cdot t}{k}} . \qquad (2.7.1)$$

The quantity is the mass of the body at a point in time $t = 0$, i.e. at the beginning of the countdown. We omit the minus sign on the right side, because the direction of the velocity to the center of the body is specified in words. The magnitude $\frac{\alpha}{k} = 2{,}97 \cdot 10^{-18} [c^{-1}]$. It was obtained by us from the analysis of changes in the motion of the Moon that have taken place over the centuries and has nothing to do with the ideas of the expansion of the Universe. Nevertheless, it turned out to be equal in magnitude to the Hubble redshift constant $H = \frac{\alpha}{k}$.

Expression (2.7.1) defines the law of increase in the masses of all bodies in the Universe with increasing time, including photons of light.

Those. we believe that the Universe is not as static as astrophysicists currently think about it. Over time, not only living beings, plants, bacteria, viruses, etc. change. Non-living matter, for example stars, planets, moons, meteorites, up to atoms and elementary particles also change over time. The reason for these changes lies in the interaction of all these bodies with dark matter. Knowing this opens up additional opportunities for understanding the dynamics of the world around us.

We believe that when leaving the emitting atom at a speed of $C = 3 \cdot 10^8$ m / s, the photons of the light wave carry away the momentum J. This momentum is equal to the product of the mass of photons m_o and the speed of light C, and it persists until meeting with the observer

$$J = m_o C = m \cdot C' = Const . \tag{2.7.2}$$

During the movement of a light wave from a radiation source to an observer on Earth, the mass of photons, like all other baryonic bodies, increases with time due to the absorption of dark matter from the surrounding space according to the revealed law (2.7.1). With increasing mass, the speed of light C' decreases, because the amount of movement remains constant

$$C' = \frac{m_o C}{m} = \frac{m_o C}{m_o e^{\frac{\alpha}{k}t}} = \frac{C}{e^{\frac{\alpha}{k}t}} . \tag{2.7.3}$$

Here $C = 3 \cdot 10^8 [m / s]$ is the speed of light at a moment $t = 0$. It is the same as that of light in earthly conditions. The value $\frac{\alpha}{k} = 2{,}97 \cdot 10^{-18} s^{-1}$ is very small. It was obtained by us from the analysis of changes in the motion of the moon, occurring during a long time of observations of this space object.

The number of waves passing by the observer's device in one second will be determined by the expression

$$\nu' = \frac{C'}{\lambda} = \frac{C}{e^{\frac{\alpha}{k}t} \cdot \lambda} = \frac{C}{\lambda'} . \tag{2.7.4}$$

The new wavelength λ' after the expiration of time t will be

$$\lambda' = e^{\frac{\alpha}{k}t} \cdot \lambda . \tag{2.7.5}$$

The wavelength in the path from the radiation source to the observer on Earth will increase by an amount

$$\Delta\lambda = \lambda' - \lambda = e^{\frac{\alpha}{k}t} \cdot \lambda - \lambda = \lambda(e^{\frac{\alpha}{k}t} - 1) . \tag{2.7.6 }$$

Hubble's law for the increment of the wavelength of the light wave in this case can be written as

$$\frac{\Delta\lambda}{\lambda} = e^{\frac{\alpha}{k}t} - 1 = e^{H^* \cdot L} - 1 . \tag{2.7.7}$$

This new version of the Hubble law more correctly reflects the realities of the world around us than the known original version of this law. It should be noted that Hubble's law for very large distances and, consequently, the time of motion of a light wave, it is more correct to write down without resorting to a series expansion of the quantity $e^{\frac{\alpha}{k}t}$, i.e. as

$$\Delta\lambda / \lambda = e^{\frac{\alpha}{k}t} - 1 = e^{H \cdot t} - 1 = e^{\frac{H}{C} \cdot L} - 1 . \tag{2.7.8}$$

As can be seen from formula (2.7.8), the redshift in the spectra of galaxies increases exponentially with distance. The value $\frac{\Delta\lambda}{\lambda}$ is determined from the lines of the Balmer series in the spectra of the observed objects.

Objects have already been discovered [15,16,19], for which $\frac{\Delta\lambda}{\lambda}$ tends to 5 and whose velocities of distance from the Earth approach the speed of light. In accordance with formulas (2.6.1) and (2.7.8), these offsets are obtained differently. The calculation using the Hubble formula, without any tweaks, contradicts the modern estimate of the size of the investigated part of the universe, approximately equal to 15 light years. For example, let's perform a calculation using these formulas for $\frac{\Delta\lambda}{\lambda} = 3$. We will get

$$L_{habbl} = \frac{\Delta\lambda / \lambda}{H^*} = \frac{3}{10^{-26}} = 3 \cdot 10^{26}[m] = 32 \text{ billion light-years.}$$

Calculation by the refined formula of the theory of dark matter (2.7.8) gives a more correct result. For example for $\frac{\Delta\lambda}{\lambda} = 3$

$$L = \frac{\ln\left(\frac{\Delta\lambda}{\lambda} + 1\right)}{H^*} = \frac{1{,}38}{10^{-26}} = 1{,}38 \cdot 10^{26}[m] = 14{,}6 \text{ billion light-years.}$$

Where $1Gyr = 10^{16}\,s$

From the more accurate Hubble's law (2.7.8) obtained by us, we notice that over time, in contrast to the linear Hubble's law (2.6.1), the wavelength increases nonlinearly. The more the light wave is on the way, the more intensively its length increases. This is explained by an increase in the mass of photons that make up the light wave. And this does not mean at all that the Universe is expanding, especially since this expansion occurs the more intensely, the further away from us its outer border is moved. Figure 2.7.1 shows a comparison of the increase in the wavelengths of light, obtained by formulas (2.6.1) and (2.7.8), depending on the distance to the radiation sources and the propagation time of light from distant galaxies to the Earth.

However, if we take the erroneous point of view of the supporters of the Big Bang theory and interpret the accelerated increase in the wavelength predicted by law (2.7.8) in comparison with (2.6.1) as an increase in the rate of removal of galaxies from the observer on Earth, then it turns out that the

Universe indeed expands at an accelerated rate as it approaches its outer boundaries.

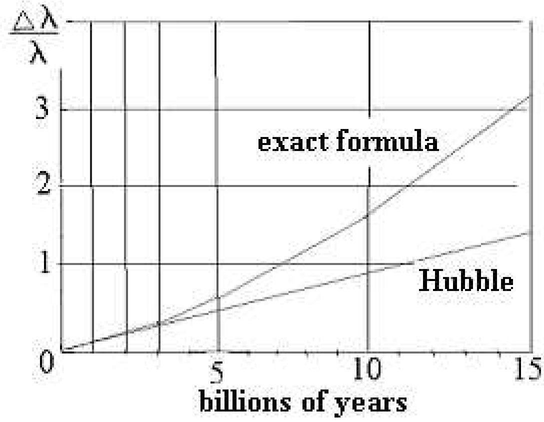

Fig.2.7.1

We also note that as a result of the explanation of the nature of the redshift in the spectra of distant galaxies given in the book, by the interaction of photons of light with dark matter, it is unnecessary to explain this phenomenon by the Doppler effect and of the "Big Bang" of an incomprehensible elementary particle.

Explosions of massive stars are observed in the Universe and are the most important events in the cycle of the circulation of matter in the Universe. They do not occur at the same time, but are the result of the accumulation of excess weight through the absorption of dark matter. Apparently, these explosions are accompanied by partial conversion into gaseous dark matter with a large energy yield.

Summarizing all that has been said, it can be argued that none of the considered points of view on the phenomenon called the "Big Bang" can convincingly, in accordance with the earthly practice of man and the knowledge accumulated by physics and astronomy, explain what exploded 15 billion years ago and spawned the universe? Both of these points of view agreed on only one thing, that the universe expands after the explosion. Moreover, the expansion of the Universe is happening in a strange way. The Milky Way galaxy and the nearest galaxy Andromeda are approaching, not scattering, and, therefore, contradict Hubble's law. Galaxies far from the Earth scatter in accordance with the Hubble law, and at a very large distance from the Earth, near the visible edge of the Universe, galaxies cease to obey the Hubble law and begin to scatter at an increased speed. There is no explanation for this.

Returning further to the more exact form of the Hubble law (2.7.8) obtained by us, we note that over time, in contrast to the Hubble law, the wavelength increases nonlinearly. Hubble's law is written as

$$\Delta\lambda / \lambda = H^* \cdot L = H \cdot t \,, \qquad (2.7.9)$$

Where $H \approx 3 \cdot 10^{-18} [1/s]$ is the Hubble redshift constant, $H^* = H / C \approx 10^{-26} [m^{-1}]$. $L[m]$ is the distance between the galaxy and the observer on Earth, $t = \frac{L}{C}[s] -$ the time the light travels from the emitting galaxy to the Earth.

The longer the light wave is on the way, the more intensively its length increases. This is explained by an increase in the mass of photons that make up the light wave. The more their mass becomes, the more they absorb dark matter from the surrounding space and the more intensively their mass grows and, therefore, the more intensively the wavelength grows. It is this property of light that leads to a more intense increase in the wavelength with an increase in the distance between the observer on Earth and the radiation source near the visible edge of the Universe. And this does not mean that the Universe is expanding, and does not mean that this expansion occurs the more intensively, the further away from us its outer border is. The convergence of the Milky Way and Andromeda galaxies, which are close to the observer on Earth, is explained by the own speeds of these galaxies, and not by the expansion of the space of the Universe. **Hence it follows that no expansion of the space of the Universe occurs. Everything is explained by the properties of light.** The main question remains open, whether the “Big Bang” occurred 15 billion years ago, which is signaled by relic radiation and gravitational waves. In this regard, we will present our hypothesis about the “Big Bang”.

2.8 The Big Bang hypothesis, which rejects the expansion of space

This hypothesis is based on the idea that baryonic bodies, including elementary particles, are surrounded by an ocean of gaseous dark matter and constantly absorb dark matter from the surrounding space. As a result of this process, their mass and size increase over time. Radial flows to the centers of bodies are unstable and therefore curl up into vortices. These vortices spin the nuclei of atoms at a high speed.

The atoms of baryonic matter rotate very quickly, because dark gas enters them at high peripheral speed. Apparently, the phase transition of a dark gas from a gaseous state to a liquid (solid) state occurs at the outer boundary of atoms at the speed of dark gas jets reaching the speed of light (in a vacuum) $C = 3 \cdot 10^8 m/s$. The presence of a circumferential velocity upon absorption of a dark gas by an atom leads to the unwinding of an atom with a radius $r_0 = 10^{-10}[m]$ up to an angular velocity of the order of $\omega = \frac{C}{r_0} = \frac{3 \cdot 10^8}{10^{-10}} = 3 \cdot 10^{18}[1/s]$. The nucleus of the atom rotates with the same angular velocity. The hydrogen atom has an axis of rotation and, accordingly, has poles. Let's select a segment of the atomic nucleus with a width Δr near the equator, as shown in Fig.2.8.1.

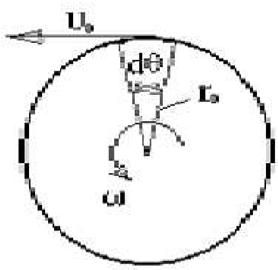

Fig.2.8.1

The mass of this segment $dm = \rho_o r_o^2 \Delta r \cdot d\theta / 2$. This mass, (the center of mass is located at a distance $r_{ц.м} = \frac{2}{3} r_o$ from the axis of rotation), rotating with an angular velocity ω, is acted upon by a centrifugal force

$$dF_z = \frac{3u_o^2 dm}{2r_o} = \frac{3}{4}\omega^2 r_o^3 \rho_o \Delta r \cdot d\theta \, . \tag{2.8.1}$$

This force is balanced by the force of external pressure acting on the surface of the segment where the pressure of the dark gas p_{e-V} at the velocity $V = C$ in the jet decreases compared to the pressure p_e in the dark gas at the velocity $V = 0$ This pressure according to [8,9,11] is equal to $p_{e-V} = p_e (1 - \frac{C^2}{V_{\max}^2})^{\frac{\kappa}{\kappa-1}} = 2{,}64 \times 10^{25} [N / m^2]$; The pressure in the calm gaseous dark matter of the surrounding space is defined by us as $p_e = 6{,}426 \times 10^{25} [Па]$, the circumferential velocity on the outer boundary of the atom $u_o = \omega \cdot r_o = C = 3 \cdot 10^8 [м / c]$. The density of the substance of the nucleus of an atom can be expressed by the ratio of its mass m to its volume $\rho_o = 3m / 4\pi \cdot r_o^3 \approx 10^{18} [кг / м^3]$. A segment of the atomic nucleus will be torn apart by centrifugal force when it exceeds the pressure forces

$$dF_{ц.б} / dF_p \geq 1 \, . \tag{2.8.3}$$

Substituting expressions (2.8.1) and (2.8.2) into inequality (2.8.3), we obtain the condition for the destruction of the atomic nucleus by centrifugal forces

$$\frac{dF_z}{dF_p} = \frac{9\omega^2 m}{16\pi \cdot r_o p_{to} (1 - \frac{C^2}{V_{\max}^2})^{\frac{\kappa}{\kappa-1}}} \geq 1 . \tag{2.8.4}$$

The hydrogen atom (nucleon) and the pressure in the dark gas are characterized by the following parameters: mass is $m = 1{,}673\times10^{-27}[kg]$, angular velocity of rotation $\omega = 3\times10^{18}[s^{-1}]$, radius of the nucleus $r_o = 10^{-15}[m]$, radius of the atom $r_A = 10^{-10}[m]$, pressure in the dark gas $p_e = 6{,}426\times10^{-25}[N/m^2]$. For the nucleus of a hydrogen atom, we have according to formula (2.8.4) $dF_{ц.б} / dF_p = 0{,}0187 < 1$. Consequently, the nucleus of a modern atom cannot be torn apart by centrifugal forces.

The process of transition of gaseous dark matter into a liquid phase at the boundary of atomic nuclei of baryonic bodies increases their mass and size. Next, we will estimate how long it took to fill the nucleus of a hydrogen atom to its present size. From expression (2.1.6) it follows that the growth rate of the mass of the atomic nucleus is determined by the dependence $\frac{dm}{dt} = \frac{\alpha}{k}m$ .The mass of an atom in accordance with the law (2.1.6) does not increase uniformly over time. We take the value as the average of this increase $(\frac{dm}{dt})_{mdl} = 0{,}7\frac{\alpha}{k}m$. Taking this value into account, the mass of an atom will increase in the time interval Δt in accordance with the expression $m = (\frac{dm}{dt})_{mdl}\Delta t$. The modern value of the mass of the hydrogen atom $m = 1{,}67\cdot10^{-27}[kg]$ This mass has accumulated over time $\Delta t = \frac{m}{(\frac{dm}{dt})_{mdl}} = 0{,}48\cdot10^{18}[c] = 15{,}3[Gyr]$. This time has an order of the life span of the Universe from birth to the present day, assigned to it by astronomy.

The process of filling the core with liquid dark matter increased weight and volume to the extreme. This brings us to the Big Bang hypothesis. We believe that the "act of creating baryonic matter from a dark gas" could occur simultaneously throughout the entire Universe. Liquid dark matter fills the nuclei of atoms for a long time. For all matter in the universe. annihilation of matter can also occur at the same time (by astronomical standards). It is likely that this will be accompanied by a simultaneous explosion. It will be the Big Bang. In this case, of course, the explosion of one "superdense elementary particle" is not needed, the structure of which even scientists with the most violent imagination could not imagine. An explosion of empty space with its subsequent expansion don't you also need.

In this case, the **"Big Bang" will begin everywhere, as if at the signal of a clock mechanism installed in each atom.** As a result of this explosion, matter will decay into free atoms of dark gas. The entire field of dark gas will be excited by the explosion and vortexes formation will immediately begin, that is, the transformation of dark gas into matter. The process can be repeated an infinite number of times.

You can try to estimate how much time is left until the next "Big Bang". For this we use the condition of destruction of the atomic nucleus (2.8.4). In this case, we will take into account that with increasing time, the mass of the atomic nucleus will increase in accordance with the law $m = \cdot m_o e^{\frac{\alpha}{k}t}$. With increasing mass, the radius of the nucleus will grow in accordance with the expression

$$r = \sqrt[3]{\frac{3m_o e^{\frac{\alpha}{k}\cdot t}}{4\pi \cdot \rho_o}} . \qquad (2.8.5)$$

The angular velocity of rotation of the atom does not change in this case, because it was determined from the peripheral speed at the farther boundary of the entire atom, and not its nucleus. Taking these remarks into account, the condition for the destruction of the atomic (hydrogen) nucleus takes the form

$$\frac{dF_z}{dF_p} = \frac{9m_o\omega^2 e^{\frac{\alpha}{k}t}}{16\pi\cdot\sqrt[3]{\frac{3m_o e^{\frac{\alpha}{k}t}}{4\pi\cdot\rho_o}}\cdot p_{eo}(1-\frac{C^2}{V_{\max}^2})^{\frac{\kappa}{\kappa-1}}} \geq 1, \qquad (2.8.6)$$

Where
$\kappa = 5/3$, $p_e = 6{,}426\times10^{25}[H/m^2]$, $u_o = C = 3\times10^8[m/s]$,
$m_o = 1{,}673\times10^{-27}[kg]$, $\omega = 3\cdot10^{18}[s^{-1}]$, $\alpha/k = 2{,}97\cdot10^{-18}[s^{-1}]$. The calculation showed that this condition $t = 32$ billion years is fulfilled at. The radius of the nucleus of the hydrogen atom at this moment is $r = 2{,}02\cdot10^{-15}[m]$. Those. by this time the size of the atomic nucleus had grown by a factor of 2.02.

So from the previous "Big Bang" has passed about $15{,}3$ billion years, and the next one needs to wait more 32 billion years. For now, you don't have to worry about the next Big Bang. In this case, one must take into account the fact that we did not make an accurate calculation, but an approximate estimate. The obtained values can be refined.

The considered hypothesis of the nature of the Big Bang partly coincides with one of the two previously considered existing theories of the Big Bang in that the explosion occurs simultaneously and everywhere in the entire universe. **The fundamental difference is that it is not empty space that explodes, but all the atoms of the baryonic matter of the Universe or its large part explode, as it were, at the signal of the clock mechanism, but this does not lead to the expansion of the space of the Universe.**

2.9 The fine structure of dark matter

Until now, we have not considered the fine structure of dark matter. However, for a deeper understanding of the nature of the universe, we will try to find out the structure of this substance. At the same time, it is clear in advance that this substance cannot be seen, directly touched, weighed, chemically analyzed, and so on. Dark matter is viewed as a gas. This gaseous dark matter is made up of atoms that are in constant motion. Due to the significant volumetric concentration of these atoms, dark matter is viewed as a continuum. Such a medium is described in a traditional way, using the usual values of density, pressure, temperature and velocity. With the help of this medium, ordinary baryonic bodies interact with each other. To study the internal structure, we will use the achievements of gas dynamics and thermodynamics. For this we turn to the equation of state for an ideal gas [8,9,12]. To obtain gaseous dark matter, the equation of state can be written in the form

$$\frac{p_e}{\rho_e} = \frac{b}{m^*_{e-A}} T_e , \qquad (2.9.1)$$

where $b = 1.38 \times 10^{-23} \left[J / K \right]$ is the Boltzmann constant, p_e, ρ_e and T_e are the pressure, density and temperature of gaseous dark matter. From the formula (2.9.1) we find the mass of one atom of dark matter m^*_{e-A}

$$m^*_{e-A} = bT_e \rho_e / p_e = 7.03 \times 10^{-40} [kg] . \qquad (2.9.2)$$

According to formula (2.9.2), the mass of one dark gas atom, represented in the usual units of the mass of baryons of bodies, we can express through the mass of one dark gas atom, written in units of the mass of dark matter

$$m^*_A = m^*_{e-A} / k = 7.03 \times 10^{-40} / 3.36 \times 10^{17} [kg] = 2.09 \times 10^{-57} [kg] . \qquad (2.9.3)$$

The number of dark matter atoms per cubic meter of space is very large

$$n_e = \rho_e W / m^*_{e-A} = 1.19 \cdot 10^9 / 7.03 \times 10^{-40} = 0.17 \times 10^{49} . \qquad (2.9.4)$$

If we assume that the density of an atom of dark matter is equal to the density of the nucleus of a hydrogen atom, we can determine the radius of an atom of dark matter

$$r_{0e}^{*} = \sqrt[3]{\frac{3m_A^*}{4\pi\rho_0}} = 0.62\times10^{-25}[m] \; , \qquad (2.9.5)$$

Where $\rho_0 = 10^{18}\ [kg/m^3]$ is the density of the nucleus of the hydrogen atom [1,2]. For comparison, recall that the radius of the nucleus of the hydrogen atom $r_{0-nu} = 10^{-15}\ [m]$. The number of dark matter atoms that are located next to each other inside the nucleus of a hydrogen atom is equal to the ratio of the masses of the proton m0-nu to the mass of the dark matter atom m_A^*

$$N_{0z} = m_{0-nu} / m_A^* = \frac{1.67\times10^{-27}}{2.09\times10^{-57}} = 0.8\times10^{30}. \qquad (2.9.6)$$

The nucleus of a hydrogen atom constantly absorbs dark matter atoms for 15 billion years ($4{,}71\cdot10^{17}\,s$) at the speed $0{,}17\cdot10^{13}$ of dark matter atoms per second. Stable elementary particles constantly absorb dark matter for billions of years. The absorbed dark gas with a low density $3{,}54\cdot10^{-9}$ [kg / m^3] becomes a liquid with a density $\rho_o = 10^{18}$ [kg / m^3]. When a substance passes from a gaseous to a liquid state, the volume decreases.

Hence we can conclude that an elementary particle is something like a liquid drop of dark matter. Its shape is maintained due to high external pressure or, possibly, in accordance with Gamow's hypothesis [15, 16], due to surface tension. It is obvious that the conversion of dark matter gas into particles of baryonic matter is accompanied by a change in the type of its interaction with dark matter gas in free space.

2.10 Nature of inertial mass

Many physicists have speculated at various times about the nature of inertial mass. For example, the Austrian physicist Ernst Mach expressed the idea that inertia, that is, the unwillingness of mass to move in response to the action of a force, can be explained by the joint attraction of all matter in the Universe, and that the mass of an object is not something only inherent in it, but depends on the surrounding universe. We show in this article that the inertial mass of the material bodies of the Universe is due to their interaction with the field of gaseous dark matter. This mass is called the added body mass. The monograph assumes that gaseous dark matter (dark gas) fills the Universe. Baryonic bodies from elementary particles to planets and stars are in the ocean of gaseous dark matter and interact with it.

2.11 The added mass of baryonic bodies

In (2.3.2) and (2.3.3) the physical parameters of gaseous dark matter were obtained. The values of the coefficient $\alpha=1c^{-1}$ and the density of gaseous dark matter (dark gas) $\rho_e=1{,}19\cdot10^9$ kg/m^3 raise the question of how the mass of baryonic bodies should be understood today in concepts of dark matter? The first thing that is striking is the enormous density of gaseous dark matter filling the space between baryonic bodies. Estimating this, it should be understood that the atoms of baryonic bodies consist of very dense nuclei with a density of the order $10^{18}\,kg/m^3$, surrounded by a cloud of electrons. A cloud of electrons occupies a large volume compared to the volume of nuclei. As a result, the average density of atoms turns out to be relatively small, on the order of. $10^3\,kg/m^3$. The question arises whether the high density of the dark gas will prevent the movement of bodies through this gas. Let's take an example.

To understand this, consider a hypothetical spatial fishing net with large meshes. Its average density, and not the density of individual threads, is low compared to the density of water. If you increase the size of the cells, then this average density can be made as small as desired. But at the same time, the network will easily pass through the water. Such a fishing net device simulates the atomic structure of most of the minerals that make up the Earth and other planets. For liquids and gases, the interatomic distances are of the order of 10^{-10} m and more. At the same time, the size of the nuclei of atoms of these liquids and gases is only 10^{-15} m [1.2]. The internuclear distances become inconceivably huge if they are measured by the dimensions of an atom of gaseous dark matter $r_o=10^{-25}$ m.. Consequently, the nuclei of atoms that make up the molecules and the bodies themselves, including the planets and stars, cannot be an insurmountable obstacle to the movement of these bodies through gaseous dark matter or to the flows of gaseous dark matter through bodies.

A continuous non-viscous medium resists only bodies moving either with acceleration or deceleration. And this is exactly what we see in the nature of the movement of celestial bodies. To explain these features of the force interaction between a continuous medium and moving bodies, scientists W. Thompson and Tet once developed the theory of added masses. Without it, for example, it is impossible to correctly calculate the flight of an airship, which, due to its huge volume, has a large added mass.

According to the views of the method of added masses, we will consider the medium of a dark gas together with a solid body moving in it as a single mechanical system. In this case, the work of the forces acting on the body will be associated with a change in the kinetic energy of the surrounding dark gas or the impulse of these forces and the associated change in the momentum.

In the initial period of motion, in order to develop a speed from zero to V, the body must expend energy to overcome the energy of the particles of the dark gas medium. This energy is stored in it even after the speed of the body reaches a constant value V. Thus. it turns out that the change in the kinetic energy of a dark gas medium is closely related to the force of the impact on it of a body moving with acceleration j. This change in the kinetic energy of an infinite medium caused by the motion of a body, in the method of added masses, is represented as the kinetic energy of some, as it were, concentrated mass of this medium, all particles of which move with the same speed, equal to the speed of the body. The effective lumped mass is called added body mass.

Let us prove the theorem: the added mass of the "body-drain" is equal to the specific mass flow rate of gaseous dark matter (surrounding continuous medium) absorbed by this drain, multiplied by a unit of time.

We have already noted that interstellar dark gas freely penetrates moving bodies, flowing around only very dense atomic nuclei. Moreover, the nuclei of atoms continuously absorb dark gas, which at the boundary of the nuclei goes into a liquid state. (atomic nuclei are sinks for dark gas). A sink with a specific mass flow rate q creates a velocity field around itself in the surrounding dark gas (2.1.3, 2.1.8). Therefore, its accelerated or decelerated motion will correspond to a certain added mass of the gaseous dark matter m_e^*. An impenetrable spherical body moving in a continuous medium has its own attached mass, the value of which depends on the radius of the sphere r_{oz}.. We assume that for a certain value of the radius $r_{oz}=r_{oz}^*$. these added masses will be equal. We need to find this radius. Then the associated drain mass can be defined as the associated mass of a sphere with this radius.

Assuming that the atomic nuclei have a round shape, we write the well-known expression for the added mass m_{ze}^{*} of a spherical body [11] with the dimensions of the nucleus of an atom of a body moving with acceleration or deceleration through a dark gas

$$m_{ze}^{*}=0,5\rho_e W_{oz}=2\pi r_{oz}^{3}\rho_e/3\ , \tag{2.11.1}$$

where W_{oz} is the volume of the atomic nucleus of the body. r_{oz} is the radius of the atomic nucleus. The ability of bodies to absorb dark gas can be characterized by the value of the specific mass consumption of dark gas through a spherical surface per unit time

$$q=dm_e/dt=4\pi\cdot r^2\rho_e V_{re}\ , \tag{2.11.2}$$

where ρ_e is the density of the gaseous dark matter; V_{re} is the radial velocity towards the centers of the bodies; r-radial coordinate. It is obvious that the flows of dark gas to the centers of bodies depend on the mass of these bodies m. Therefore, specific costs are proportional to their masses

$$q=dm_e/dt=\alpha\cdot m\ . \tag{2.11.3}$$

α -coefficient of specific consumption. The speed with which streams of ether cross the surface of the body can be written in the form

$$V_{ro}=\alpha\cdot m/4\pi\cdot\rho_e r_o^{2}\ . \tag{2.11.4}$$

Further, using expressions (2.11.1), (2.11.2), we write down the expression for the specific consumption of dark gas q_A absorbed by an individual atom of a body with mass m_A and radius of the atomic nucleus r_{oz}.

$$q_A=dm_e/dt=4\pi\cdot r_{oz}^{2}\rho_e V_{reoz}=12\pi\cdot r_{oz}^{3}\rho_e V_{reoz}/3r_{oz}\ . \tag{2.11.5}$$

Comparing (2.11.1) and (2.11.5), we find a relationship between the specific mass flow rate of a dark gas absorbed by an atom of a body and the added mass of the nucleus of this atom m_{ze}^{*} and, therefore, by entire atom (electrons are not taken into account)

$$q_A=q_z=m_{ze}^{*} \cdot 6V_{reoz}/r_{oz} . \qquad (2.11.6)$$

If in this formula the factor $6V_{reoz}/r_{oz}$ is set equal to α

$$6V_{reoz}/r_{oz}=\alpha, \qquad (2.11.7)$$

then the specific mass flow rate of each atom of a body q will be equal to the added mass of the dark gas of the nucleus of an atom of this body m_{ze}^{*}., multiplied by α. From where

$$q_A=m_{ze}^{*} \cdot \alpha \qquad (2.11.8)$$

or

$$m_{ze}^{*} = q/\alpha , \qquad (2.11.9)$$

Q.E.D. We emphasize that when deriving the law of universal gravitation, the gravitational mass in accordance with (2.11.3) means the quantity

$$m=q/\alpha, \qquad (2.11.10)$$

those. a value equal to the specific mass flow rate of dark gaseous matter absorbed by the body, multiplied by a unit of time.

Taking into account that the added mass of the body-runoff is its inertial mass from equalities (2.11.10) and (2.11.9), it can be concluded that the inertial and gravitational masses are equal to each other. They are of the same nature, since are expressed in terms of the same value of the specific mass flow rate of the dark gas q absorbed by the body.

Let us replace in expression (2.11.7) the velocity V_{reoz} by expression (2.11.4) for a spherical surface of radius r_{oz}^* surrounding the atomic nucleus, $V_{reoz} = -\alpha m/4\pi\rho_e r_{oz}^{*2}$. After that, we solve the resulting equation for the effective radius. For proton mass $m=1{,}7\cdot 10^{-27}$ kg

$$r_{oz}^* = \sqrt[3]{\frac{3m}{2\pi\rho_e}} = 8{,}8\cdot 10^{-13}\text{м} . \qquad (2.11.11)$$

The region enclosed within a sphere with the effective radius r_{oz}^*, determined from condition (2.11.11), encompasses the atomic nucleus. The effective radius r_{oz}^*. determines the size of the spherical region, inside which, conventionally, all dark gas atoms move with the same speed. In accordance with the ideas of the method of added masses, this speed is equal to the speed of the body, and the kinetic energy of ether atoms inside this area is equal to the change in the kinetic energy of the infinite dark gas medium caused by the motion of the body. Those. it is exclusively about the interaction of the body with the environment.

Formulas (2.11.8), (2.11.9), (2.11.11) make it possible to better understand the large value of the dark gas density, which frightens many readers. There is a widespread idea of density as a tight packing of matter through which it is difficult to penetrate (squeeze) other objects. Along with this, there is a scientific understanding of density as the limit of the ratio of mass to occupied volume when the latter tends to zero. In turn, in science, mass is understood as a measure of inertia, i.e. the unwillingness of this mass to accelerate under the influence of the force applied to it.

It is clear that it is difficult to accelerate one cubic meter of dark matter in a dark gas field, because its mass will be determined by a huge value

$$m_e = \rho_e \cdot 1\text{м}^3 = 1{,}19\cdot 10^9\text{кг}. \qquad (2.11.12)$$

This is more than a million times the mass of one cubic meter of water.

$$m_{\text{воды}} = \rho_{\text{воды}} \cdot 1\text{м}^3 = 10^3\text{кг} . \qquad (2.11.13)$$

The reason that material bodies require less effort for their acceleration is that the inertia, mass and density of a body are ultimately determined by only a small added mass of dark gas involved in motion by the accelerating body. The rest of the mass of dark gas in the volume of the body passes by the nuclei of atoms inside the bodies, like through a sieve. She does not participate in the movement of the body and does not create obstacles to this movement.

For example, one cubic meter of water when accelerated involves a very small added mass of dark gas. This mass can be estimated using (2.11.11). We assume that a cubic meter of water refers to a cubic meter of dark gas, as the added mass of dark gas of one hydrogen atom $\rho_e(4/3)\pi\cdot r_{oz}^{*3}$, where ($r_{oz}^{*}$=8,8·10^{-13}m), to the mass of dark gas in the volume of this atom $\rho_e(4/3)\pi\cdot r_{oA}^{3}$, where (r_{oA} =10^{-10}m)

$$m_{воды}/m_e=0,681\cdot 10^{-6}\ . \qquad (2.11.14)$$

According to (2.11.12) and (2.11.13), the ratio of the mass of one cubic meter of water to the mass of one cubic meter of dark gas is

$$m_{воды}/m_e=0,84\cdot 10^{-6}\ . \qquad (2.11.15)$$

The observed discrepancy between our estimates (2.11.14) and (2.11.15) by 1.23 times means that we overestimated the radius of one atom in water molecules by 6.5%, otherwise the coincidence would be complete. It is clear that the ratio of the densities of water and dark gas will be the same as the ratio of the masses of one cubic meter of water and one cubic meter of dark gas

$$\rho_{воды}/\rho_e=0,84\cdot 10^{-6}\ . \qquad (2.11.16)$$

The performed analysis allows us to assert that the mass of any material body is the total added mass of the dark gas of all the nuclei of atoms that make up this body.

Formulas (2.11.9) and (2.11.11) show that **the inertial mass of a body is not a mysterious, inexplicable property of the body itself. By its nature, it is a forceful reaction of the dark gas field to the accelerated and decelerated motion of the body and is determined through the added mass of the dark gas.** Naturally, this mass is determined by the parameters of the dark gas, the nuclei of the atoms of the bodies and the ability of the atoms of the bodies to absorb the dark gas from the surrounding space. It is the added mass that is a quantitative measure of the body's inertia, although it does not belong to this body, but is only attached to it, since expressed in terms of the specific mass flow rate of dark gas $q=dm_e/dt$...

In order not to introduce new terminology, in what follows, the added masses of bodies caused by their motion in a dark gas, we will habitually call them masses, the masses of dark gas particles will be denoted by the subscript “e”, for example m_e. The attached masses of bodies caused by their motion in air or water will be denoted m^*. Taking into account the result obtained, the force of inertia of a body moving with acceleration dV/dt in air or in water under terrestrial conditions can be written by the formula

$$F=-\frac{dV}{dt}(m+m^*)\,. \qquad (2.11.17)$$

In this formula, m is body mass. We now know that it is determined through the added masses of the dark gas of the nuclei of all atoms of the body in accordance with formulas (2.11.1) and (2.11.9). m^*-attached air mass of this body.

In addition, we note that the mass of baryonic bodies, as follows from equation (2.11.3) at $\alpha=1$, is determined not by the amount of matter inside the bodies, but, as it were, by the “appetite” of these bodies, i.e. the amount of dark gas that these bodies are able to absorb per unit of time (q). Consequently, the mass of any body is determined by the mass of dark gas involved in the movement along the radii to the centers of each of these bodies. The very idea of □□the masses of bodies turns out to be associated with the amount of motion and energy of the masses of dark gas, which are outside these bodies, but are involved in movement to their centers due to the absorption of dark gas.

Returning to the question of whether each person feels the forceful effect of a dark gas, let us answer that each person feels this effect on himself in the form of a pressing force of gravity, in the form of a force of inertia at the moments of acceleration or deceleration. All our habits, devices and mechanisms function with this influence in mind. Sometimes, as we know, underestimating this leads to tragic consequences. Only moving in a straight line at a constant speed, a person can temporarily forget about the existence of a dark gas. Considering that it is the dark gas that creates the force of inertia during the accelerated motion of bodies and the force of gravity (attraction), it can be understood that it cannot be poetically incorporeal, but must have greater density and inertia.

On the other hand, it would be strange to expect that a weightless, extremely rarefied dark gas, or physical vacuum, could create quite tangible, and sometimes enormous, gravity. Moreover, by some miracle, he could drain into denser bodies. It is clear that dark gas is not only found around bodies, but also permeates these bodies. Therefore, despite the high density of baryonic bodies, there is a reduced pressure of the dark gas inside them compared to the pressure in the external field of the dark gas. This causes the dark gas to flow into these bodies.

Inside bodies, gaseous dark matter turns into a liquid state. In this case, the atoms of gaseous dark matter are located close to each other. Having negligibly small intrinsic dimensions, they occupy a very small volume (The volume of one atom of dark gaseous matter $W_{oe}=m_e/\rho_o=2{,}09\cdot10^{-75}$ m^3. For comparison, the volume of the nucleus of a hydrogen atom is $W_{oz}=4\pi\cdot r_{oz}^3/3$ $=4{,}19\cdot10^{-45}$ m^3). Therefore, the transition of gaseous dark matter into a liquid state inside the atoms of the body stretches over billions of years. This ensures a continuous process of absorption of dark gas by bodies from the surrounding space.

2.12 The effect of the compressibility of a gaseous dark matter onto the force interaction of the bodies with by gaseous dark matter. Masses of rest and motion

In Newtonian mechanics, mass is considered constant. Subsequently, this turned out to be incompatible with the requirement that the equations be invariant with respect to the Lorentz transformations used in the theory of relativity. Therefore, Einstein suggested that the mass of a body depends on the speed of the body relative to the frame of reference in which the mass is measured. As a result, it turned out that in two frames of reference moving with a speed V one relative to the other, to create the same accelerations dV / dt of the body, it is necessary to apply different forces. Hence the mass m, measured in the frame relative to which it moves, is greater than the mass mo in the frame in which it is at rest. The connection between these masses is determined by the formula [3]

$$m = \frac{m_o}{\sqrt{1 - \frac{V^2}{C^2}}}. \tag{2.12.1}$$

The greater the speed of movement of the body, the greater its mass. When the speed V tends to the speed of light in a vacuum, the mass becomes infinitely large. Since the forces are finite, the speed of light in emptiness turns out to be a limiting value that cannot be reached, much less surpassed. The mass m, determined by the formula (2.12.1), in the theory of relativity is called the transverse mass. There is also a longitudinal mass

$$m = \frac{m_o}{\sqrt[2]{(1 - \frac{V^2}{C^2})^3}}, \tag{2.12.2}$$

used when a force acts in the direction of travel. There is something strange about this division of masses into longitudinal and transverse. Why is the longitudinal mass not included in the momentum theorem used to study accelerated translational motions of bodies, but transverse mass is included? After all, this mass is used in movements with deviations from rectilinear movement. In light of the above, the momentum theorem of the theory of relativity has the form

$$\frac{d}{dt}\left(\frac{m_o}{\sqrt{1 - \frac{V^2}{C^2}}}\vec{V}\right) = \vec{F}. \tag{2.12.3}$$

It follows from the above formulas that noticeable differences in the values of m and m_o appear only at very high velocities V, approaching the speed of light in emptiness. These formulas are used in the study of the motion of electrons emitted by radioactive elements, as well as in the acceleration and deflection of electron beams in betatrons, synchrotrons and other devices.

Although an experimental test of the motion of electrons in a transverse electric field has confirmed formula (2.12.3), it cannot be recognized as comprehensive. It should be noted that in reality no one measured the mass of motion of an electron at near-light speeds. It was not for nothing that Einstein was tormented by the thought of whether it is possible to transfer the concept of rest and motion masses from inertial mass to gravitational mass. Direct verification is unlikely to be feasible due to technical difficulties. **In the meantime, we state that it was not the mass that was experimentally measured, but the force required to accelerate or deflect a moving electron in a system associated with the Earth. The only indisputable, therefore, is the observed increase in this force at speeds close to the speed of light.**

Evaluating this conclusion, let us recall that in human practice there are many cases when, with an evolutionary change in the operating modes of a particular installation or the course of a phenomenon, additional factors appear that change the quantitative indicators of these installations or phenomena. Moreover, these factors are not always visible. You need to be able to detect them. In the theory of relativity, prohibitions are prudently imposed on the identification of such additional factors. This is achieved by introducing the postulate of the constancy of the speed of light in emptiness and the rejection of the intermediate medium between bodies. Therefore, it is impossible to refute or change anything in this theory from the standpoint of the theory itself. A rigid mathematical apparatus will always lead to the same known conclusions.

Let's try to consider this problem, abandoning these two prohibitions of the theory of relativity. Suppose the universe is filled with dark matter. Dark matter is in a gaseous state. Baryonic bodies up to elementary particles exist in the ocean of dark matter. Previously, the properties of dark gaseous matter (dark gas) were studied, the main parameters of this medium were found. In this case, we will be dealing with the physics of gases. Mathematics plays an auxiliary, service role and does not hinder research.

If you think into Einstein's logic, you can easily imagine how a theoretical physicist in his thoughts compares the relative motions of various bodies, no matter how many of them there are and no matter how far from each other they are. **However, it is difficult to understand how nature determines and tracks what is moving relative what and in which system at a given moment in time mass calculations are performed. It is more realistic to look for the**

cause of the increase in force directly around the moving body. And there is such a reason.

The form of formulas (2.12.1) (2.12.3) suggests that the influence of the velocity V on the force that must be applied to a flying electron in order to accelerate it or change its trajectory is due not to the relativity of motion of the systems in which measurements are made, but due to the influence of the compressibility of the dark gas.

The electron and other elementary particles are very dense bodies of the Universe. Therefore, dark gas flows around these bodies in the same way as air flows around a soccer ball, or a meteorite that falls from space into the Earth's atmosphere. Consequently, flows of a dark gas near a flying electron can be described by the Laplace equation for an incompressible liquid if the velocity $V \ll C_{ao}$

$$\partial^2\varphi/\partial x^2+\partial^2\varphi/\partial y^2+\partial^2\varphi/\partial z^2=0. \qquad (2.12.4)$$

Here Cao is the speed of propagation of weak disturbances. It was previously shown that in a quiet dark gas Cao = C = 300000 km / s.

Consider the reversed motion. This is a common technique in gas dynamics. In this formulation, it is not the electron that moves with the speed V through the calm dark gas, but, on the contrary, the flow of the dark gas runs onto the stationary electron with the speed V.

It is known that the compressibility of a gas manifests itself at high velocities and is expressed in the fact that the action from any source of disturbances to a distant point is delayed in comparison with a similar action in an incompressible medium, where it manifests itself and is transmitted instantly. Vortex free flows of a compressible gas, which is the dark gas of world space at flow velocities approaching the speed C_{ao} and, therefore, the speed of light in vacuum, in a linear setting is described by the equation

$$(1-M^2)\partial^2\varphi/\partial x^2+\partial^2\varphi/\partial y^2+\partial^2\varphi/\partial z^2=0. \qquad (2.12.5)$$

In this equation, the number M is the ratio of the flow velocity to the propagation velocity of weak disturbances in a gas medium. As applied to a dark gas far from material bodies, $M=V/C_{ao}=V/C$. Here $C_{ao} \approx C=3\cdot10^8$ m/s is the propagation velocity of weak disturbances in a gas medium. C is the velocity of propagation of weak disturbances in a calm dark gas. By transforming coordinates of the view

$$x = \left(\sqrt{1 - M^2}\right) \cdot x_n ; y = y_n ; z = z_n . \qquad (2.12.6)$$

equation (2.12.5) for an arbitrary number M <1 is reduced to equation (2.12.4) for the number M = 0. The potential of velocities φ in both cases is the same. The speed of the body (electron) is directed along the OX axis. Formulas (2.12.6) show that when passing from an incompressible fluid to a compressible medium, the dimensions transverse to the direction of motion of a body or a dark gas do not change. Dimensions that coincide with the direction of motion along the OX axis are reduced in comparison with similar dimensions along the OXn axis in an incompressible medium in accordance with the formula coinciding with the Lorentz - Fitzgerald formula

$$l = \left(\sqrt{1 - M^2}\right) \cdot l_n .$$

Moreover, there is no need to literally understand this contraction as a physical change in the size of bodies. The properties of the flow of a dark gas around the body actually change due to the manifestation of compressibility, and the transition formulas (2.12.6) only formally interpret this phenomenon mathematically as a change in the length of bodies in the direction of their motion. In aerodynamics, the aerodynamic characteristics of the wings in an incompressible flow at M = 0 are thus successfully recalculated to their corresponding characteristics in a compressible flow at any numbers M <1.

Corresponding changes occur not only with linear dimensions, but also with local flow rates. Indeed, we differentiate the velocity potential along the coordinates X, Y, Z in a compressible flow and, passing to the coordinates Xn, Yn, Zn in an incompressible flow, we will have

$$\frac{\partial\varphi}{\partial x} = \frac{1}{\sqrt{1-M^2}} \frac{\partial\varphi}{\partial x_n}; \quad \frac{\partial\varphi}{\partial y} = \frac{\partial\varphi}{\partial y_n}; \quad \frac{\partial\varphi}{\partial z} = \frac{\partial\varphi}{\partial z_n}. \qquad (2.12.7)$$

Taking into account that the first derivatives of the velocity potential for both an incompressible and a compressible medium are equal to the corresponding projections of the velocity of the disturbed flow on the coordinate axes, we replace (2.12.7) with the corresponding equalities

$$V'_x = \frac{V'_{xn}}{\sqrt{1-M^2}}, V'_y = V'_{yn}, V'_z = V'_{zn} . \qquad (2.12.8)$$

These equalities give a connection between the velocities of a disturbed flow near a streamlined body, for example, an electron, in compressible and incompressible flows at all the corresponding points related by equations (2.12.6).

The velocities of the disturbed flow V′ and V′n represent the absolute velocities of the flow of a dark gas relative to the field of a calm dark gas in a coordinate system associated with the body (electron) and moving with it at a velocity V.

In this regard, we note that equations (2.12.6) (2.12.8) reveal the essence of real physical phenomena occurring in a compressible dark gas gas near a moving electron (body). At the same time, the study itself prompts the need to understand the coordinate systems and their relative movements. This is very similar to the approaches of general relativity. It also considers two systems moving relative to one another with a certain speed V. Depending on the system in which the speeds and other quantities of interest are measured, the correction $1/(1\text{-}M^2)^{1/2}$ appears in their expressions.

Only in the theory of relativity is it exclusively determined by the relative motion itself, and in the theory of dark gaseous matter, this correction is filled with physical meaning, since it takes into account the influence of the compressibility of a dark gas. In gas dynamics, this is known as the Prandtl correction for air compressibility. The propagation speed of weak disturbances in a dark gas and any other gas does not depend on the intrinsic speed of the disturbance source. It is this property that in the theory of relativity is transferred without proof to the speed of light and is introduced as an indisputable postulate.

From relations (2.12.8) it can be seen that at all points of the compressible flow at M> 0, the absolute velocities of the dark gas in the direction of the OX axis (the direction of motion of the body) are $1/(1\text{-}M^2)^{1/2}$ times higher than the velocities at the corresponding points of the incompressible flow at M = 0. The same changes will occur in the field of an incompressible flow near the body if, instead of taking into account the effect of compressibility, purely formally, the incident flow velocity is increased by $1/(1-M^2)^{1/2}$, that is, the incident flow velocity is

$$V = \frac{V_n}{\sqrt{1-M^2}}.$$

In direct motion, when a body (electron) moves through a calm dark gas, the velocities V and V_n will be the velocities of this body in compressible and incompressible flows. In this case, the momentum theorem is written in the form

$$\frac{d}{dt}\left(m_o\vec{V}\right) = \frac{d}{dt}\left(m_o\frac{\vec{V}_n}{\sqrt{1-M^2}}\right) = \vec{F}. \qquad (2.12.9)$$

Here, as in Newtonian mechanics, the body mass m_o is a constant value, and the speed, acceleration and, as a consequence, the force F depend on the correction for the influence of the compressibility of the dark gas $1/(1-M^2)^{1/2}$.

Next, we will follow the logic of the theory of relativity and assume that at any speed of motion of a body, for example an electron, in order to give it the same accelerations dV/dt and dV_n/dt in compressible and incompressible flows, you need to apply different forces to it. In this formulation, in equation (2.12.9) the correction $1/(1-M^2)^{1/2}$ formally moves from speed to body mass. As a result, this mass ceases to be a constant value and begins to depend on the speed of movement of the body relative to the calm dark gas. On the contrary, the velocities and accelerations in compressible and incompressible dark gas flows are equal to each other:

$V=V_н$, $dV/dt=dV_н/dt$.

As a result, the mass acquires the meaning of the mass of motion m at a speed V and a rest mass m_o at zero speed. Between them, as follows from (2.12.9), a connection is formally established

$$m=m_o/\sqrt{1-V^2/C^2} \quad . \qquad (2.12.10)$$

Here V is the velocity of a body with respect to a calm dark gas. With this understanding of mass, the momentum theorem (2.12.9) takes the form, as in the theory of relativity:

$$\frac{d}{dt}\left(\frac{m_0}{\sqrt{1-\frac{V^2}{C^2}}}\overline{V}\right)=\vec{F}\ . \qquad (2.12.11)$$

From the point of view of practical use, formula (2.12.11) does not differ in any way from formula (2.12.3) of Einstein's theory of relativity. However, the philosophical significance of this formula changes, since it is known in aerodynamics that the linear theory used to obtain it does not give the correct result at M = 1. For this, aerodynamics uses a different theory developed for transonic flows. This theory, although it gives the maximum values for the forces acting on bodies in gas flows at M = 1, but the forces remain finite values. The same theory should be applied to the analysis of dark gas flows with the transition through the speed of light in the void $C=3\cdot10^8$ m/s/.

Therefore, on the basis of formulas (2.12.3) and (2.12.11), one should not make a philosophical conclusion about the impossibility of exceeding the speed of light in emptiness by material bodies. In this connection, it is appropriate to recall that a number of publications have recently appeared on astronomical observations of superluminal velocities of some space objects. However, now the positions of the theory of relativity are still so strong that relativists are skeptical of these messages. Despite the facts, supporters of this theory are trying to find explanations that deduce from under criticism the main postulate of the theory of relativity that there are no more speeds in nature than light in a vacuum.

It is quite clear that when deriving formula (2.12.11), the correction $1/(1-M^2)^{1/2}$ was only formally transferred from acceleration to mass. Therefore, we can talk about the dependence of mass on speed rather conditionally.

It is necessary to dwell on one more point related to the acceleration of an electron. During the acceleration of the electron, when the Mach number is greater than the critical number Mcr, shock waves appear in the ether flow around the electron. This phenomenon is accompanied by the appearance of wave resistance, which requires additional force to overcome. It is quite clear that the wave impedance, preventing the acceleration of electrons in the forward direction, does not affect the curvature of their trajectories. Apparently this is connected with the division in the theory of relativity of masses into longitudinal and transverse. By changing the degree in the denominator of formula (2.12.1) and turning it into formula (2.12.2), it was possible to approximately take into account the additional force of wave resistance, which appears precisely when the speed of the electron approaches the speed of light and is therefore psychologically associated with the acceleration of the electron.

In conclusion, let us make an assumption about the problem that needs to be investigated in the future. If the body reaches the value of the superluminal velocity in gaseous dark matter, then the theorem on the change in momentum must be amended. This is done in gas dynamics when studying the motion of bodies in air at supersonic speeds.

2.13 Force interaction of the flow by dark gas whith moving bodies

All the bodies of the Universe do not move in emptiness, but in the ocean of dark matter. Why does not humanity participating in this movement feel and notice it? It's not just a matter of habit. After all, any person feels the forceful effect of wind or water pressure. It turns out that the main reason for the emergence of the resistance force of bodies in air or water flows is the viscosity of these media. Few people, with the exception of gas dynamics specialists, know about the D'Alembert-Euler paradox. According to this paradox, bodies moving at a constant speed in a gaseous or liquid medium of any density, but devoid of viscosity, do not experience resistance to their motion. The mathematical proof of this paradox was first given in 1745. Now it can be found in many textbooks on hydro-gas and aerodynamics, for example, in [8,9,11].

The difference between ordinary gases and dark gas flowing around bodies is that bodies are impenetrable for ordinary gases, but they are easily penetrated by dark gas through and through. **Therefore, the force interaction of bodies with a dark gas consists of forces acting on each of their atoms separately. These forces in gas dynamics are called mass forces.** The nucleus of an atom is a very dense formation and does not allow dark gas to pass through itself ($\rho_{ядра}=10^{18}$ kg/m^3).

The dark gas flows around the nuclei of atoms of bodies , but on the basis of the D'Alembert-Euler paradox, the bodies does not experience resistance of pressure to its motion. There is also no resistance of a friction, since the dark gas is practically devoid of viscosity. However, atomic nuclei continuously absorb dark gas from the surrounding space. Therefore, any material body consisting of atoms is a sink for dark gas. This makes its own adjustments to the force interaction of bodies with dark gas. around with dark gas, but on the basis of the D'Alembert-Euler paradox, it does not experience resistance of pressure to its motion.

The flow outside the atom is potential (irrotational). Therefore, the solution to the problem of the force interaction of bodies with a dark gas can be obtained by superimposing potential flows for any number of material bodies. That is, it is possible to separately investigate the problem of a uniform dark gas flow around bodies (sinks) and add the result to the D'Alembert-Euler paradox without absorbing the dark gas.

We are used to determining the force of inertia acting on bodies using the classical theorem of impulses

$$\overline{F}^{*} \cdot dt = -d(m \cdot \overline{V}), \qquad (2.13.1)$$

from where

$$\overline{F}^{*} = -m\frac{d\overline{V}}{dt} - \overline{V}\frac{dm}{dt}. \qquad (2.13.2)$$

This expression defines the force of inertia of the body. Modern science views this force as something that cannot be explained. **The theory of dark matter believes that the force of inertia is the force of the reaction of the dark gas field to the accelerated or slowed motion of the body.** When a body moves with acceleration in a dark gas field, the body must expend energy to overcome the inertia of the particles of the environment. This energy is stored in it in the form of kinetic energy. When the speed of the body reaches a constant value and no longer changes, further expenditure of energy stops and the resistance force, based on the d'Alembert – Euler paradox, becomes equal to zero. In the development of this concept of the nature of the inertial force, we replace the increase in body mass due to the absorption of dark gas from the surrounding space in equation (2.13.2) with the help of equation (2.1.6)

$$\overline{F}^* = -m\frac{d\overline{V}}{dt} - \frac{\alpha}{k}\overline{V}m. \quad (2.13.3)$$

This force is always directed in the direction opposite to acceleration. However, the reaction of a dark gas field to a moving body is not limited to equation (2.13.3). It does not take into account the flow velocity and inertia of the jets of dark gas flowing around the body. Taking this factor into account allowed us to reveal the physical nature of gravity. The force of gravity, as we have seen, is realized due to the fact that the mass of dark gas absorbed by the body q·dt every second loses its velocity V_e to zero and transfers its momentum to the absorbing body. However, this proof did not take into account the absorbing body's own speed.

Now let us consider the case when the absorbing body moves with speed $\overline{V}_{body}$ in the same direction (or in the opposite direction), in which the flow of dark gas flows with speed $\overline{V}_e$. The body absorbs an amount of dark gas $q \cdot dt = \frac{d(m_{e-body})}{dt}dt$ at a time dt. This mass of dark gas transfers to the body an amount of motion equal to

$$\overline{I}_{e-body} = q \cdot dt \cdot \overline{V}_e = \frac{d(m_{e-body})}{dt}dt \cdot \overline{V}_e.$$

Inside the body, the absorbed dark gas becomes the material of this body and in accordance with equation (2.1.5) its mass decreases and becomes equal $\frac{dm_{body}}{dt}dt = \frac{1}{k}\frac{dm_{e-body}}{dt}dt$. Since the body moves with speed $\overline{V}_{body}$, the amount of motion of this body mass will be

$$\overline{I}_{body} = \frac{d(m_{body)}}{dt}dt \cdot \overline{V}_{body} = \frac{1}{k}\frac{dm_{e-body}}{dt}dt \cdot \overline{V}_{body}.$$

The change in momentum corresponds to the impulse of the force with which the absorbed mass of dark gas acts on the body

$$\overline{F} \cdot dt = \overline{I}_{e-body} - \overline{I}_{body} = \frac{d(m_{e-body})}{dt}dt \cdot (\overline{V}_e - \frac{\overline{V}_{body}}{k}).$$

Where we find the expression for the force with which the flow of dark gas acts on a body moving in the same direction

$$\overline{F} = \frac{d(m_{e-body})}{dt} \cdot (\overline{V}_e - \frac{\overline{V}_{body}}{k}) \ . \qquad (2.13.4)$$

If the body is moving in the opposite direction, the sign should be changed in front of the body's speed. Considering that $k = 3{,}36 \cdot 10^{17}$ and $V_{body} \leq C$ (C =3·10^8 m/s is the speed of light), and that according to (2.1.4)

$$q = \frac{d(m_{e-body})}{dt} = \alpha \cdot m_{body} = \alpha \cdot m \ , \qquad (2.13.5)$$

expression (2.13.4) can be written neglecting the second term in brackets on the right side (as $\overline{V}_{body}/k \angle \overline{V}_e$)

$$\overline{F} = \alpha \cdot m \cdot \overline{V}_e \ . \qquad (2.13.6)$$

In this expression, the velocity V_e is no longer only the speed directed to the centers of bodies, but an arbitrarily directed speed. As will be shown later, dark gas vortices are widespread in nature, within which there are velocities directed in circles around massive bodies. The forces acting on the material bodies trapped inside these vortices will also be directed. In other words, **<u>the force F_g is directed in the direction of flow of a dark gas and does not depend on the magnitude and direction of the velocity of the uniform motion of bodies.</u>**

We have seen that this is so with the force of gravity. The latter is directed in the direction of the movement of jets of dark gas to the centers of mass of bodies, but does not depend on the direction and magnitude of the velocities of bodies in the gravity field, wherever they move. Formula (2.13.4) shows that this rule remains valid for arbitrarily directed velocities of dark gas jets.

The independence of this force, including the force of gravity, from the speed of uniform motion of the body is due to the new understanding of the mass of material bodies defended in this theory. The masses and momenta of material bodies entirely depend on the surrounding field of dark gas, outside of which they are inconceivable. According to these ideas, the momentum of bodies is also determined by the entire field of dark gas.

If jets of dark gas move relative to the field of dark gas, then they have momentum. This momentum cannot disappear without a trace, being absorbed by the body. Therefore, regardless of the magnitude of the speed of the body, this momentum is transferred to it, exerting a force on it in the direction of movement of the jets of dark gas. This happens even when the body is moving faster than these jets.

If the dark gas is calm and absorbed by a body moving through it at a constant speed, then the absorbed mass of the dark gas has no momentum. It is spent on a slow increase in body weight and, as a result, does not exert a direct force effect on the absorbing body. More precisely, it further manifests its forceful interaction with the field of a dark gas through the mass of an absorbing material body during its acceleration or deceleration.

Summarizing what has been said, it can be argued that not everything in the world is relative. The gravitational force is determined by the absolute speed of the dark gas surrounding the body and does not depend on the speed of the body itself.

Expression (2.13.6) allows you to determine the absolute speed of the dark gas flow at any point in space $\overline{V}_e = \dfrac{\overline{F}_g}{\alpha \cdot m}$. To do this, it is enough to measure the control body mass m and the gravitational force acting on it $\overline{F}_g$. It should be borne in mind that the field of a dark gas near massive material bodies is inhomogeneous. It contains vortex flows, radial flows, and arbitrarily directed flows. That is, knowledge of the absolute speed of a dark gas will not give an answer to the question of what is the absolute speed of motion of bodies, including the Earth, the Sun and other space bodies.

Summing up expressions (2.2.7) and (2.13.3) we obtain an expression for the force acting on any material body moving uniformly or with acceleration in the field of a dark gas.

$$\overline{F} = \overline{F}_g + \overline{F}^* = \overline{F}_g + \overline{F}_j + \overline{F}_m = m\alpha \cdot \overline{V}_e - m\frac{d\overline{V}}{dt} - m\frac{\alpha}{k}\overline{V}\,, \qquad (2.13.7)$$

in which the force $\overline{F}_g$, as already noted, we call the gravitational force and write it in the usual form through the acceleration of the gravitational force j_g

$$\overline{F}_g = m \cdot j_g = m\alpha \cdot \overline{V}_e , \tag{2.13.8}$$

where

$$\bar{j}_g = \alpha \cdot \overline{V}_e . \tag{2.13.9}$$

The force $\overline{F}_j$ is called, as usual, the inertial force and is written through the inertial acceleration $\bar{j}_j = \frac{d\overline{V}}{dt}$

$$\overline{F}_j = m \cdot \bar{j}_j = m\frac{d\overline{V}}{dt} . \tag{2.13.10}$$

$\overline{F}_m$ we will call the force of deceleration of bodies by a dark gas caused by the growth of their masses due to the absorption of a dark gas, and we will also express it through the acceleration of this force $\bar{j}_m$

$$\overline{F}_m = m \cdot \bar{j}_m = m \cdot \frac{\alpha}{k}\overline{V} , \tag{2.13.11}$$

where

$$\bar{j}_m = \frac{\alpha}{k}\overline{V} . \tag{2.13.12}$$

Newton's second law is a special case of expression (2.13.7) for V_e=0. Because the quantity $\frac{\alpha}{k} = 2{,}97 \cdot 10^{-18} s^{-1}$ is very small., then usually the quantity $m\frac{\alpha}{k}\overline{V} \approx 0$. Therefore

$$\overline{F}_j = -m\frac{d\overline{V}}{dt} \ . \tag{2.13.13}$$

A body moving at a constant speed $\overline{V}$ in a stream of dark gas with speed $\overline{V}_e$ is affected by a force

$$\overline{F} \approx \overline{F}_g = m\frac{\alpha}{k}\overline{V} \cdot +\alpha \cdot m \cdot \overline{V}_e \approx \alpha \cdot m \cdot \overline{V}_e \ , \tag{2.13.14}$$

since $m\frac{\alpha}{k}\overline{V} \approx 0$. If $\overline{V}_e = \overline{V}_r$ (radial velocity directed to the center of the body), then this formula gives the force of gravity when the velocity of the body is not equal to zero (V≠0). It is the same as with a motionless body.

Next, consider the case of uniform motion of a body with a velocity V in the field of an unperturbed dark gas (V_e=0). From expression (2.13.7) for this case, we obtain the force F, due to the increase in mass in the process of absorption of a dark gas by a moving body from the surrounding space. This force is applied to the body from the side of the field of dark gas. It inhibits body movement

$$\overline{F}_m = -\frac{\alpha}{k}\overline{V} \cdot m \ . \tag{2.13.15}$$

Here $\bar{j}_m = \frac{\alpha}{k}\overline{V}$ makes sense to the acceleration of braking. It changes very slowly over time as the body moves. This change can be neglected and express the change in speed over time, caused by an increase in mass, by the well-known formula

$$V = V_0 - jt = V_0 - \frac{\alpha}{k}Vt \ . \tag{2.13.16}$$

where do we get

$$V = \frac{V_0}{1 + \frac{\alpha}{k}t} \ . \tag{2.13.17}$$

Here V_0 is the speed of the body at the moment t=0.. As shown in the previous section, the value $\frac{\alpha}{k} = 2{,}97 \cdot 10^{-18} c^{-1}$ is very small. Therefore, in most cases, the strength and acceleration of this resistance can be neglected. However, this force can affect the speed of movement of photons of light that come to Earth from distant stars and have been on the way for many billions of years.

From equation (2.13.7) it is clear that weightlessness can be artificially created. To do this, you need to give the body an acceleration in the direction of the center of the Earth, equal to the acceleration of gravity g. According to (2.2.6), the acceleration of gravity is $g=dV_r/dt= \alpha V_{re}$. therefore

$$F_{тяж}=m\alpha V_{re}-m\frac{dV_r}{dt} = m\alpha V_{re}- m\alpha V_{re} =0. \qquad (2.13.18)$$

This technique is used when training astronauts to feel artificial weightlessness inside an aircraft moving along a certain trajectory.

Part 3.

Dark energy

3.1 On the nature of a dark energy by space

Inseparable with the concept of the Big Bang, which gave birth to a three-dimensional material universe and time (the fourth coordinate) in modern science, there is a concept of "thermal death" of the universe. The idea of □□heat death stems from the second law of thermodynamics, which states that entropy tends to increase in an isolated system due to the dissipation of mechanical energy, which is converted into heat. Energy regeneration is impossible, since dissipation is an irreversible process. Energy is constantly emitted during the life of stars and is irreversibly dissipated in the surrounding space. The universe is constantly expanding, the stars are scattering and cooling. At the end of this process, the "thermal death of the universe" occurs

However, in nature there is a continuum of dark matter that surrounds baryons and there are pressure forces in it that generate radial flows of dark matter gas towards the centers of baryons, replenishing the amount of mass and energy in them. As a result, there is a constant circulation of matter and energy in the Universe. Dark matter regulates this cycle. The constant process of creating baryonic matter is not taken into account by modern science when analyzing the processes occurring in stars, planets and other baryons. All this leads to a distorted picture of the evolution of the Universe.

What is dark energy? We have already said that gaseous dark matter is endowed with tremendous internal energy. According to the kinetic theory of gases, it is known that gaseous dark matter, like any gas, has internal energy, which is the total kinetic energy of the chaotic motion of all its atoms. Atoms of gaseous dark matter move chaotically without resistance between successive collisions with each other. The collision of such atoms occurs without loss of energy, as in the collision of elastic balls. Internal energy per unit mass of an ideal gas is expressed by the formula [9,11,12]

$$\bar{U}_0 = \frac{U_0}{m} = C_V T_0 = \frac{ia^2}{2\chi} . \qquad (3.1.1)$$

Here C_V is the specific heat at constant volume, T_0 is the stagnation temperature of the gas (for $V_e = 0$), i is the number of degrees of freedom of gas molecules, a is the speed of sound in the gas, $\chi = (i+2)/i$ is the adiabatic index. For a monatomic gas of dark matter $i = 3$ and formula (3.1.1) takes the form

$$\bar{U}_e = \frac{U_e}{m} = \frac{iC_a^2}{2\chi} = 0.9 \times C_a^2 , \qquad (3.1.2)$$

where, according to our assumption, the role of the speed of sound by the speed of light in vacuum played $C_{a0} = 3 \cdot 10^8 \ [m/s]$. For a monatomic gas, we have $i = 3$ and $\chi = (i+2)/i = 5/3$. According to the formula (3.1.2), the internal energy of one cubic meter of dark matter gas at rest (volume $W = 1 \ [м^3] = 10^6 \ [sm^3]$) is very important

$$E_{1e} = 0.9 \cdot C_a^2 \cdot \rho_e W = 9.64 \cdot 10^{25} [Дж] \ . \qquad (3.1.3)$$

The energy of space filled with gaseous dark matter is really huge. This energy supports radial flows of gaseous dark matter in relation to the centers of baryonic particles throughout the universe. We, ordinary people, are constantly dealing with the flow of dark matter gas to the center of the Earth, and we feel it as the force of gravity.

The internal energy of a unit mass of gas is related to the flow rate in accordance with the energy equation for isentropic flows known from gas dynamics [8,9]

$$\chi U_e + \frac{V_e^2}{2} = \frac{V_{max}^2}{2} = const , \qquad (3.1.4)$$

where V_{max} is the maximum gas flow rate. From this equation, it can be seen that with an increase in the speed of gaseous dark matter, the internal energy decreases, and is converted into kinetic energy of an ordered stream and vice versa. Let us substitute expression (3.1.2) into equation (3.1.4) instead of. U_{0e} As a result, we obtain a relationship between the propagation velocity of weak disturbances C_a and the velocity of the dark matter gas flow V_e

$$C_a^2 = \frac{1}{i} \cdot (V_{max}^2 - V_e^2) \ . \qquad (3.1.5)$$

The value $V_{\max}$ is determined from the condition that for a gas of dark matter at rest $V_e = 0$, or the velocity C_{a0} is equal to the velocity of propagation of weak disturbances

$$C_{a0} = 300000\ [км/c],$$
$$V_{max} = \sqrt{i}C_{a0} = 519615\ [км/c] = 5.19615\times10^8[м/c]. \qquad (3.1.7)$$

From the formula (3.1.3) it is clear that the space around us is an ocean of practically inexhaustible energy. It would be very important for the future of humanity to find an opportunity to put this energy at its service. This task has not been solved yet. It was possible to extract and use nuclear energy in nuclear power plants and in the creation of nuclear weapons. In addition, with the help of nuclear processes, it was possible to explain the processes going on inside the stars .. At the heart of these processes is A. Einstein's formula, which linked nuclear energy with the mass of radioactive bodies

$$E_o=m\cdot C^2\ . \qquad (3.1.8)$$

It is believed that nuclear energy is in the body at a temperature of absolute zero. Planck called it latent energy. For our senses, the enormous amount of energy $E_o=m_o\cdot C^2$ is imperceptible. Note that Planck's statement does not answer the question of how this energy exists in the body, what it is, and what can be expected from it.

This ignorance is not as harmless as it might seem, since does not allow us to find, for example, the correct answer to the question of where the huge energy comes from, which is released during mysterious superpowerful explosions in radio galaxies. The energy determined by Einstein's formula $E_o=m_o\cdot C^2$ is completely insufficient for this. Misunderstanding of this phenomenon leads some scientists to assume completely exotic mechanisms of explosions. For example, it is assumed that not central explosions occur in radio galaxies, but explosions directed at the Earth as if by a narrow beam. According to their calculations, A. Einstein's formula gives sufficient energy for this. At the same time, they do not find it surprising that a sufficiently large number of observed explosions are directed at the Earth, as if the Earth is the center of the Universe.

Isn't the huge belief that SRT is the limit of human thought in understanding the structure of the Universe, reassured some scientists, prompting them to stop searching for an unknown source of possibly even greater energy contained in some bodies, for example, into the superdense white dwarf stars? The theory of dark matter allows you to figure out where the so-called latent energy is hidden and to find another type of energy in bodies. Let's first figure out what it is and where the latent energy $E_o = m_o \cdot C^2$ is stored.

For our senses, this energy is imperceptible until the processes leading to the destruction of mass and its transformation into thermal and kinetic energy of moving dark matter take place.

When heated under normal conditions, the changes in energy are so small that the corresponding changes in masses cannot be detected experimentally. When a hydrogen bomb explodes, about 10^{17} J of energy is released. This, according to formula (3.10.1), approximately corresponds to the transition into energy of 1 kg of matter. However, in order to confirm the decrease in the mass of the charge after a nuclear explosion by 1 kg, it would be necessary to collect all the products of the explosion and weigh them. This is unrealistic. To confirm the phenomenon of a decrease in mass during the release of energy in accordance with formula (2.10.1), it was possible to weigh the deuterium nucleus and the nuclei-products of its fission (helium nuclei and proton) by different methods and determine the difference between them. It turned out that in this process there is a so-called defect (decrease) in mass. The mass defect is approximately 1/130 of the mass of the atom itself. So it turned out that the energy of 10^{17} J corresponds to a mass defect of the nuclear charge of an atomic bomb equal to 1 kg.

Formula (2.10.1) is also used to explain the energetics of stars. The explanation is based on a chain of nuclear transformations of hydrogen, the final link of which was helium atoms, positrons and neutrinos. During the reaction, a mass defect takes place and a portion of radiation energy is released, which heats the Sun. According to the energy conservation law, this mass defect must correspond to an energy equal to the binding energy in the nucleus. The problem with this explanation is that the observations do not reveal enough neutrinos in the radiation of the Sun. This raises doubts about its correctness.

It is still not clear where the enormous amounts of radiant energy that are continuously emitted by the Sun and other stars go to. In accordance with Einstein's principle of equivalence of mass and energy, from this energy, under certain conditions, at least individual electrons, protons and neutrons, and then atoms, should arise. However, this is not observed. Modern science, rejecting the existence of a material interstellar medium, is here at another dead end.

In our theory of dark matter, the possibility of complete transformation of baryonic matter into energy is theoretically permissible, since baryonic matter itself is interpreted as a (vortex) form of motion of gaseous dark matter, and energy is interpreted as the internal energy of the chaotic movement of dark gas atoms or as the kinetic energy of streams (jets) dark matter. In addition, according to our theory, in the entire Universe in accordance with formula (2.1.7), the formation of a new mass (new matter) continuously occurs in the process of absorbing dark matter from the surrounding space. The space-filling dark gas gas has tremendous internal energy. Naturally, an exchange of energy and mass takes place between the field of dark matter and material bodies, including stars. Therefore, energy on the scale of the Universe does not disappear and does not appear out of nothing, but only passes from one type to another. So there is no mysticism in such a transformation. However, in practice, we still do not know how to convert baryonic matter into energy and energy into baryonic matter.

3.2 Energy exchange between dark matter and by space objects.

We showed earlier that dark matter is a gaseous substance. It obeys the well-known laws of gas dynamics [8,9,11] and therefore it can be studied using the achievements of this science. Based on these advances, we have determined the main physical parameters in gaseous dark matter, namely, density, pressure and temperature:

$$\rho_e = 1.19 \times 10^9 [кг / м^3], \qquad (3.2.1)$$

$$p_e = 6.426 \cdot 10^{25} [H / м^2], \tag{3.2.2}$$

$$T_e = 2.75\ [K]. \tag{3.2.3}$$

Here the pressure and temperature are given in the SI system of units, adopted for the usual baryonic matter of the nature around us. However, dark matter is the original substance, the so-called forematter with its density value given above. The density value (3.2.1) refers to pra-matter. Baryonic bodies, from the smallest elementary particles to the largest stars, are composed of vortex structures moving at tremendous speeds by jets of dark matter. At the boundary of elementary particles (protons, neutrons, positrons, electrons and even photons), a phase transition of dark matter occurs from a gaseous state to a liquid state with a density value characteristic of baryonic matter:

$$\rho_e^* = 3.54 \times 10^{-9} [кг / м^3]. \tag{3.2.4}$$

We have obtained the law of growth of the mass of all baryonic bodies (stars, planets, and others). In this regard, I note that <u>**the law of growth of the mass of all baryonic bodies, including photons of light, is universal for the entire Universe:**</u>

$$m = m_o \cdot e^{\frac{\alpha \cdot t}{k}}. \tag{3.2.5}$$

According to (2.4.6) the value $\frac{\alpha}{k} = 2{,}97 \cdot 10^{-18} s^{-1}$. This value turned out to be equal to the Hubble constant [15,16]. During the absorption of dark matter by a star from the surrounding space, the radial velocity of gaseous dark matter on the spherical surface of stars is determined by the formula

$$V_r = \alpha m_0 \;\;/\;\; 4\pi\rho_e r_o^2, \tag{3.2.6}$$

where r_o is the radius of the star and m_0 is the mass of the star, according to [1] $\alpha = 1$s^{-1}], the density of dark matter $\rho_e = 1{,}19 \cdot 10^9 [kg/m^3]$. (in the parameters of baryonic matter, the density of the dark gas $\rho_e^* = 3.54 \times 10^{-9} [kg/m^3]$).

Dark matter, possessing mass and speed, gets inside cosmic bodies and also brings kinetic energy into them. In this case, the power due to the kinetic energy of dark matter introduced into the body will be written for baryonic matter in SI units in the following form

$$N_{погл.} = \frac{dm_o}{dt} \cdot \frac{V_r^2}{2} = \frac{\alpha^2 \cdot \frac{\alpha}{k} \cdot m_o^3}{(4\pi \cdot \rho_e \cdot r_o^2)^2} \;. \tag{3.2.7}$$

where $N_{погл}$ is the gravitational power of absorption. r_o is the radius of the body.

<u>Formula (3.2.7) is the law for the energy power entering any baryonic body from the field of dark matter surrounding these bodies.</u> It shows that stars not only waste energy in the form of radiation and during explosions, but also receive energy from the dark matter of the surrounding space. This rejects the "thermal death of the universe" hypothesis.

The rate of transformation of dark matter into baryonic matter is determined by the formula (2.1.6)

$$\frac{dm_e}{dt} = \frac{\alpha}{k} m_o . \qquad (3.2.8)$$

It follows from this relationship that the Hubble $H = \frac{\alpha}{k} = 2{,}97 \cdot 10^{-18} c^{-1}$ is world constant takes on the meaning of the rate of transformation of dark matter into baryonic matter when it is absorbed by bodies from the surrounding space. Conversion rate coefficient of the mass of dark matter into baryonic matter $k = 3{,}36 \cdot 10^{17}$.

3.3 About the explosions of stars.

It is interesting to note that the luminosity of stars, that is, the power of radiation into space, depends on the mass and radius of the star. An analysis of the known mass-luminosity and radius-luminosity diagrams [15,16] showed that for large stars with a mass three or more times greater than the mass of the Sun, the luminosity is proportional to the cube of mass and is inversely proportional to the fourth power of the stellar radius. **In accordance with formula (3.2.7), the gravitational absorption power is also proportional to the cube of mass and inversely proportional to the fourth power of the radius of the stars. Therefore, it can be expected that the luminosity of stars with large masses is proportional to the gravitational power of absorption by stars of the kinetic energy of dark gas jets.**

It is very interesting that the structure of the obtained expression for the power absorbed by bodies from outer space has an obvious coincidence with the diagrams: mass-luminosity, radius-luminosity. **This indicates an obvious**

<u>connection between the luminosity of stars, i.e. the amount of light energy emitted by a star per unit of time, with the power received by bodies from space along with the dark matter introduced into them.</u>

To better understand these questions, let us numerically estimate the power of gravitational absorption for the Sun

$$N_{погл.} = \frac{dm}{dt} \cdot \frac{V^{*2}}{2} = \frac{\alpha^2 \cdot \frac{\alpha}{k} \cdot m_o^3}{2 \cdot (4\pi \cdot \rho_e \cdot r_o^2)^2} = 2{,}22 \cdot 10^{17} [W]. \qquad (3.3.1)$$

Power of light radiation from the Sun [4,5] $N_{радиац} = 3.8 \times 10^{26}\ [W]$. Comparison of these values shows that the increase in the energy of the Sun due to the absorption of dark matter turned out to be less than the loss of energy for radiation $N_{погл} < N_{радиац}$. Those. radiation from the sun occurs due to nuclear reactions inside the sun. If we assume that the Sun has existed in its current state for about 15 billion years ($4.71 \times 10^{17} s$), then the gravitational energy that accumulates during this time inside the Sun is equal to:

$$E_{погл} = N_{погл} 4.71 \times 10^{17} = 1{,}045 \times 10^{35} [J]. \qquad (3.3.2)$$

Astronomy does not yet take this energy into account in the evolution of the Sun. For a white dwarf star Wolf-457 with absorption $m_o = 1{,}01 \cdot 10^{30} kg,\ r_o = 0{,}7 \cdot 10^6 m,$ power parameters. $N_{погл} = 2{,}77 \cdot 10^{28} [W]$. If we assume that the white dwarf star Wolf-457 exists in its current state for 15 billion years ($4.71 \times 10^{17} s$), then the gravitational energy that accumulates during this time inside this star will be:

$$E_{погл} = N_{погл} 4{,}71 \times 10^{17} = 1{,}3 \cdot 10^{46} [J]. \qquad (3.3.3)$$

Attention is drawn to the fact that the energy of the explosion of “supernova” stars [15,16] is $E_{изл.} = 10^{42} ... 10^{44} W$. Consequently, a star with the Wolf-457 parameters will accumulate such energy in excess over 15 billion years. Apparently, the developers of the theory of supernova explosions should take into account the factor of the replenishment of internal energy from space by these stars in their evolution. This phenomenon is not taken into account by modern cosmology when analyzing the energetics of stars and other cosmic bodies.

We believe that star explosions are associated with this phenomenon. Astrophysics today cannot explain the grandiose explosions in galaxies [4,5] that astronomers observe. These explosions release a huge energy of the order of 10^{51} J, equivalent to a simultaneous nuclear explosion of 10 million supernovae. (the energy of the explosion in the galaxy M82). The energy of explosions occurring in radio galaxies is estimated at 10^{57} J.

Where this monstrous energy comes from, astronomy cannot explain, since the nuclear energy source is completely insufficient for this (the energy and mass of bodies are identical and interconnected by the formula $E=mC^2$). The transition into helium of the substance of an entire galaxy ($m_{гал}=10^{40}$-10^{41} kg), consisting entirely of hydrogen, would give, according to the corresponding Einstein formula, only the energy $E_{гал} = m_{гал} \cdot C^2 \approx 10^{56}$-$10^{57}$ J.. (During thermonuclear transformations, only a part of the mass is transferred to energy, the so-called mass defect equal to 1/130 of this mass. Therefore, this energy will be even less $E^* = E_{гал}./130 = 0{,}77 \cdot (10^{54}...10^{55}) J$). But such a transition cannot be one-time, even if we assume that the explosion of one star initiates the explosions of other nearby stars. It should have been carried out over billions of years, since the stars in galaxies are spaced from one another at distances of billions of kilometers, and the rate of transfer of disturbances in the Universe from one object to another does not exceed the speed of light.

This simple analysis shows that **the source of this energy released during these mysterious explosions must be a compact space body.**

But without realizing that cosmic bodies interact with the gaseous dark matter surrounding them and continuously draw energy from space, it is impossible to understand and explain this phenomenon. The theory of gaseous dark matter provides an answer to this question. We have already noted that there are so-called black holes at the centers of spiral galaxies. In a "black hole" gaseous dark matter is converted into a neutron liquid of high density and small volume. At the same time, the energy absorbed from space along with dark matter accumulates inside the "black hole" located inside the galaxy. A “black hole” does not radiate energy. Due to the small intrinsic dimensions of dark gas atoms, the process of absorbing dark gas and matter stretches over billions of years, but invariably ends with the creation of new matter and its release into the vastness of the Universe. Astronomers, based on their observations, claim that. it is from the galactic nuclei that outflows of huge masses of neutral gases are observed. Calculation using the formula (3.2.7) allows you to determine the power introduced into the "supermassive neutron black hole"

$$N_{ч.д.} = \frac{2{,}97 \cdot 10^{-18} \cdot (10^{39})^3}{32 \cdot 9{,}86 \cdot (1{,}19 \cdot 10^9)^2 \cdot (1{,}135 \cdot 10^{10})^4} = 0{,}4 \cdot 10^{39} W \qquad (3.3.4)$$

The following values are taken as the parameters of the “black hole”:

The mass of the black hole $m_{чд} = 10^{39} kg$, the radius of the black hole $r_{очд} = 1{,}135 \cdot 10^{10} m$, For 15 billion years, energy will accumulate inside the massive "black hole"

$$E_{ч.д.} = N_{ч.д.} \cdot 15 \cdot 3{,}15 \cdot 10^{16} = 1{,}9 \cdot 10^{56} J. \qquad (3.3.5)$$

This energy is enough to explain the grandiose explosions in galaxies [15,16], which are observed by astronomers. As already noted, these explosions release a huge energy of the order of 10^{51} J, equivalent to a simultaneous nuclear explosion of 10 million supernovae. (the energy of the explosion in the galaxy M82). The energy of explosions occurring in radio galaxies is estimated at about 10^{57} J. Despite the fact that these stars (massive black holes) cannot be seen, it can be confidently asserted that they are not lifeless holes or mythical time corridors to other worlds. They are constantly accumulating mass and energy processes. Inside them, matter is compressed to densities close to the densities of pulsar stars and white dwarf stars ($0.4\cdot10^8$кг/м^3-$0,9\cdot10^{12}$ kg/m^3).

<u>So supermassive neutron black holes in the centers of galaxies are huge cauldrons in which new matter is cooked from dark matter and absorbed stars for its further circulation in the vastness of the Universe.</u>

3.4 About warming of the Earth's climate

Formula (3.2.7) will allow you to calculate the power of the heat flux absorbed by the Earth's core from space.

$$N_{погл.} = \frac{dm}{dt}\cdot\frac{V^{*2}}{2} = \frac{\alpha^2\cdot\frac{\alpha}{k}\cdot m_o^3}{(4\pi\cdot\rho_e\cdot r_o^2)^2} = \tag{3.4.1}$$
$$= \frac{2,97\cdot10^{-18}\cdot(1,932\cdot10^{24})^3}{(4\cdot3,14\cdot1,19\cdot10^9\cdot(1,3\cdot10^6)^2)^2} = 3,35\cdot10^{10}W$$

Here: the mass of the Earth's core is $m_o = 1\cdot932^{24}kg$, the radius of the Earth's core $r_o = 1,3\cdot10^6 m$ (the mass and radius of the Earth are respectively equal $m_3 = 6\cdot10^{24}kg, r_3 = 6,4\cdot10^6 m$), the Earth practically does not radiate energy from itself into outer space. This flow of energy increases the internal energy of the bowels of the Earth and, first of all, the Earth's core. If at such a rate energy had been supplied to the Earth during 1 billion years ($3,15\cdot10^{16}$ sec), then energy would enter the Earth. It should be borne in mind that during the eruption of one volcano, on average, $E_{погл.} = 3,35\cdot10^{10}\cdot3,15\cdot10^{16} = 1,05\cdot10^{27}J$ energy is released. Therefore, the energy that entered the Earth in one billion years should be enough for the eruption of $8{,}75 \cdot 10^{10}$ volcanoes, that is, on average 87 ... 88 volcanoes per year. Of course, this energy is also spent on earthquakes, the movement of lithospheric plates, the formation of mountain ranges and other phenomena.

Over the course of the Earth's existence (3.5 ... 4.5 billion years, according to some sources, 6 billion years), this thermal energy heated its bowels, especially the core, consisting of an iron-nickel alloy with an admixture of other siderophilic elements. As a result, metals, being heavier, were located in the center of the Earth, forming a molten metal core. Above the hot metal core were lighter and less heated masses of terrestrial rocks. A relatively cold earth's crust, consisting of lithospheric plates, formed on the surface, oceans, seas and lakes arose. Simultaneously with the growth of the Earth's mass, its dimensions increased.

With the increase in the size of the Earth, its crust on its surface disintegrated into lithospheric plates, which spread and collided. In places of faults, volcanoes appeared, mountain folds formed, earthquakes occurred. Currently, there is a significant activation of these processes.

Of course, an increase in the temperature of the subsoil cannot be equated with the everyday idea of climate and weather changes on its surface. But the problem of the currently observed warming of the Earth's climate exists. It is hotly debated in the scientific community. However, modern science cannot explain why this is happening. Apparently, the algorithm for solving this problem should include the described process of the growth of the Earth's mass and size and the heating of its interior as a result of the interaction of the Earth with the surrounding ocean of dark matter.

3.5 Influence of the Sun on the Earth's climate.

There is another important problem that can affect the Earth's climate. It is associated with an increase in the mass of the Sun and its radiation, which leads to an increase in the energy received by the Earth from the Sun. Some scientific studies claim that a significant increase in the luminosity of the Sun can destroy all life on Earth. At the same time, Japanese astronomers showed that our planet is gradually separating from the Sun. As a result, in their opinion, the Earth receives less and less heat energy and over time everything on it will freeze out. Until now, astrophysicists have poorly studied these phenomena, but soon they are going to correct this deficiency. We will also express our attitude to this problem.

.Note that although warming has been observed on Earth, we know that no evidence of radical changes in the Earth's climate has been found over the past billions of years. Consequently, the amount of thermal energy received from the Sun does not change, although it has been proven that every billion years the Sun becomes 10% hotter and that during the lifetime of the Sun (3.5 billion years) its radiation has increased by 30%.

When analyzing the growth of solar radiation, one should take into account not only the increase in the mass of the Sun according to formula (2.1.7), but also the simultaneous increase in its volume. If we assume that the average density of the Sun remains unchanged, using (2.1.7) one can find an expression for the change in its radius over time, depending on the change in mass:

$$\frac{r}{r_0} = \sqrt[3]{\frac{m}{m_0}} = \sqrt[3]{e^{\alpha t/\ k}} = e^{\alpha t/\ 3k} , \qquad (3.5.1)$$

where r_0 and m_0 are both the radius and mass of the Sun for $t = 0$. For an ideal monatomic gas, the adiabatic exponent is i = 3. (gaseous dark matter is an ideal monatomic gas). According to the "Radius-luminosity" diagram, the capacity of the Sun's light radiation is inversely proportional to the fourth power of its radius. Therefore, the luminosity of the Sun increases with time.

$$E / E_0 = (m / m_0)^3 / (r / r_0)^4 = e^{(5/3\alpha/k)t} . \qquad (3.5.2)$$

According to table 2.4.1, calculated by the formula (2.1.7), during the last billion years the mass of the Sun has increased by 1.098 times. During this time, its radius increases by 1.0317 times. Therefore, the luminosity of the Sun increases by 1.1687 times. This estimate is in agreement with astronomical observations.

The power of the light radiation of the Sun according to the “radius-luminosity” diagram is inversely proportional to the fourth power of its radius. The power of light radiation from the Sun is directly proportional to the gravitational power of absorption $N_{погл.}$. Therefore, taking into account these two factors, the luminosity of the Sun increases with time into a relation

$$E/E_o=(m/m_o)^3/(r/r_o)^4=e^{(5/3\ \alpha/\ k)\ t}\ . \qquad (3.5.3)$$

.According to Table 2.4.1, the mass of the Sun has increased by 1.1 times over the last billion years. During this time, its radius has grown 1.0317 times. Consequently, the luminosity of the Sun has increased by 1.1687 times in one billion years. This estimate coincides with the observational data available to astronomy today.

It is known that the energy of solar radiation, which is absorbed by distant objects, including the Earth, is inversely proportional to the square of the distance. During the last billion years, the amount of energy that the Earth received from the Sun has not changed. Therefore, it can be argued that with an increase in the mass and luminosity of the Sun, the distance between the Sun and the Earth also grows simultaneously. This is consistent with the astronomical observations of Japanese scientists. In addition, it is known from astronomical observations, for example, that the distance from the Earth to the Moon increases by $1,5$ meters every 100 year. Why can't the same thing happen to the Earth and other planets? Let's calculate the increase in the distance between the Earth and the Sun, which is necessary to compensate for the increase in the luminosity of the Sun. Obviously, the ratio of the radii of the Earth's orbit at the end and beginning of the considered time interval should be as follows

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$$R_{orbit} / r_{0\ orbit} = \sqrt{E / E_0} = 1.08 \qquad (3.5.4)$$

Currently the radius of the Earth's orbit $r_{orbit}=1.495\times10^{11}\ [m]$. Considering (22), we can assert that one billion years ($3,15\times10^{16}$ s) ago the radius of the Earth's orbit was $r_{orbit}=1.380\times10^{11}\ [m]$. Increase in distance during this time $\Delta r_{orbit}=0.115\times10^{11}\ [m]$. The average increase in the radius of the Earth's orbit over a hundred years (100 years=$3,15\times10^{9}$ s) is

$$\Delta r_{orbit} = 0.115 \times 10^4 \ [м] = 1.15 \ [km] \qquad (3.5.5)$$

The relative increase in the radii of the Moon's orbit during 100 years is $\Delta r_{orbit} / r_{0\ orbit} = 3.91 \times 10^{-9}$. For the Earth this $\Delta r_{orbit} / r_{0\ orbit} = 7.70 \times 10^{-9}$ is an attitude. As you can see, the relative increase in the distance between the Sun and the Earth, which is necessary to compensate for the increase in the luminosity of the Sun, 1.97 is only times higher than the observed relative increase in the distance between the Earth and the Moon. It is possible that a violation of this condition causes a warming of the Earth's climate. Nevertheless, scientists studying the problem of warming of the Earth's climate must carefully monitor the balance between changes in the luminosity of the Sun and changes in the distance between the Earth and the Sun.

3.6 The hidden meaning of the formula $E = mC^2$

In a nuclear explosion, a small amount of radioactive material releases enormous energy from itself. Before the explosion, this substance has a small mass and normal temperature. The question is, in what form can this huge energy be stored in a cold, ordinary-looking substance?

To answer this question, we assume that this energy is stored inside themselves by elementary particles of baryonic matter of stars, planets and other bodies, including radioactive substances. But science does not know how this happens. Let's try to figure it out. The point is that radial flows of gaseous dark matter towards the center of any elementary particle are unstable. They curl up into vortices. These vortices, entering the nuclei of atoms, rotate very quickly, because the dark gas absorbed at their outer boundary enters them at a high peripheral velocity. Apparently, the phase transition of dark matter from a gaseous state to a liquid (solid) state occurs when the speed of jets of dark gas exceeds the speed of light (in a vacuum).

It is known that with increasing velocity, the temperature of any gas decreases [8,9,11]. This leads to a phase transition of dark matter from a gaseous state to a liquid state. The peripheral velocity at the outer boundary of the atomic nucleus, while, according to our estimates, should reach the value

$C_e = 3{,}875 \cdot 10^8 \, м/с$. This will cause the temperature of the dark gas to decrease by half according to the well-known isentropic relation

$$\frac{T}{T_0} = (1 - \frac{V^2}{V_{MAX}^2}) = 1 - \frac{(3{,}875 \cdot 10^8)^2}{(5{,}477 \cdot 10^8)^2} = 0{,}5 .$$

Here the temperature of dark matter is $T_0 = 3^0 K$ (physics experimentally determined this value as the temperature of dark matter). Maximum speed for jets of dark gas $V_{MAX} = 5{,}477 \cdot 10^8$ m / s. The temperature of the jets of dark gas at the outer boundary of the atomic nucleus of the substance is equal to $T = 1{,}5^0 K$. According to the kinetic theory of gases, the temperature that a person feels is caused by the chaotic movement of air molecules or the vibrational movements of molecules of liquids or solids in contact with human skin. Chaotic or oscillatory motion of elementary particles of dark gas (atoms of dark matter) does not cause such sensations.

The presence of a circumferential velocity when a dark gas is absorbed by an atom of a baryonic body leads to unwinding of the nuclei of atoms of baryonic bodies (protons) with a radius $r_0 = 1{,}29 \cdot 10^{-10}$ [m] to an angular velocity of the order of $\omega = \frac{C_e}{r_0} = \frac{3{,}875 \cdot 10^8}{1{,}29 \cdot 10^{-10}} = 3 \cdot 10^{18}$ [rad / s]. Here the speed of the jets of dark gas $C_e = 3{,}875 \cdot 10^8 [m/s]$ exceeds the speed of light in emptiness, but remains much less than the maximum speed $V_{\max} = 5{,}477 \cdot 10^8 [m/s]$. We assume that when this speed is reached, an intense transition of dark matter from a gaseous state to a liquid occurs on the outer boundary of the atom (hydrogen). As a result, the atoms of matter accumulate in themselves a huge (nuclear) energy in the form of the kinetic energy of the rotating nuclei of atoms. The energy of the rotating nucleus of an atom (hydrogen) can be written as the energy of rotation of a homogeneous ball $E_0 = J_o \cdot \omega_0^2$, where the moment of inertia of a homogeneous ball (proton, neutron) $J_0 = \frac{3}{5} m_0 r_0^2$. [kg·m^2]. (mass of proton, neutron $m = 1{,}67 \cdot 10^{-27}$ [kg]). Let's substitute the moment of inertia in the expression for the energy of the rotating nucleus of the atom $E_o = J_o \omega_o^2 = \frac{3}{5} m_o \cdot r_o^2 (\frac{C_e}{r_o})^2 = \frac{3}{5} m_o \cdot C_e^2$. After substitution of numerical values we get $E_o = 15{,}05 \cdot 10^{-11} [J]$.

One kilogram of the mass of (radioactive) substance contains the following number of atoms $n_o = \frac{1}{1{,}67 \cdot 10^{-27}} = 0{,}6 \cdot 10^{27}$. Consequently, the stored kinetic energy of rotation in one kilogram of matter will be $E = E_0 n_0 = 15 \cdot 10^{-11} \cdot 0{,}6 \cdot 10^{27} = 0{,}9 \cdot 10^{17}$ [J]. The formula of the theory of relativity, linking energy with mass $E = m \cdot C^2$, gives the amount of energy in one kilogram of matter $E = (3 \cdot 10^8)^2 \cdot 1 = 0{,}9 \cdot 10^{17}$ [J]. (here $C = 3 \cdot 10^8$ [m / s] is the speed of light in emptiness). So the results of calculating the energy by Einstein's formula (the formula is confirmed by practice) and by the formula for calculating the rotational energy stored in the nucleus of an atom (hydrogen) completely coincided. Consequently, the performed evaluative analysis showed **that nuclear energy is stored inside an atom in the form of kinetic energy of rotation of atomic nuclei.**

During nuclear explosions of atomic bombs, as well as in nuclear processes in the interior of the Sun and other stars, this energy breaks out into the surrounding field of dark matter and turns into the energy of chaotic movement of elementary particles of dark gas in full accordance with the kinetic theory of gases. This energy simultaneously heats the Earth. Astrophysics, based on A. Einstein's theory of relativity, rejects the presence of a material gaseous medium in interstellar space, but cannot explain where the huge amounts of radiant energy that are continuously emitted by the Sun and other stars go. In accordance with Einstein's principle of equivalence of mass and energy, from this energy, under certain conditions, at least individual electrons, protons and neutrons, and then atoms, should arise. However, this is not observed. Modern science, unlike the theory of gaseous dark matter, is at another dead end here.

3.7 The cycle of matter and energy in the Universe

The constant circulation of matter and energy in the Universe is explained by the fact that all baryonic bodies do not exist in empty space, but in the continuum of gaseous dark matter, which regulates this cycle. The enormous energy that stars emit during their life and release during explosions. does not dissipate irreversibly in the surrounding space, but passes into the surrounding dark gaseous matter, increasing its internal energy of the chaotic movement of dark matter atoms. The dark matter continuum, as noted earlier, contains tremendous internal energy. Each cubic meter of gaseous dark matter contains energy $E_e = 9.64\times10^{25}$ $[J]$.

Although dark gas is invisible, has no smell or taste, we perceive it through gravity, inertia, and electromagnetic influences. We, following Einstein, believe that all fundamental interactions (fundamental interactions, include gravitational forces, inertial forces, nuclear forces, electromagnetism and electroweak forces) are derivatives of some Unified field. We believe that it is **the dark matter of the cosmos that is the material Unified field** that unites all the listed fundamental interactions, and also includes the circulation of energy between baryonic and dark matter and affects the laws of light propagation in space between distant luminaries.

3.8 "EmDrive" motor for the space travel and the laws of physics

In this section, we will consider the operation of the "EmDrive" engine designed for space travel. The fact is that its creators themselves cannot substantiate the experimentally measured thrust of this engine, since it has no fuel and no visible jet stream. It is powered by electricity supplied to the engine (from batteries on board the spacecraft). Therefore, according to a number of scientists, the result obtained violates the laws of physics.

Contrary to this opinion, we offer our theoretical substantiation of the nature of the EmDrive engine thrust. In our opinion, this substantiation is within the framework of mechanics' concepts of reactive force, but not of the products of fuel combustion, but due to the reactive action of the invisible gaseous dark matter being thrown away.

The history of the issue is as follows. The drafts of the NACA article, which caused a stir, have leaked into the Internet, which confirms the operability of the controversial EmDrive engine (Fig. 3.8.1), which allegedly does not need fuel. According to the findings of experts from the Eagleworks laboratory, the engine develops a thrust of 1.2 millinewtons per kilowatt. And it probably works on the energy of a vacuum. Is it worth believing? (Amazing engine enthusiast Phil Wilson posted a post on the NASA forum site under the nickname The Traveler The Next Big Future website made the documents and their schematics freely available, making the article finally public.

NASA experts report a successful repetition of an experiment conducted by British engineer Roger Scheuer in 2006. He managed to create a rotating engine that does not produce any emissions, and showed that the device obeys the laws of Newtonian mechanics. According to the developer, the device converts electricity into microwaves, their energy is stored in the resonator, and as a result, there is a small thrust. Since then, scientists have been struggling with the EmDrive puzzle: does it work, and if so, why? Indeed, according to the law of conservation of momentum, thrust occurs due to the jet stream. In other words, for an object to move forward, something needs to bounce off it in the opposite direction.

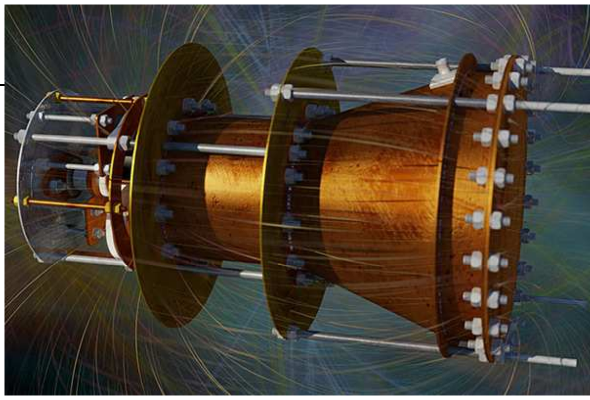


Fig.3.8.1

The study used a torsional pendulum, an aluminum structure mounted on a slippery table in a vacuum chamber. Such a device is capable of measuring even very weak thrust. On one arm of the pendulum there was an EmDrive, and as a result of a series of tests at 40, 60 and 80 watts, it showed a force of 1.2 millinewtons per kilowatt in vacuum. The inspections did not reveal any unaccounted for sources of motion, but experts recognized the need for additional research in order to exclude distortions from such a factor as thermal expansion.

The latest version of the engine was patented by its inventor Roger Scheuer at the end of October 2016. The new modification differs from the previous ones by the presence of a superconducting plate. According to the scientist, this makes it possible to reduce, relative to an outside observer, the change in the frequency of the electromagnetic wave during its propagation in the engine cavity and thus increase the thrust of the EmDrive.

Scientists trying to understand the principles of engine operation believe that the law of conservation of momentum is preserved in it; it is rather difficult to simply explain how this turns out. Thus, Michael McCalloche from the University of Plymouth (UK) admits the existence of photons with mass, as well as a change in the speed of light inside the device. Another hypothesis speaks of quenching microwaves, as a result of which pairs of photons are born that carry momentum. This can only happen in conical cavities.

A number of scientists assume the existence of a quantum vacuum in the space around us — a medium that supports acoustic oscillations, and that the components of any such medium are capable of exchanging momentum. This means that work can be done on and removed from the vacuum, which determines the engine's performance. However, these assumptions go beyond the modern concepts of physics, which rejects the presence of a continuous gaseous medium in space, and are unlikely to convince other specialists.

Contrary to this opinion, the NASA article claims that the engineers have achieved a positive result. It is assumed that such engines can be used on spacecraft for interplanetary travel. In theory, a flight to Mars with such an engine would only last ten weeks.

We also believe that modern physics, rejecting the existence of a continuous gaseous medium in space, creates problems for itself. By doing this, it impoverishes its tools for solving these problems. We have shown earlier that the recognition by physics of the presence of a continuum of gaseous dark matter in the surrounding space allows us to reveal the nature of gravity, inertia, and to look differently at the nature of the “big bang” and many other mysterious phenomena in physics and astronomy. In these works, the physical parameters of interstellar gaseous dark matter were theoretically determined. It has been shown, in particular, that it possesses density, mass, inertia, interacts with ordinary baryonic matter and can exert a force on baryonic bodies. .

Further, based on the ideas of [9], we will consider the nature of the thrust force of the EmDrive engine from the standpoint of the theory of interstellar gaseous dark matter that fills all space around us. To do this, refer to Figure 3.8.2. If a small change in pressure occurs at some point O, then this change, due to the elasticity of the gas, will propagate further from the source O in the form of a spherical compression or rarefaction wave (weak disturbance).

Let the front L be the position of this wave at the moment of time t, and L_1 - its position at the moment of time $t + dt$. If the speed of propagation of a weak disturbance wave is equal to the speed of light in emptiness $C = 3 \cdot 10^8$ m / s. then the distance between L and L_1 will be equal $dr = C \cdot dt$. Let, further , be the pressure $p_e + dp_e$ to the left of the line L, and the p-pressure to the right of the line L_1 Then the product $dp_e \cdot \Delta s \cdot dt$ will give us an impulse of pressure forces acting along the radius r on the considered gas column during time dt. Under the action of this impulse, the mass $dm = \rho_e^* \cdot \Delta s \cdot dr$ of the column of gaseous dark matter, expressed in baryon units [1,2], acquires the velocity of motion dw in the direction of the radius r and the corresponding momentum $dm \cdot dw = \rho_e^* \cdot \Delta s \cdot dr \cdot dw$. Equating the impulse of pressure forces to the change in momentum and taking into account that $dr = C \cdot dt$, after small contractions, we obtain $dp_e = \rho_e^* \cdot C \cdot dw$.

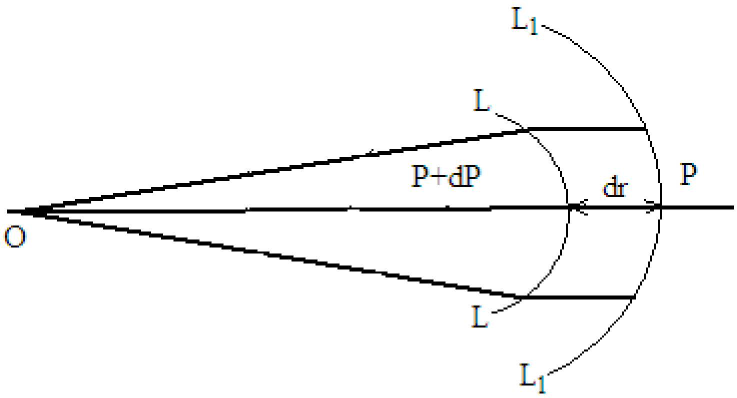


Fig.3.8.2

From this it follows that behind the compression wave, the motionless dark gas comes into motion with a speed $dw = dp_e/\rho_e^{*} \cdot C$, where $C = 3 \cdot 10^8$ m/s - the speed has reduced (in emptiness). $\rho_e^{*} = 3{,}54 \cdot 10^{-9}$ кг/м^3 kg/m^3 is the density of gaseous dark matter (expressed in units of baryonic matter [1,2]). In finite differences, the previous expression can be rewritten as

$$V_e = \Delta W = \frac{\Delta p_e}{\rho_e^{*} \cdot C} \quad , \tag{3.8.1}$$

The force of pressure in one direction accelerates particles of gaseous dark matter, and in the opposite direction acts on the structural elements of the EmDrive engine and creates a thrust force

$$F = \Delta p_e \cdot S \, . \tag{3.8.2}$$

As the area S we take the area of the minimum cross-section of the nozzle of the EmDrive engine. In the absence of accurate data on the dimensions of this engine, we take ΔS=1 m^2. The force applied to the cross section of the engine nozzle will be equal to the pressure multiplied by the cross sectional area, which is equal to $S = 1m^2$. Of course, the pressure is not created by one wave. The motor device continuously converts electricity into microwaves, their energy is accumulated in the resonator. The pressure behind all microwaves along the entire section of the engine nozzle remains the same as in the case under consideration behind one wave. As a result of the effect of this pressure on the engine components, a small thrust is generated.

This traction force (per 1 kilowatt) according to article [42] is

$$F = \Delta p_e \cdot S = 1{,}2 \cdot 10^{-3} \quad [\mathrm{N}]\,. \tag{3.8.3}$$

Where will the excess pressure behind the wave be

$$\Delta p_e = 1{,}2 \cdot 10^{-3} = 0{,}0012 \quad [\mathrm{N/m^2}]\,. \tag{3.8.4}$$

Using formula (3.8.1), we determine the speed of the dark gas behind the wave

$$V_e = \frac{1{,}2 \cdot 10^{-3}}{3{,}54 \cdot 10^{-9} \cdot 3 \cdot 10^{8}} = 0{,}113 \cdot 10^{-2} = 0{,}00113 \ [\mathrm{m/s}]\,. \tag{3.8.5}$$

These values of pressure and velocity of gaseous dark matter behind the wave provide the appearance of a force acting on the cross section of the engine nozzle. (the value of this force is given in the article considered in the NASA article). These values of speed, pressure and force are not great. But in section 2.2 it is shown that the small speed of radial flows of gaseous dark matter $V_r = 9{,}8$ m/s towards the center of the Earth creates the Earth's gravity.

In [1,2] it is correctly noted that, according to the law of conservation of momentum, the thrust arises due to the jet stream. For the object to move forward, something must "bounce" from it in the opposite direction. In this case, the mass of the plug of gaseous dark matter "bounces off", moving after the wave emitted by the engine. Under the action of pressure inside the engine nozzle, a local jet flow of gaseous dark matter occurs. At the same time, it is clear that the EmDrive can generate thrust without breaking the laws of physics. The invention of the EmDrive engine, from our point of view, exceeds the applied value of the invention of a new economical propulsion device. For physics, this has a great worldview breakthrough in understanding the world order, which opens the way to the use of inexhaustible dark energy of space.

As a working hypothesis to solve the problem of determination Δp, we can use our assumption that the power supplied to the EmDrive is spent on accelerating the mass of gaseous dark matter m at a speed

$$V_e = \frac{\Delta p}{\rho_e^* \cdot C} \ . \tag{3.8.6}$$

As the mass, we take the product of the volume of the circular segment W (Fig. 3.8.3) and the density of gaseous dark matter $\rho_e^* = 3{,}54 \cdot 10^{-9}$ kg/m^3. The radius of the segment $r = C \cdot \Delta t$, the width h = 1m (equal to the side of the square of the resonator). The power supplied to the motor is the energy supplied during the time t = 1 s. The volume of the circular segment will be

$$W = h \cdot \frac{\pi \cdot r^2 \cdot \theta^o}{360} = 0{,}00873 \cdot r^2 \cdot \theta^o \cdot h, \tag{3.8.7}$$

Segment mass

$$m = W \cdot \rho_e^* = 0{,}00873 \cdot C^2 \cdot (\Delta t)^2 \cdot \rho_e^* \cdot \theta^o \cdot h \cdot, \tag{3.8.8}$$

In this case, the energy supplied every second to the resonator $E = N \cdot 1c = 10^3$W should be equal to the kinetic energy of the mass of gaseous dark matter inside the segment under consideration

$$E = \frac{m \cdot V_e^2}{2} = 0{,}00873 \cdot C^2 \cdot \Delta t \cdot \rho_e^* \cdot \theta^o \cdot h \cdot \frac{1}{2} \frac{(\Delta p)^2}{(\rho_e^*)^2 \cdot C^2} \cdot. \tag{3.8.9}$$

Whence the increase in pressure can be expressed by the formula

$$\Delta p = \sqrt{\frac{2 \cdot E \cdot \rho_e^*}{0{,}00873 \cdot \theta^o \cdot h}} \tag{3.8.10}$$

The calculation using this formula allows you to calculate the magnitude of the pressure increase

$$\Delta p = \sqrt{\frac{2 \cdot E \cdot \rho_e^*}{0{,}00873 \cdot \theta^o \cdot h}} = \sqrt{\frac{2 \cdot 10^3 \cdot 3{,}54 \cdot 10^{-9}}{0{,}00873 \cdot 60^o \cdot 0{,}6}} =$$
$$= \sqrt{22{,}5 \cdot 10^{-6}} = 4{,}74 \cdot 10^{-3} [N / m^2] \quad (3.8.11)$$

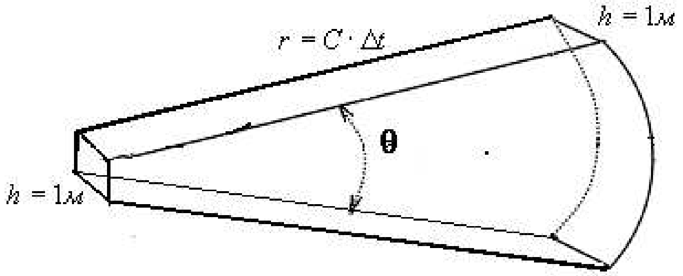


Рис.3.8.3

Here, as an angle θ, we will choose an angle equal to 60 degrees, since the waves of weak disturbances and the plug of gaseous dark matter moving behind them propagate only in the direction opposite to the direction of the engine thrust. The force of pressure in one direction accelerates particles of gaseous dark matter, and in the opposite direction acts on the structural elements of the EmDrive engine and creates a thrust force

$$F = \Delta p_e \cdot S \,. \quad (3.8.12)$$

As in the derivation of formula (3.8.3), we take the area of the resonator (cross-section of the nozzle) of the EmDrive engine as the area S. In the absence of accurate data on the dimensions of this engine, we take ΔS=1 m^2. The force applied to the cross section of the engine nozzle will be equal to the pressure multiplied by the cross sectional area, which is equal to $S = 1m^2$. Of course, the pressure is not created by one wave. The motor device continuously converts electricity into microwaves, their energy is accumulated in the resonator. The pressure behind all microwaves along the entire section of the engine nozzle remains the same as in the case under consideration behind one wave. As a result of the effect of this pressure on the engine components, a small thrust is generated. This traction force (per 1 kilowatt), according to the calculation performed, is

$$F = \Delta p_e \cdot S = 4{,}74 \cdot 10^{-3} \cdot 0{,}36 = 1{,}7 \cdot 10^{-3}\,[\text{H}]\,. \qquad (3.8.13)$$

This value is only 1.4 times higher than the value obtained in the experiment for the EmDrive motor. If we reduce the area of the resonator to a value of $S = 0{,}7$ m2, then the force will be equal to the value obtained in the experiment $F = 1{,}2 \cdot 10^{-3}$ [N]. Probably there is a loss of power supplied to the engine when it is converted into the power of the kinetic energy of the motion of the plug moving behind the waves of weak disturbances of gaseous dark matter. Therefore, the agreement can be considered satisfactory.

In this case, we were not so much interested in the complete coincidence of the calculations with the experiment as in the validity of our assumption that the engine thrust arises due to the reactive action of a jet of gaseous dark matter from the nozzle of the engine EmDrive. It should be taken into account that formula (3.8.10) is obtained on the basis of the idealized model shown in Figure 3.8.3. In a real design, the pressure determined by this formula will retain its value only near the resonator and the engine nozzle. As the waves of weak disturbances move away from the engine, the pressure will decrease inversely to the square of the distance. Nevertheless, formula (3.8.10) can be used in the design of motors of the EmDrive type. It can be seen from it that the greater the value of power supplied to the engine, the greater the increase in pressure and, consequently, the thrust of the engine. However, this increase in pressure and thrust will be proportional to the square root of the energy supplied every second, i.e. power.

Part 4

Vortexes of gaseous dark matter into

the outer space

In the concept of interstellar gaseous dark matter filling all interstellar space, except for radial currents near stars and planets, cosmic vortices of gaseous dark matter take place. Vortices arise due to the instability of radial currents directed towards the centers of stars and planets. A similar picture can be observed when draining water from a large container through the drain hole. Although these vortices cannot be seen, their existence can be judged based on the observed interactions with cosmic bodies. They gather stars into galaxies, creating a characteristic spiral pattern with arms lagging behind the faster rotating core. They form planetary systems around stars. They also spin the stars and planets around their axes. In this part of the book, analyzing these observations, we will calculate the size of cosmic vortices of dark gas (gaseous dark matter), their angular velocities of rotation. Let us find the relationship between the angular velocities of stars and planets, including the Sun and the Earth, with the angular velocities of the dark gas vortices surrounding them.

Vortex of gaseous dark matter around the rotating central massive body

Astronomical observations show the striking uniformity of rotational movements widespread in the Universe. Stars in galaxies rotate in the same direction. In the direction of rotation of the Milky Way, the Sun revolves around its axis. The planets of the solar system run around the Sun in one direction, which coincides with the direction of rotation of the Sun itself. Moreover, their own rotation around their axes, with rare exceptions, coincides with their direction of motion around the Sun and its own rotation. Satellites of the planets also mostly rotate in the direction of rotation of the planets themselves. This uniformity of rotational motions does not fit well with the idea of the “Big Bang of the mysterious first atom”, which allegedly gave birth to the Universe. The explosion, by its nature, was supposed to create chaos, not an observable pattern.

All this suggests that there is a common driving mechanism that works in all of the above cases. Vortexes of gaseous dark matter, which are apparently widespread in space, can serve as such a mechanism. Without taking them into account, it is impossible to explain the wide distribution and uniformity of rotational motions in the Universe, as well as a number of other related problems. Science, for example, has not yet been able to explain the disproportionately large angular momentum of the planets of the solar system and the structural features of spiral galaxies.

Eddies are widespread in the nature of the Earth. We know atmospheric vortices, whirlpools. It is known that the discharge of water from any container through a hole is accompanied by the formation of a vortex (vortex funnel) in the water, which draws the surrounding water mass and floating objects in it into its rotation. Material bodies that continuously absorb dark matter act as such a funnel for draining gaseous dark matter of space. The radial flow to the body is unstable and curls up into a stable vortex. Let us describe the flow near a vortex of gaseous dark matter with a central massive body (Fig.4.1.1) with the potential of the vortex flow velocities

$$\varphi = \alpha m/4\pi\rho_e r + \omega_B \cdot r_{oB}^2 \cdot \psi , \qquad (4.1.1)$$

where m is body weight; ω_B - angular velocity of rotation of the vortex core with radius $r_{oB;}$ ψ and θ - angular coordinates (Fig.4.1.1); r is the radial coordinate. The origin of the spherical coordinates coincides with the center 0 of the spherical body. The gaseous dark matter inside the vortex rotates according to the law of rotation of a solid body The speed inside the core of the vortex can be written as

$$U_e = \omega_B \ r \sin\theta. \qquad (4.1.2)$$

In this problem, the translational motion of the body and the vortex is absent. The method of overlaying potential flows allows you to add them later. The influence of the compressibility of the dark gas is absent due to the low rotation speed and radial flow. The flow outside the vortex is potential. Using the velocity potential (4.1.1), one can write down the projections of the dark gas velocities outside the vortex:

$$V_{er} = \partial\varphi/\partial r = - \alpha m/4\pi\rho_e r^2, \qquad (4.1.3)$$

$$V_{e\theta} = (1/r)\, \partial\varphi/\partial\theta = 0, \tag{4.1.4}$$
$$V_{e\psi} = (1/r\sin\theta)\, \partial\varphi/\partial\psi = \omega_B r^2_{oB}/(r\sin\theta). \tag{4.1.5}$$

Solution (4.1.1), (4.1.3) - (4.1.5) satisfies the Laplace equation and boundary conditions at infinity. The angular velocity of rotation ω and the radius r_o of the central body may not coincide with the angular velocity of rotation ω_B and the radius r_{oB} of the vortex core of gaseous dark matter.

Let us consider in more detail the force effect of a dark gas vortex on the central body. For this we turn to the differential equation of the rotational motion of a rigid body around the axis [14]:

$$J_o d\omega/dt = M. \tag{4.1.6}$$

In this equation, J_o is the moment of inertia of a spherical body; ω is the angular velocity of rotation of the body; t is time; M-moment from the force F acting on the body from the side of the moving gaseous dark matter. The flow of gaseous dark matter acts on the body with force , regardless of the body's own motion. Therefore, the rotational motion of the dark gas inside the vortex core will increase with time the angular velocity ω of the central body. The dark gas flow outside the vortex core with a circumferential velocity V_ψ also exerts a force effect on the satellites of the central body, increasing their circumferential velocities. Until now, this has not been taken into account by science and has baffled astronomy in attempts to explain some of the phenomena associated with this. Let us integrate equation (4.1.6) and find the dependence of the angular velocity on time:

$$\omega = (M/J_o)t + \omega_o. \tag{4.1.7}$$

The moment of inertia of a homogeneous ball is known [16]:

$$J_o = (3/5) \cdot m_o \cdot r_o^2\,. \tag{4.1.8}$$

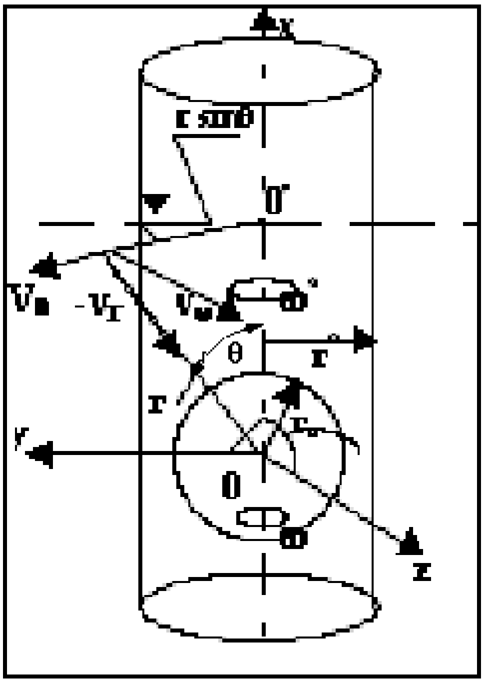


Fig.4.1.1

Here m_o is the mass of the central body with radius r_o (ball mass $m_o = \frac{4}{3}\rho_o \pi \cdot r_o^3$). Next, we write down the moment from the forces from the side of the rotating dark gas applied to the spherical body:

$$M = \iiint_W \cdot r \cdot \sin\theta \cdot dF = \frac{3}{20}\pi \cdot \alpha \cdot \omega_в \cdot r_o^2 \cdot m_o, \qquad (4.1.9)$$

where dF is the elementary force applied to the elementary mass of the body $dm_o = \rho_o \cdot dW = \rho_o r^2 \cdot dr \cdot d\theta \cdot d\psi$ dm.. where $dW = r \cdot d\theta \cdot r \cdot d\psi \cdot dr$ - elementary volume of the sphere; (Fig.4.1.1); The force dF is determined by the formula

$$dF = j \cdot dm = \alpha \cdot V_e \cdot dm\,, \qquad (4.1.10)$$

in which j is the acceleration in the SI system (acceleration can also be expressed through the parameters of the flow of gaseous dark matter $j = \alpha \cdot V_e$. Formula (4.1.10) establishes a bridge between the parameters of baryonic matter and dark matter. matter of the world around us)); $V_e -$ the speed of jets of dark matter; the force $dF -$is directed in the direction of speed. The force is determined in accordance with the formula (4.1.2)) for the velocity $V_e = U_e$.

Let us substitute into equation (4.1.7) the expressions J_o and M from (4.1.8) and (4.1.9). As a result, we get

$$\omega = \frac{\pi}{4}\alpha \cdot \omega_в \cdot t + \omega_o\,. \qquad (4.1.11)$$

The resulting formula determines the law of increasing the angular velocity of rotation of a massive body inside a vortex of gaseous dark matter from time to time. Formula (4.1.11) can be used to solve the inverse problem, that is, to determine the angular velocity of rotation of the vortex core of gaseous dark matter ω_B from the known angular velocity of the central massive body:

$$\omega_в = \frac{4}{\pi} \cdot \frac{\omega - \omega_o}{\alpha \cdot t}\;. \qquad (4.1.12)$$

The complexity of this problem lies in the fact that, despite the seeming simplicity of this formula, in its implementation, it is necessary to know the angular velocity of rotation of the central body without external influences on its value from other cosmic bodies or other events in the life of this body that could change this velocity. In addition, it is necessary to know the time during which the unwinding took place and the initial angular velocity ω_o.

Let us apply the formula (4.1.12) to the calculation of the angular velocities of the vortices of the gaseous dark matter of the Sun and the planets of the solar system. The rotation of the Sun around its axis is determined by the time of revolution of spots on the Sun in the equatorial region as 25.2 days. The circulation period in seconds is $T_C = 25{,}2 \cdot 60 \cdot 60 = 0{,}9 \cdot 10^5 s$ .The angular velocity in this case will be $\omega_C = 2\pi / T_C = 7 \cdot 10^{-5}$ rad/s. For the current value of the angular velocity of rotation of the Sun ω = 7·10 $^{-5}$ rad/s and the lifetime of the Sun as a star t = 15 billion years at ω_o = 0, the angular velocity of rotation of the solar vortex of gaseous dark matter will be ω_{B1} = 0,2·10 $^{-21}$ rad/s.

In addition, we will determine one more value ω_{B2} of the solar vortex, based on the lifetime of the solar planetary system t = 3,5 billion years. At the same time, we assume that at the moment of formation of the planets the angular momentum was transferred to the planets, and the rotation of the Sun itself was practically stopped: ω_{B1} = 0,857·10 $^{-21}$ rad/s..

The results of calculating the angular velocities of dark gas vortices near the planets of the solar system for a time of t = 3,5 billion years are given in Table 4.1.1. In this table, the first column contains the names of the planets, and the following columns give the values of the masses, radii, and angular velocities of the planets. The seventh column shows the angular velocities of the vortices of dark gaseous matter.

Table 4.1.1

Planets	Weight, g	Radius, sm	Angular velocity of planets, glad / s	Radius of orbits, sm	Orbital speed of planets sm / s	Corner speed of vortex, glad / s
Earth	5,.98·10 ^{27}	6,.37·10 ^{8}	7,28·10 $^{-5}$	1,49·10 ^{13}	2,98·10 ^{6}	8,44·10 $^{-22}$
Mars	6,57·10 ^{26}	3,39·10 ^{8}	5,98·10 $^{-5}$	2,28·10 ^{13}	2,41·10 ^{6}	8,23·10 $^{-22}$
Jupiter	1,89·10 ^{30}	6,.99·10 ^{9}	1,76·10 $^{-4}$	7,88·10 ^{13}	1,31·10 ^{6}	2,04·10 $^{-21}$

Saturn	$5{,}68 \cdot 10^{29}$	$5{,}75 \cdot 10^{9}$	$1{,}71 \cdot 10^{-4}$	$1{,}42 \cdot 10^{14}$	$0{,}97 \cdot 10^{6}$	$1{,}98 \cdot 10^{-21}$
Uranus	$8{,}78 \cdot 10^{28}$	$2{,}55 \cdot 10^{9}$	$1{,}63 \cdot 10^{-4}$	$2{,}87 \cdot 10^{14}$	$0{,}68 \cdot 10^{6}$	$1{,}90 \cdot 10^{-21}$
Neptune	$1{,}03 \cdot 10^{29}$	$2{,}50 \cdot 10^{9}$	$1{,}10 \cdot 10^{-4}$	$4{,}60 \cdot 10^{14}$	$0{,}54 \cdot 10^{6}$	$1{,}28 \cdot 10^{-21}$

Over time, the angular velocity of the Earth's rotation increases. In accordance with formula (4.1.1), every 100 years, it increases by the value

$$\Delta\omega = \omega - \omega_o = 2\alpha\omega_B t_{100}/3 = 2{,}08 \cdot 10^{-12} \text{ glad / s.}$$

Average increment in angular velocity over this period

$$\Delta\omega_{cp} = \Delta\omega/2 = 1{,}04 \cdot 10^{-12} \text{ glad / s..}$$

For the Earth, the present angular velocity is $\omega_o = 7{,}28 \cdot 10^{-5}$ glad / s.. As a result of unwinding, the Earth's day is shortened on average over 100 years by the time $\Delta T_{100} = 2\pi/\omega_o - 2\pi/(\omega_o + \Delta\omega_{cp}) = 1{,}235 \cdot 10^{-3}$ s. This is a very small value, but it is 1.23 times higher than the deceleration of the Earth by tidal forces from the Moon, which, according to [21], are 10^{-3} s per 100 years or 10^{-5} s per year. However, this value is incommensurably small in comparison with the annual fluctuations in the speed of rotation of the Earth around its axis. It was found [21] that at the end of the 19th century the Earth was in a hurry for more than 1 s a year. After 1900, it was less than 1 second a year behind. Beginning in 1920, she began to rush again. How to relate to the result obtained? He, no doubt, gives food for thought, but it should not be absolutized.

There is an identical order of values for the tidal deceleration of the Earth by the Moon and its spinning by a vortex of dark gas. The discrepancy of 1.235 times should not seem large, considering that the calculation of the Earth's unwinding was carried out with many unknowns that can influence this process. We do not know, for example, when and how the Earth and the Moon formed a close pair and, therefore, we do not know if we chose the right time for 3.5 billion years in formula (4.1.12). We do not know if the total effect of braking and spinning can be obtained by simple summation. Finally, we do not know what caused the annual fluctuations in the speed of the Earth's rotation and how they are reflected in the tidal deceleration and spinning of the Earth by a vortex.

4.2 The shape of the real cosmic vortex of dark gas

Let us consider the question of what shape a real vortex should have near a massive body. As shown above, in vortex modeling of phenomena occurring in space, it is sufficient to assume that this vortex has a constant cross section and extends to infinity on both sides of the central body. However, it is difficult to imagine the presence in the Universe of a huge number of such infinite vortices. Most likely, the cross section of a dark gas vortex increases with distance from the central body, which is a sink (Fig. 4.2.1). For example, vortex funnels have such a shape when water is drained from a container through an opening. In this case, the Helmholtz theorem should be fulfilled that the stress of the vortex cord remains unchanged along its length, that is

$$I = 2\iint_S \omega \cdot dS = \text{const}.$$

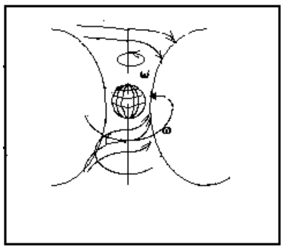


Fig.4.2.1

Here ω is the angular velocity of the vortex rotation; S - vortex cross-section. As applied to a dark gas vortex with a cross-sectional area $S = \pi r_o^2$ and rotating with a constant angular velocity $\omega = \omega_B$, this theorem degenerates into the equality

$$\omega_в \cdot r_{ов}^2 = const$$

This equality means, in essence, the constancy of the angular momentum along the length of the vortex. The quantity $\omega_в \cdot r_{ов}^2$ enters into expression (4.1.1) for the velocity potential, which describes the external flow of a dark gas near a vortex. Since it is constant along the length of the vortex, expressions

(4.1.1), (4.1.3) 4.1 (4.1.5) will not change when the radius changes $r_{ов}$ if the angular velocity of rotation of the core of the dark gas vortex changes simultaneously in accordance with the formula $\omega_{в} = \dfrac{const}{r_{ов}^{2}}$.

When the radius of the vortex section $r_{ов}$ becomes infinitely large, the angular velocity of rotation ω_B becomes equal to zero. Therefore, real vortices of dark gas near massive bodies have actually a limited extent.

Observations of the rotation of the Sun serve as an indication of a decrease in the angular velocity of rotation along the axis of the vortex with distance from the equatorial plane of the central body. Being a gaseous ball, the Sun does not rotate like a solid body. Observations of sunspots and spectral analysis [15, 16] showed that equatorial points revolve the fastest, making a complete revolution in 25 days. The farther from the equator, the longer the orbital time. At 40^{o} latitude, it is already over 27 days. At 80^{o} latitude, the circulation time reaches 34 days. The rotation of Jupiter around the axis [15,16] has the same feature. Along the way, we note that the reason for the mysterious "equatorial acceleration" remains a mystery to science and has not been resolved to this day.

4.3 Radii of cosmic vortices of dark gas. Effect of dark gas vortices on radii of planetary orbits.

An important question that does not yet have an answer is the question of the radius of the vortex core. The easiest way would be to assume that it is equal to the radius of the central body, as in the case of the formation of a vortex due to the forces of friction against the surface of a rotating body. However, the nature of the dark gas vortex is not related to friction. It is due to the fact that the ideal radial flow of dark gas near the drain hole is unstable and, as a result, curls up into a vortex. The flow inside and outside the vortex is resistant to external disturbances. Therefore, it is impossible in all cases to require equality of the radii of the body and the vortex, although this equality cannot be ruled out either.

Convenient space objects that make it possible to determine the radius of a dark gas vortex directly from observations are spiral galaxies, in which stars, as it were, visualize the boundary of the core of a galactic dark gas vortex. Observations show that the stars in the core of a spiral galaxy revolve around a common center according to the law of a rigid body, and only stars in the spiral arms have velocities decreasing with distance from the core. The same picture of the distribution of velocities, as is known, is characteristic of flows inside and outside a vortex (air, water). This observation, in addition, confirms the previously made statement that the radius of the dark gas vortex may not coincide with the radius of the solid central body, since the stars in the galactic core are remote from each other at large distances and do not represent a single body. **The drawing of spiral galaxies also suggests that the galactic vortex of dark gas actively forms the speeds of motion of stars and their position relative to the center of the galaxy.**

Unfortunately, there are no direct observations of objects in the solar system, from which it would be possible to determine the radii of the vortices of the dark gas of the Sun itself and the planets. This forces us to look for phenomena that at least indirectly allowed us to determine these radii. For this we turn to the laws of planetary motion.

It is known that the motion of planets in elliptical orbits obeys Kepler's laws. Since the elliptical orbits of the planets of the solar system are close to circular, this means that at any point of the orbit the equality of the centrifugal force and the force of gravity from the central body acting on the planet should be fulfilled:

$$F_{ц.б}=F_{тяж}\,, \qquad (4.3.1)$$

where

$$F_{ц.б}=m_п U^2/r_{орб},\ F_{тяж}=f m_п m/r^2_{орб}\,. \qquad (4.3.2)$$

After substituting (4.3.2) into (4.3.1) and the necessary reductions, we have

$$U^2 = fm/r_{орб}. \qquad (5.3.3)$$

In (4.3.2) and (4.3.3) the quantities mп and m represent the masses of the planets and the central star; U is the circumferential orbital velocity of the planet; $r_{орб}$ is the average radius of the orbit. At the initial moment of time t = 0, when $U = U_o$, $m = m_o$ and $r_{орб} = r_{o\ орб}$, condition (4.3.3) takes the form

$$U_o^2 = fm_o/r_{oорб}\,. \qquad (5.3.4)$$

As shown in (2.1.7), over time, the masses of bodies increase due to their absorption of gaseous dark matter from the surrounding space according to the law

$$m = m_o \cdot e^{\frac{\alpha \cdot t}{k}}\,, \qquad (5.3.5)$$

In this formula, the parameter $\frac{\alpha}{k} = 2{,}97 \cdot 10^{-18}\, s^{-1}$ was determined from the analysis of the motion of the Moon around the Earth [21]. Subsequently, it turned out that it is equal to the Hubble constant. The coefficient of the specific consumption of dark gas through the surface of the absorbing body $\alpha = 1s^{-1}$, k is the coefficient of the rate of formation of body mass from gaseous dark matter.

As a result, the force of attraction of the planet to the central body increases. On the other hand, under the influence of the vortex of the dark gas of the central body, the circumferential speed of the planet increases when moving in orbit, increasing the centrifugal force and thereby preventing the action of the forces of attraction.

Consider these processes for the motion of the planet outside the core of the dark gas vortex. During a small space time interval, we will neglect the change in the average radius of the orbit and assume that $r_{орб} = r_{o\text{-}орб}$. The jets of dark gas in a vortex exert a force effect on a satellite or planet in the direction of the circumferential velocity of the dark gas tangentially to the orbit, regardless of their own velocities. According to (2.8.6), this force can be written as

$$F = j \cdot m_n\,. \qquad (5.3.6)$$

Here, the acceleration of the planet, like any other baryonic body, taking into account [26,27,28], can also be expressed through the parameters of dark matter

$$j = \frac{dV_{орб}}{dt} = \alpha \cdot V_e \,. \tag{4.3.7}$$

The velocity of the jets of dark gas in the plane of the planet's orbit according to expression (4.1.5) and Fig. 4.1.1 with considering $\theta = 90^o$ will be

$$V_e = \frac{\omega_в \cdot r_{ов}^2}{r_{орб}} \,. \tag{4.3.8}$$

After substituting (4.3.7) and (4.3.8) into (4.3.6), we obtain a differential equation with separable variables

$$dV_{орб} = \alpha \cdot \frac{\omega_e \cdot r_{ов}^2}{r_{орб}} dt \,. \tag{4.3.9}$$

We integrate equation (4.3.9), as a result we obtain an expression for the speed of a planet or satellite in orbit

$$U = U_o + \alpha \omega_B \cdot r_{oB}^2 \, t / r_{орб}. \tag{4.3.10}$$

Let us substitute in condition (4.3.1) the equality of the force of gravity and centrifugal force acting on the planet, the mass of the central body from (4.3.5) and the velocity from (4.3.10). After the necessary transformations, we get

$$U_o^2 \left(1 + \frac{r_{oB}^2 t \omega_B \alpha}{U_o r_{opb}}\right)^2 = \frac{f m_o e^{\frac{\alpha}{k} t}}{r_{opb}}. \tag{4.3.11}$$

We assume that there is an orbit whose radius does not change with time. For this orbit $r_{орб} = r_{о\text{-}орб}$. Further, we will take into account that from relation (4.3.4) the quantity $U_o^2 = f \cdot m_o / r_{o-орб}$ and $(e^{\alpha \cdot t / k})^{-2} = 1 + \alpha \cdot t / 2k$, we solve expression (4.3.6) with respect to the vortex radius:

$$r_{OB} = \sqrt{\frac{(\alpha / k)\sqrt{f m_o r_{opb}}}{2\alpha \cdot \omega_B}}. \tag{4.3.12}$$

Formula (4.3.12) allows you to determine the radius of the vortex of a dark gas near any massive body, **<u>if the radius of the equilibrium orbit is known, on which the equality of the centrifugal force and the force of attraction acting on the planet located on this orbitю</u>** $r_{орб} = r_{о-орб} = r_{орб-рав}$.

As an equilibrium orbit, it is logical to take the orbit passing along the outer boundary of the dark gas vortex, since it changes the law of the dark gas flow outside and inside the vortex core. In this case $r_o = r_{орб-\ pab}$ and from formula (4.3.12) it follows that

$$r_{oB} = r_{opb-рав} = \sqrt[3]{fm_o \left(\frac{\alpha / k}{2\alpha \cdot \omega_B} \right)^2} . \tag{5.3.13}$$

According to this formula, the radii of dark gas vortices around the Sun and the Earth will be

$r_{oBC} = 0{,}574 \cdot 10^{12}$ sm, (5.3.14)

$r_{oB Зем} = 0{,}956 \cdot 10^{9}$ sm. (5.3.15)

When calculating, the following values were used: $m_{oЗем} = 6 \cdot 10^{27}$ g, $\omega_{B\ Зем} = 9{,}93 \cdot 10^{-22}$ rad / s, $m_{oC} = 2 \cdot 10^{33}$ g, $\omega_{B\ C} = 3{,}96 \cdot 10^{-23}$ s^{-1}.

It is interesting to note that the orbits of all planets in the solar system lie outside the core of the solar vortex of dark matter. (the radius of the orbit of the planet Mercury, closest to the Sun, is $r_{орб} = 0{,}577 \cdot 10^{13}$ sm). The Moon's orbit also lies outside the Earth's vortex of dark matter. (radius of the moon's orbit $r_{орб} = 3 \cdot 10^{10}$ sm). The radius of the vortex of dark gas around Jupiter according to (4.3.13) $r_{oB} = 0{,}4 \cdot 10^{10}$ sm. The orbits of the four Galilean satellites of Jupiter are from 0.5 to 5 times the distance of our Moon [21], that is from $1{,}5 \cdot 10^{10}$ sm to $15 \cdot 10^{10}$ sm. As you can see, they also lie outside the vortex dark gas near Jupiter.

Next, we solve equation (4.3.11) with respect to the orbit radius, replacing U_o in it with the help of (4.3.4) and discarding small quantities. As a result, we obtain the ratio

$$\frac{r_{opb}}{r_{0opb}} = e^{\frac{\alpha}{k}t} - \frac{2\alpha \cdot \omega_B r_{oB}^2}{\sqrt{fm_o r_{0opb}}} t. \qquad (4.3.16)$$

For small cosmic time intervals, this formula can be used to write down the increment of the orbit radius by expanding $e^{\alpha \cdot t/k}$ in a power series and keeping the terms linear in t in it:

$$\Delta r_{opb} = r_{0opb} \left(\frac{\alpha}{k} - \frac{2\alpha \cdot \omega_B r_{oB}^2}{\sqrt{fm_o r_{0opb}}}\right) t. \qquad (4.3.17)$$

Let us apply formulas (4.3.10) and (4.3.17) to determine changes in the parameters of the Moon's motion in its orbit around the Earth for a time interval t_{100}=3,15·10^9s. (a hundred years). In the calculations, we use the values of the $r_{орб\ Луны}$ = 3,844·10^{10} sm, $r_{оВ\ Зем}$ = 0,965·10^9 sm, $\omega_{В\ Зем}$ = 9,93·10^{-22} рад/с. As a result, we obtain an increment in the radius of the orbit $\Delta r_{орб}$ = 3 m, the average increment in the peripheral speed $\Delta U_{ср}$ = ΔU/2 = 3,8 ·10^{-5} sm/s and the associated accelerated orbital motion at a distance ΔS = $\Delta U_{ср} t_{100}$ = 1,2 km. These figures are close to the known values of the secular acceleration of the Moon ΔS_{100} = 7,45 km and the increment in the average orbital radius $\Delta r_{орб}$ = 1,5 m, determined from observations of the motion of the Moon. Next, let's turn to the Earth's orbit around the Sun. Over 3.5 billion years at $\omega_{В\ С}$ = 3,95·10^{-23} rad/s, $r_{оВ\ С}$ = 0,574 ·10^{12} sm, $r_{орб\ Зем}$ = 1,465·10^{13} sm, the increment in the Earth's orbital velocity will be $\Delta U_{Зем}$ = 1,436 km / s . The present speed of the Earth is U_o = 29,8 km/s. For one billion years, according to (4.3.16), the radius of the Earth's orbit has increased in the ratio

$$r_{орб}/r_{oорб}=1{,}08. \qquad (4.3.18)$$

The increase in the radius of the Earth's orbit, due to the vortex of dark gas around the Sun, fully compensates for the increasing luminosity of the Sun with time.

4.4 Role of cosmic vortices gaseous dark matter in the formation of the galaxy - "Milky Way"

The structure of spiral galaxies has two distinctive features [15,16]. The first of these is that the core of any spiral galaxy consisting of billions of stars rotates as a single solid body. The second feature is that outside the core, the angular displacements of the stars located in the spiral arms around the center of the galaxy begin to decrease with distance from the center. Observations show [15,16] that spiral galaxies rotate backward with their branch ends. This could not be explained by the existing hypotheses of the formation of spiral galaxies (Jeans, Lingblad and a number of modern authors), but the theory of gaseous dark matter naturally explains (Fig.4.4.1, spiral galaxy M51).

We believe that the core of a spiral galaxy is enclosed in a huge galactic vortex of dark matter. The core of the vortex is the same size as the core of the galaxy. This conclusion was made by us on the basis that any moving material body, including stars, is acted upon by the gravitational force from the side of the moving dark gas, determined by the formula (4.1.10)

$$F_u=\alpha m V_{e\psi}. \qquad (4.4.1)$$

The force acts in the direction of the dark gas flow. Here $V_{e\psi}$ is the circumferential velocity of the dark gas in and around the vortex; m is the mass of the star. This gravitational force does not depend on the speed of the body.

.Since these forces acting on the stars from the direction of the dark gas flow are proportional to the velocities in the vortex, it is they who form the characteristic pattern of a spiral galaxy in accordance with the velocity field in the vortex itself. As a result, the stars located in the core of the dark gas vortex rotate as a single solid body, and outside of it the speeds of stars, like the speeds of dark gas, decrease with distance from the center of the core.

So Three forces act on the stars of the galaxy: gravity, centrifugal force, and circumferential force. Gravity and centrifugal force act in a radial direction with respect to the center of the galactic dark gas vortex and spiral galaxy, while a circumferential force acts in the circumferential direction. It forces stars to accelerate around the center of the galaxy, grouping them into a characteristic spiral pattern depending on their location in relation to the core of the dark gas vortex.

.Naturally, in this case, the values of the peripheral velocities of the stars in the vortex and around it depend not only on the distance to the vortex center, but also on the time during which the star is in the zone of action of the galactic vortex of dark gas. In this sense, the galactic vortex and the spiral galaxy are linked by date of birth.

.Regarding the answer to the question of which arises first - stars or a vortex of dark gas, we tend to consider the following sequence. First, a huge cloud of gas and dust collects in space, which has a center of mass, regardless of its own shape. As a result of the fact that all the particles of this cloud absorb gaseous dark matter, there is a radial flow of dark gas to the center of mass and, as a consequence, the force of gravity directed towards the center of mass. Earlier, we have already noted more than once that the radial flow of a continuous gaseous medium is not stable and, when disturbances arise, it is rearranged in the flow near the vortex. This flow of dark gas is a huge galactic vortex consisting of a core spinning like a solid body and a potential flow beyond it. In this region, the peripheral velocities decrease with distance from the nucleus in inverse proportion to the radius.

In parallel with this, stars are formed in the gas-dust cloud in the way that cosmology considers. It is easy to see that, **in contrast to the theory of gaseous dark matter, modern cosmology has lost from the field of view the circumferential force acting on the stars and the resulting circumferential velocities and accelerations. This significantly narrows its possibilities for a correct understanding of the structure of the Universe. Consider the consequences of these differences.**

Under the influence of this force, the star acquires a circumferential acceleration and an increment in circumferential speed:

$$j_u=dU/dt=F_u/m_п=\alpha V_{e\psi}, \qquad (4.4.2)$$

$$\Delta U = j_n \cdot t = \alpha \cdot V_{e\psi} \cdot t\ . \qquad (4.4.3)$$

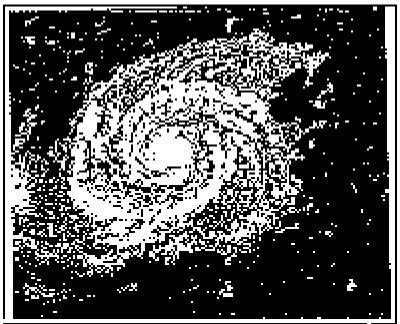
The path increment in time t along the orbit and the angle increment (Figure 4.4.2) will be

$$\Delta S=j_u t^2/2=\alpha V_{e\psi} t^2/2\ , \qquad (4.4.4)$$

$$\Delta\varphi=\Delta S/r_{орб}=(\alpha V_{e\psi} t^2)/2r_{орб}\ . \qquad (4.4.5)$$

As can be seen from formulas (4.4.1) - (4.4.4), the acceleration of stars, the increment in the speed of their movement in orbit around the central star, the increment in the path traversed along the orbit, and the additional angular displacement are directly proportional to the peripheral velocity of the dark gas $V_{e\psi}$. The boundary of the galactic nucleus, clearly visible in photographs, is also the boundary of the galactic vortex. Therefore, for the "Milky Way" galaxy, the radius of the core $r_{о.ядра}=r_{oB}=9\cdot10^{21}$sm. The peripheral velocity of the dark gas in the vortex core is determined by formula (4.1.2), and outside the core - by formula (4.1.5). In accordance with these formulas, in Fig.4.4.2, a diagram of the peripheral velocities of a dark gas inside and outside the glactic vortex of a dark gas is plotted.

Fig.4.4.2 shows that inside the core, the dark gas rotates according to the law of a rigid body. In accordance with formulas (4.4.4) and (4.4.5), this determines the observed motion of stars inside the galactic core according to the law of a rigid body. Outside the core of a galactic dark gas vortex, the circumferential velocity of the dark gas decreases inversely with the radius (distance to the vortex). This should lead to a lag behind the stars located at the ends of the spiral arms of the Galaxy. Over time, the radii of the orbits of stars in the spiral arms change, adjusting to Kepler's laws.



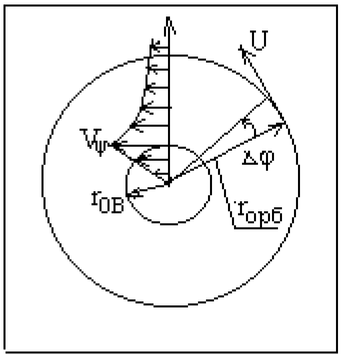


Fig.4.4.1

Fig.4.4.2

Without pretending to fully explain the structure and origin of spiral galaxies, nevertheless, using the example of our Galaxy (the “Milky Way”), we note some interesting quantitative coincidences of the increments of the velocities of the motion of stars in their orbits, obtained by calculations using the formulas of this work, and observations. **<u>These coincidences indicate that galactic dark gas vortices are actively shaping the structure of spiral galaxies.</u>**

:The Milky Way is known to be a spiral galaxy. Our Sun is one of the billions of stars that make up the Galaxy. It is located outside the core. Just like other stars, it moves around the center of the Galaxy with a circumferential velocity U_c = (220 ÷ 225) km / s at a distance from the center $r_{орб\ C}$ = 10 kiloparsec = $3{\cdot}10^{22}$ sm. The mass of the Galaxy is determined in astronomy from the condition of equality of centrifugal the forces of the Sun and the force of attraction created by the mass of the Mgal Galaxy, enclosed within the radius of the Sun's orbit:

$$M_{гал}=U_c^2 r_{сорб}/f=2{\cdot}10^{44}\ г. \qquad (4.4.6)$$

In [15], it is noted that the rotation periods of all observed galaxies are confined within a relatively narrow range from 30 to 100 million years. This corresponds to the following range of variations in the angular velocities of rotation of galactic nuclei:

$$\omega_{ядр}=(6{,}65{\div}2){\cdot}10^{-15}\ rad\ /\ s. \qquad (5.4.7)$$

According to [15], the radius of the nucleus of our Galaxy is $r_{ядр}$=3kiloparsec=$9{\cdot}10^{21}$ sm. As the angular velocity of rotation of the Galactic nucleus, we take the average value from the range (4.4.7), namely $\omega_{ядр}$= $5{,}6{\cdot}10^{-15}$ glad / s.

We can model the interaction of the Sun with the core of the Milky Way as if, instead of billions of stars in the core, there were one star at its center with a mass equal to the mass of the galactic core. This allows us to use for our analysis the formulas obtained for the vortex near the central star.

Let us calculate by the formula (4.1.12) at ω_o = 0 the angular velocity of rotation of the core of the galactic vortex of the dark gas of the Milky Way for the age of the Galaxy t_1 = 15 billion years:

$$\omega_{в-гал} = \frac{4}{\pi}\frac{\omega_{ядр}}{\alpha \cdot t_1} = 1{,}515 \cdot 10^{-32}\, rad\,/\,s. \qquad (4.4.8)$$

Over this time, in accordance with the formula (4.3.10), there was an increase in the circumferential speed of the Sun by the value

$$\Delta U = \alpha\omega_{Bгал} r_{oB}^2 t / r_{copб} = 226 км/с, \qquad (4.4.9)$$

coinciding with the current speed of the Sun. Consequently, **<u>the speed of the Sun is entirely due to the galactic vortex.</u>** During the same time, in accordance with formula (4.3.16), the radius of the Sun's orbit has increased slightly: $r_{орб}/r_{о\ орб} = 1{,}025$.

Let's consider another interesting problem related to our Galaxy. The article [42] notes that within the framework of the Sloan Digital Spectral Sky Survey (SDSS) program, American astrophysicists discovered an unusual star escaping from our Galaxy at a speed of 700 km / s. This confused astrophysics. The fact is that the second cosmic velocity for the Milky Way, at which a star could fly out of the Galaxy, has a value

$$V_2 = \sqrt{2 f M_{гал} / r_{0яядр}} = 546 км/с,$$

where

$$M_{гал} = 2 \cdot 10^{44} г,\ r_{оядр} = 9 \cdot 10^{21} см,\ f = 6{,}7 \cdot 10^{-8}\ см^3/(г \cdot с^2).$$

Astrophysicists ignore the presence of a galactic vortex of dark gas in our galaxy. They do not know about the action of the circumferential force (4.4.1), accelerating the stars in their motion in orbits and are convinced that the Milky Way lacks mechanisms capable of accelerating a star faster than 450 km / s. Therefore, they are unable to explain the observed phenomenon.

However, it is naturally explained by the theory of gaseous dark matter, based on the formulas used to determine the orbital speed of the Sun and the planets of the solar system. To be convinced of this, let us calculate the circumferential velocity of a star using formula (4.4.9), which by chance turned out to be close to the boundary of the core of the galactic vortex of dark gas at a distance $r_{орб} = r_{оВгал} = 8 \cdot 10^{21}$ sm and was there during the life of the galaxy for 15 billion years up to the present day $t=4,725\cdot10^{17}$s. The angular velocity of the galactic vortex of dark gas is determined in (4.4.8). The radius of the vortex core coincides with the radius of the core of our Galaxy $r_{оВгал}=9\cdot10^{21}$sm..

$$\Delta U_{зв}=\alpha\omega_{Вгал}r^2_{оВгал}t/r_{зв\ орб}==\alpha\omega_{Вгал}r_{оВгал}t=725\ km/s$$

The calculation showed that over 15 billion years, this star gained speed sufficient to escape from the Galaxy. In addition, the calculation showed that the galactic vortex of dark gas continues to change the structure of galaxies along with the force of gravity throughout the life of galaxies. The effect of gravity also does not remain constant in time due to the growth of the masses of the stars and planets that make up the galaxy. The discussed theory of gaseous dark matter makes it possible to trace the evolution of galaxies.

About the reasons for acceleration of artificial earth satellites LAGEOS when moving in near-earth orbits

The article [42] provides interesting information that Italian scientists from the University of Lecce analyzed data from two orbiting NASA satellites LAGEOS-1 and LAGEOS-2. These satellites orbited in airless space around the Earth - one since 1976 and the other since 1992. All this time, they reflected the laser beam directed at them. This made it possible to calculate their orbit with great accuracy. At the same time, it turned out that their position in orbit was shifted by as much as two meters per year (2m / year) in the direction of the Earth's rotation in comparison with the calculated one.

According to Italian scientists, the data obtained "pour water on the mill" of Einstein's general relativity and confirm an effect no less interesting for science - frame dragging, which was formulated in 1918 by scientists Lense and Thirring. According to their version, near any massive rotating body, space and time spins around these bodies in the direction of their rotation. In order to test this assumption, in April 2004, another Nazov satellite was launched - Gravity Probe B.

With regard to the deformation of space and time, it should be noted that despite the almost 100-year age of this idea (since the publication of general relativity), no sane person is able to imagine how it should look in practice. Today it is nothing more than a mathematical abstraction. At the same time, the theory of “gaseous dark matter” developed in this book offers a completely visual and physically substantiated model for these concepts. Indeed, any massive space body, being in the surrounding infinite field of dark gas, continuously absorbs it. As a result, the flow of dark gas to the center of this body is organized. In addition, cosmic vortices of dark matter are formed near such bodies, rotating in the direction of rotation of these bodies. The flow near such bodies is modeled by the flow near the vortex stream.

Obviously, any material body located in the field of dark gas near the vortex will be picked up by the flow of dark gas, like a chip in a whirlpool, and will receive additional to its main motion-a movement towards the center of mass of central body and in the direction of rotation of the cosmic vortex of dark gas. Today, the theory of “gaseous dark matter” takes into account the movement of dark gas to the centers of massive bodies in the form of gravity, described by Newton's law of gravity. Earlier in this book, it was shown that vortices of dark gas near massive space bodies exert a force effect on other bodies located near them. This influence has already manifested itself in observations of the secular acceleration of the Moon, the acceleration of satellites in the direction of vortex rotation, in the deflection of light rays near massive stars. Unfortunately, science still does not understand what actually happens in nature. This is where these abstract ideas about swirling space-time come from.

However, let us return to the observation data for artificial satellites LAGEOS. We do not separate the discovered phenomenon of the acceleration of these satellites in their orbits from the previously known secular acceleration of the Moon, from the behavior of the planets orbiting the Sun and other natural satellites of all other massive celestial bodies. Earlier we showed that it is cosmic vortices of dark gas that cause the known secular acceleration of the Moon as it moves around the Earth, form a characteristic pattern of spiral galaxies, and determined the magnitude of the circumferential speed of the Sun as it moves around the center of the Milky

Way. In the same row, there is an annual displacement of two meters against the calculated position of NASA satellites LAGEOS-1 and LAGEOS-2 as they move in orbits around the Earth. This displacement ΔS is determined by the formula (4.4.4) of this work

$$\Delta S = j_u \cdot t^2/2 = \alpha V_{e\Psi}\, t^2/2 \,, \qquad (4.5.1)$$

where $\alpha = 1 s^{-1}$; ju is the acceleration of satellites due to the forceful effect of a vortex of dark matter; $t = 3{,}15 \cdot 10^7 s$ is the number of seconds in a year; $V_{e\psi} = \omega_e r_{o3}$ is the circumferential velocity of dark gas in a cosmic vortex near the Earth at a distance ro3 from its center; $\omega_в = 8{,}44 \cdot 10^{-22}$ rad/s-angular velocity of rotation of the core of the vortex of the Earth's dark gas (Table 4.1.1); $r_{o3} = 6{,}37 \cdot 10^8$sm-radius of the Earth. Calculation by formula (4.5.1) gives the value

$$\Delta S = 2{,}67м \,. \qquad (4.5.2)$$

This would be the displacement of artificial satellites in orbit for a year if the orbit lay strictly in the equatorial plane. As you can see, the result turned out to be very good. It is important to emphasize that no additional assumptions were made to obtain this result. This confirms the unity of the laws of nature in relation to the movement of natural celestial bodies: the Moon, the Earth, the Sun, entire galaxies and artificial satellites of the Earth, made by human hands.

Part 5
Mysterious Stars

5.1 Black holes in the Universe, filled with gaseous dark matter

This part discusses some of the contradictions in the widely accepted explanations of the nature of stars of Black Hole . It is shown that Black Holes with the masses of ordinary stars are unstable. They is must be destroyed by centrifugal forces. The dimensions of supermassive black holes at the centers of spiral galaxies are overestimated. At such sizes, they have very low density values. Such a density contradicts ideas that explain the formation of black holes by the catastrophic contraction of large, but rarefied stars to the values □□of the densities of neutron stars.

Based on the ideas of the considered theory of gaseous dark matter, calculations of more realistic sizes of black hole stars are proposed. With such dimensions, the indicated contradictions of the modern theory of black holes disappear. In addition, the article reveals the role of black holes in the circulation of matter and energy in the Universe. It is shown that black holes at the centers of spiral galaxies are huge "cauldrons" in which new matter is created. The absorbed dark matter from the surrounding space is processed inside supermassive black holes into baryonic matter, which is then ejected into the vastness of the Universe. In this sense, black holes cease to be "singularities."

The book also shows that at the same time as dark matter, enormous energy flows into black holes. Calculations show that over 15 billion years, enough energy accumulates inside supermassive black holes to explain the explosions observed by astronomers with the simultaneous release of huge energy, comparable to the explosion energy of all stars in the whole galaxy.

5.2 The Black holes with masses of ordinary stars

Stars are called black holes, which supposedly have such large masses m_o and small sizes (r_o -radii) that light (a chain of photons at a light wavelength.) Cannot overcome the force of gravity and leave the star. It is known that for one component to escape from the binary system of masses, its velocity V must reach a certain critical value, called the second cosmic velocity. This speed is determined by the formula

$$V = \sqrt{\frac{2fm_o}{r_o}}\ . \qquad (5.2.1)$$

If instead of the speed V in this expression we substitute the speed of light $C = 3 \cdot 10^8$ m / s, solve it with respect to the radius of the star ro, then we get the value of the gravitational radius of a star with mass m_o:

$$r_o = \frac{2fm_o}{C^2}\ . \qquad (5.2.2)$$

If the radius of the star is less than this value, then the heavy light wave (a chain of photons at the length of the light wave) cannot leave it and the star must go out for the rest of the world. It is impossible to see the “black hole”. Therefore, attempts to detect it (them) are reduced to searching for secondary phenomena from the region of unusually strong gravitational interactions in the centers of galaxies.

Although condition (5.2.2) itself is correct, there are doubts about the possibility of the existence of black hole stars satisfying this condition. To verify this, we will try to apply it to a hypothetical star formed as a result of collapse from a normal star with the initial parameters of the Sun (mass $m_{oC}=2\cdot10^{30}$kg, radius $r_{oC}=7\cdot10^8$m, angular rotation velocity $\omega_{oC}=7\cdot10^{-5}s^{-1}$).

After the catastrophic compression of the star, these parameters will change `to the parameters of a black hole with the same mass $m_{oC}=2\cdot10^{30}$ kg, but with a smaller radius $r_{oC}=3\cdot10^3$m (from equation 5.2.2). From the condition of conservation of angular momentum, we determine the new angular velocity $\omega_{чд}=\omega_{oC}\cdot r_{oC}^2 / r_{чд}^2 = 2{,}67\cdot10^7\ s^{-1}$. Next, we calculate the average density of this black hole $\rho_{чд}=3m_{чд}/4\pi r_{чд}^3 = 1{,}8\cdot10^{20}$ kg/m^3. It turned out to be 180 times greater than the density of the atomic nucleus (α -particle), which cannot be.

Let's continue our analysis. To do this, we write down the condition for the destruction of a black hole by centrifugal forces . This will happen if the centrifugal force $F_{ц.д} = \frac{m \cdot u^2}{r_{ч.д}} = \frac{m \cdot \omega_{ч.д}^2 \cdot r_{x/l}^2}{r_{ч.д}} = m \cdot \omega_{ч.д}^2 \cdot r_{ч.д}^3$ exceeds the force of gravity $F_{тяж} = \frac{f \cdot m \cdot m_C}{r_{ч.д}^2}$. We write this ratio

$$\frac{F_{ц.б.}}{F_{тяж}} = \frac{\omega_{ч.д}^2 \cdot r_{ч.д.}^3}{f \cdot m_C} > 1. \qquad (5.2.3)$$

The constant of gravity f = 6.7□10-11N□m2 / kg2. With these values of these quantities, the ratio $\frac{F_{ц.б.}}{F_{тяж}} = 4{,}3 \cdot 10^5$

As you can see, the black hole under consideration would actually be torn apart by centrifugal forces. In the existing popular scientific literature, one can often find the statement that a star with the parameters of the Sun, having turned into a black hole, will shrink into a sphere with a tiny three-kilometer radius, but I have never come across a continuation of this study, which would show that such a star is unstable and will be destroyed.

In the stated theory of dark matter, there is one more reason that casts doubt on the existence of black hole stars that satisfy condition (5.2.2). The fact is that a black hole star, like any other star, is a sink for dark gas. The dark gas flows down to the center of the star evenly along the radii. Therefore, the photons of light have to overcome the counter current, in whatever direction the light moves away from the star. It resembles a swimmer swimming in
river upstream. If the speed of the swimmer does not exceed the speed of the water, then you can swim as long as you like, but not one meter forward relative to the coast.

Taking these considerations into account, we assume that the speed of the flow of the dark gas directed towards the star does not anywhere exceed the speed of light m / s emitted by the star. Otherwise, the star could not be seen.

$$V_{ro} = \frac{\alpha \cdot m_o}{4\pi \rho_e r_o^2} < C\,. \qquad (5.2.4)$$

According to (2.3.2) coefficient $\alpha = 1c^{-1}$. If this condition was violated, the star could not be seen. The minimum radius of the visible star is determined from (5.2.4)

$$r_{o\min} = \sqrt{\frac{\alpha \cdot m_o}{4\pi \cdot \rho_e \cdot C}} = \sqrt{\frac{f \cdot m_o}{\alpha \cdot C}}\,. \qquad (5.2.5)$$

The minimum radius of a star with the mass of the Sun, at which the star disappears from the field of view according to expression (5.10.5), will be $r_{o\ min}$ = 668,6 км.

The value of the minimum radius $r_{o\ min}$ for stars with the mass of the Sun corresponds to the order of magnitude of the radii of actually observed stars such as white dwarfs. The smallest of the known white dwarfs, the Wolf 457 star [15], has a mass $m_o = 1{,}01 \cdot 10^{33}$ g and a radius of r_o = 700 km. The minimum radius for this mass according to formula (5.2.5) will be

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$$r_{o\min} = 470 \text{ км.}$$

A white dwarf star Van Maanen has a mass of $m_o = 0{,}28 \cdot 10^{30}$ kg and a radius of $r_o = 4900$ km. The minimum radius for the mass of this star

$$r_{o\min} = 250 \text{ км.}$$

The white dwarf satellite of Sirius has a mass of $m_o = 1{,}7 \cdot 10^{30}$ kg and a radius of $r_o = 20000$ km. The minimum radius for the mass of this star

$$r_{o\min} = 616 \text{ км.}$$

Thus, it can be argued that white dwarfs are close to the threshold of stellar visibility. No wonder astronomers do not see stars in the sky is fewer than white and red dwarfs.

5.3 The supermassive black holes into centers of spiral galaxies

A significant mass of matter must be concentrated at the center of a spiral galaxy, which creates a gravity force directed towards the center of the galaxy. This force keeps nearby stars in their orbits as they revolve around a common center. For stars farther from the center, the stars closest to it begin to increase the force of gravity. Until recently, astronomers believed that in the centers of galaxies there are gas and dust clouds that do not emit light. It was assumed that there could be a star in the center, the light from which is absorbed in the surrounding dark matter cloud.

Astrophysicists today are trying to understand the state of matter in the center of the galaxy. In this case, the value of the mass of matter in the center was determined from the analysis of the dynamics of the stars closest to the centers of galaxies, carried out on the basis of systematic observations using the Hubble Space Telescope, as

$$m_{ч.д.}= 0{,}005\ M_{гал.} =10^{42}г=10^{39}\ кг. \qquad (5.3.1)$$

The distances from these stars to the centers of ropb galaxies r_{opb} can be estimated assuming that as each star moves along its orbit, there is an equality of gravity and centrifugal forces acting on it in opposite directions

$$r_{opb}=\frac{f\cdot m_{ч.з.}}{U^2}\ . \qquad (5.3.2)$$

In these formulas, the gravitational constant $f=6{,}7\cdot10^{-11}$ Nm^2/kg^2; $m_{ч.д}$ is the mass of a supermassive black hole in the center of the galaxy $M_{гал}=2\cdot10^{41}kg$ is the mass of the galaxy (galaxy nucleus); U is circumferential speed of the stars closest to the center of the galaxy as they move along their orbits. This speed is estimated by American astrophysicists as U≅500000 km/hour=$1{,}4\cdot10^5$ m/s=$1{,}4\cdot10^7$ sm/s. . For our spiral galaxy of the Milky Way, the radii of the orbits of the stars closest to the center according to (5.3.2) will be

$$r_{орб} = \frac{6{,}7 \cdot 10^{-11} \cdot 10^{39}}{(1{,}4 \cdot 10^5)^2} = 3{,}4 \cdot 10^{18}\, м = 3{,}4 \cdot 10^{15}\, км\,. \quad (5.3.3)$$

The radius of the supermassive black hole in the center of the Milky Way can be calculated from the condition that it is impossible for light to overcome the attraction and leave the galactic nucleus by the formula (5.3.2)

$$r_{очд} = \frac{2 f m_{чд}}{C^2} = 1{,}49 \cdot 10^{12}\, м = 1{,}49 \cdot 10^{9}\, км\,. \quad (5.3.4)$$

For clarity, let us recall that the radius of Saturn's orbit is r_{opb}=1,42·10^9 km. As you can see, the radius of the black hole coincides with the radius of Saturn's orbit. This prompted astrophysicists to speculate that there are supermassive black holes about the size of our solar system at the center of spiral galaxies.

As you can see, astrophysics has awarded massive black holes at the centers of spiral galaxies with very large sizes. With such dimensions, the average density of a star is $\rho_{чд}$=0,01 g/sm^3, which is a hundred times less than the density of water and only ten times more than the density of air at the Earth's surface. It must be remembered that these stars cannot be seen and measured. At the same time, the density of ordinary stars like the Sun is $\rho_C = 1{,}4 \cdot 10^3\, kg/m^3 = 1{,}4 g/sm^3$ on the order of magnitude, and the density of white dwarf stars reaches $\rho_{б.к.} = (0{,}7 \cdot 10^9 .... 10^{12}) g/sm^3$. White dwarfs are visible stars, not black holes.

Here there is some contradiction with the modern views of astrophysics itself, since black holes according to these views are formed due to the collapse of large rarefied visible stars or gas and dust clouds. In this case, the density of matter should have increased to values that are not inferior to the densities of white dwarfs, and possibly the densities of neutron stars $\rho_{чд}$=10^{18}кг/м^3=10^{15} g / sm^3. With such a density, the radius of a supermassive black hole with the mass of the Milky Way would have to take the value

$$r_{очд} = \sqrt[3]{\frac{3 m_{чд}}{4\pi \cdot \rho_{чд}}} 0{,}31 \cdot 10^7\, м = 3100 км\,. \quad (5.3.5)$$

The condition for the existence of black holes in the theory of gaseous dark matter determines their radii from the impossibility for a wave of light to overcome the oncoming radial flow of a dark gas in accordance with formula (5.10.5). For the mass of the Milky Way, this formula gives the following value.

$$r_{o\min} = \sqrt{\frac{f \cdot m_{чд}}{\alpha \cdot C}} = 1{,}135 \cdot 10^{10}\, м = 1{,}135 \cdot 10^{7}\, км\,. \qquad (5.3.6)$$

It is more than a hundred times smaller than the radius of the black hole determined by (5.3.4). If the radius of a massive black hole is taken in accordance with the theory of gaseous dark matter (5.3.6) as $r_{очд} = 1{,}135 \cdot 10^{10}\, м = 1{,}135 \cdot 10^{7}\, км$, then the average density of such a star will be

$$\rho_{о\text{-}чд} = 1{,}63 \cdot 10^{8} кг/м^{3}\,. \qquad (5.3.7)$$

This value is close to the densities of white dwarf stars ($0.4 \cdot 10^{8}$кг/м^3-$0{,}9 \cdot 10^{12}$ kg/m^3) and, therefore, better corresponds to the modern views of astrophysics on the nature of black hole formation.

So, we have different estimates for determining the radius of a supermassive black hole at the center of a spiral galaxy. Which one should you choose? Obviously, the estimate (5.3.4) $r_{очд}=1{,}49 \cdot 10^{9}$ km, which turned out to be more than predicted by the theory of gaseous dark matter (5.3.6) $r_{omin}=1{,}135 \cdot 10^{7}$ km, means only that light from any source inside this area will not be able to leave it.

The radius cannot be less than the radius of a supermassive neutron star (5.3.5) $r_{очд}=0{,}31 \cdot 10^{4}$ km, because matter cannot be compressed more strongly than a neutron liquid with a density $\rho_n=10^{18}$ kg/m^3. So one can expect with a high degree of confidence that the radius of a supermassive black hole with mass $m_{чд}=0{,}005 \cdot M_{гал}$ lies within the limits

$$0{,}31 \cdot 10^{4}\, км \leq r_{о\text{-}чд} \leq 1{,}135 \cdot 10^{7}\, км. \qquad (5.3.8)$$

The radius $r_{очд}=1{,}49 \cdot 10^{9}$ km is too large for a black hole, because with this value, an unrealistically low density is obtained.

Recall that all reasoning about supermassive black holes is based on the observational fact that astronomers do not see radiation from a local star at the centers of spiral galaxies, but they were able to see that the circumferential velocities of the stars closest to the center are anomalously high U=500000км/час=140 km/s. Without this central mass, they would have to be much smaller.

Astronomical observations show the dual role of galactic nuclei. On the one hand, the central supermassive black holes possess a super-destructive gravity that can completely swallow any nearby star or other material formation. In this regard, astrophysicists believe that there is a singularity at the centers of black holes. By definition, is the point at which matter disappears ?? Forever or for a while ?? How does this happen?? Where does it go ?? Astrophysics cannot explain this.

On the other hand, the theory of gaseous dark matter reveals a second role for the black hole. Indeed, dark matter has the ability to self-organize, accompanied by phase transformations from a gaseous form to a liquid and solid form. This is observed on Earth with water. Water, as we know, can exist in the form of vapor, liquid and solid ice .. Earlier it was noted that with dark matter this begins to happen when the jet of dark gas reaches speed $V = 3{,}875 \cdot 10^8 m/s$. In this case, large volumes of gaseous dark matter pass into small volumes of dense liquid (solid) dark matter. Liquid dark matter acquires the properties of baryonic matter. It is subject to the force of gravity, forces of inertia. Its density reaches the same value as that of protons and neutrons $\rho = 10^{18} kg/m^3$.

Our calculations using formula (5.3.4) show that the speed with which such matter crosses the surface of a supermassive black hole star with a radius $r_{очд} = 1{,}135 \cdot 10^7 km$ is equal to

$$V_{ro} = \frac{\alpha \cdot M_o}{4\pi \cdot \rho_e r_o^2} = 5{,}18 \cdot 10^8 \text{ м/с}, \qquad (5.3.9)$$

which is slightly less than the maximum speed of the dark gas jets V_{max}=5,196·10^8 m / s.

So the second role of black holes is to create new matter from absorbed dark matter. This substance is then thrown out into the vastness of the Universe, because it is from the galactic nuclei that outflows of huge masses of neutral gases are observed. So supermassive neutron black holes are huge cauldrons in which new matter is “cooked” from dark gaseous matter and absorbed neighboring stars for its further circulation in the vastness of the Universe.

Using the example of white dwarf stars and neutron pulsars, which were formed as a result of collapse, i.e. catastrophic compression of matter, one should expect that supermassive black neutron holes at the centers of spiral galaxies rotate very rapidly. It is clear that only centrifugal forces acting on the stars as they move around the centers of galaxies can resist the unsettled gravitation. In our opinion, centrifugal forces can also lead to ejections of matter from the centers of galaxies if the centrifugal forces exceed the force of gravity.

Let us write down the condition for the destruction of a black hole in the center of the galaxy, assuming that the centrifugal forces striving to break this supermassive star are opposed by pressure forces in the surrounding dark gas acting on the very dense surface of such a star

$$\frac{F_{цб}}{F_p} = \frac{m_{o-чд}\omega^2}{4\pi \cdot r_{o-чд} \cdot p_e} \geq 1. \qquad (5.3.10)$$

In this condition, the parameters of a supermassive black hole: $m_{o\text{-}чд}=10^{39}$kg (the mass of a neutron black hole in the center of the Milky Way). ω-angular velocity of its rotation. $r_{очд}$ is the radius of the black hole. $p_e = 6{,}426 \cdot 10^{25}\, N/m^2$-pressure in dark gas.

Let us take into account that the black hole in the center of the galaxy is located inside a sphere with a radius $r_{o\min} = 1{,}135 \cdot 10^7\, km$ determined by expression (5.3.6). Let us take a slightly smaller value as the radius of the black hole, namely $r_{0чд} = 0{,}6 \cdot 10^{10}\, m$. From relation (5.3.10) we obtain the value of the angular velocity of rotation of the supermassive black hole in the center of the Milky Way, above which the centrifugal forces will exceed the pressure forces and the star will lose its excess mass

$$\omega = \sqrt{\frac{4\pi \cdot r_{0чд} \cdot p_e}{m_{чд}}} = 0{,}052c^{-1}, \quad c^{-1} \qquad (5.3.11)$$

where: $r_{очд} = 1{,}135 \cdot 10^{10}\, m$, $p_e = 6{,}426 \cdot 10^{25}\, N/m^2$, $m_{чд} = 10^{39}\, kg$. This value of the angular velocity corresponds to the period of rotation

$$T > \frac{2\pi}{\omega} = 120 \text{ s} \qquad (5.3.12)$$

In this case, the circumferential velocities on the surface of the star-black hole will be

$$U_{о\text{-}чд} = \omega \cdot r_{о\text{-}чд} = 3{,}1 \cdot 10^8 \text{ м/с}, \qquad (5.3.13)$$

This speed is slightly higher than the speed of light in a void. If the angular and peripheral velocities exceed the found values, the star will lose its excess mass and decrease its size. We do not know if this will happen by evolution or as a result of explosive processes.

If this happens in an evolutionary way, then the ejected matter will not be able to leave the area defined by the radius (5.3.4) $r_{очд} = 1{,}49 \cdot 10^9 \, km$, because the centrifugal forces acting on it did not overcome the gravity of the black hole. If the star explodes, additional radial velocities will appear. In this case, they can be expected to exceed the speed of light and leave the region near the black hole in the form of ejections of incandescent gases.

Dark matter, possessing mass and speed, gets inside cosmic bodies and also brings kinetic energy into them. Recall that in this case the power due to the kinetic energy of dark matter introduced into the black hole will be written taking into account (2.1.6) and (2.2.5) for baryonic matter in SI units in the following form

$$N_{погл.} = \frac{dm}{dt} \cdot \frac{V^{*2}}{2} = \frac{\alpha^2 \cdot \dfrac{\alpha}{k} \cdot m_o^3}{(4\pi \cdot \rho_e \cdot r_o^2)^2} = \frac{f^2 \cdot \dfrac{\alpha}{k} \cdot m_o^3}{\alpha^2 \cdot r_o^4} \; . \qquad (5.4.7)$$

This phenomenon is not taken into account by modern cosmology when analyzing the energy of black holes, stars and other cosmic bodies. We believe that star explosions are associated with this phenomenon. Today astrophysics cannot explain the grandiose explosions in galaxies [15,16] that astronomers observe. These explosions release a huge energy of the order of 10^{51} J, equivalent to a simultaneous nuclear explosion of 10 million supernovae. (the energy of the explosion in the galaxy M82). The energy of explosions occurring in radio galaxies is estimated at 10^{57} J.

Where this monstrous energy comes from, astronomy cannot explain, since the nuclear energy source is completely insufficient for this (energy and mass of bodies are identical and interconnected by the formula $E=mC^2$). The transition into helium of the substance of an entire galaxy ($m_{гал}=10^{40}$-10^{41}kg), consisting entirely of hydrogen, would give, according to the corresponding Einstein formula, only the energy $E_{гал} = m_{гал} \cdot C^2 \approx 10^{56}$-$10^{57}$ J. (During thermonuclear transformations, only part of the mass is transferred to energy, the so-called mass defect equal to 1/130 of this mass. Consequently, this energy will be even less $E^* = E_{гал}./130 = 0{,}77 \cdot (10^{54}...10^{55})J$). But such a transition cannot be one-time, it would have to take place over billions of years, since the stars in galaxies are separated from one another at distances of billions of kilometers, and the rate of transfer of disturbances in the Universe from one object to another does not exceed the speed of light.

This simple analysis shows that t**<u>he source of this energy released during these mysterious explosions must be a compact space body</u>**. But without realizing that cosmic bodies interact with the gaseous dark matter surrounding them and continuously draw energy from space, it is impossible to understand and explain this phenomenon.

At the same time, energy is accumulated inside the "black hole", absorbed from space along with dark matter. Due to the small intrinsic dimensions of dark gas atoms, the process of absorbing dark gas and matter stretches over billions of years, but invariably ends with the creation of new matter and its release into the vastness of the Universe. Astronomers, based on their observations, claim that. it is from the galactic nuclei that outflows of huge masses of neutral gases are observed. Calculation using the formula (5.4.7) allows you to determine the power introduced into the "supermassive neutron black hole"

$$N_{ч.д.} = \frac{2{,}97 \cdot 10^{-18} \cdot (10^{39})^3}{32 \cdot 9{,}86 \cdot (1{,}19 \cdot 10^9)^2 \cdot (1{,}135 \cdot 10^{10})^4} = 0{,}4 \cdot 10^{39}\, вт. \quad (5.4.17)$$

За 15 миллиардов лет внутри массивной черной дыры скопится энергия

$$E_{ч.д.} = N_{ч.д.} \cdot 15 \cdot 3{,}15 \cdot 10^{16} = 1{,}9 \cdot 10^{56}\, Дж. \quad (5.4.18)$$

This energy is enough to explain the grandiose explosions in galaxies [4,5] that astronomers observe. As already noted, these explosions release a huge energy of the order of 10^{51} J, equivalent to a simultaneous nuclear explosion of 10 million supernovae. (the energy of the explosion in the galaxy M82). The energy of explosions occurring in radio galaxies is estimated at approximately 10^{57} J. So. **supermassive neutron black holes are huge cauldrons in which new matter is cooked from dark matter and absorbed stars for its further circulation in the vastness of the Universe**. Despite the fact that these stars cannot be seen, it is safe to say that they are not lifeless holes or mythical corridors to other worlds. They are constantly accumulating mass and energy processes. Inside them, matter is compressed to densities close to the densities of pulsar stars and white dwarf stars ($0.4 \cdot 10^{8}$кг/м^{3}-$0{,}9 \cdot 10^{12}$ kg / m^{3}).

The substance, compressed to such a density, according to the scientists who developed the theory of neutron pulsars and white dwarf stars, turns into a mixture of neutrons with a small admixture of protons and electrons. The internal structure of these stars is described very approximately, since physics does not have the necessary knowledge about the properties of neutron interaction under conditions of enormous compression. Nevertheless, it is believed that the neutron star is not a gaseous but a liquid sphere. Otherwise, one would have to assume that the gas in the center of the star is compressed to a denser state than the matter of atomic nuclei. This seems to go beyond the wildest fantasies. It is also believed that the neutron liquid is devoid of viscosity. Its density is equal. $\rho_{n.w.} = 10^{18}\, kg / m^{3}$.

5.4 Short-period pulsars and neutron stars

Stars that are sources of short periodic pulses of radio and X-rays are called pulsars. Most pulsars, about 400 of them are known, emit pulses with a very short period T период T≅1s. (in the interval T=1÷3s). But short-period pulsars are also known: PSR0835-45 with a period of T = 0.089s and PSR0531 + 21 with a period of T = 0.033s. The latter is located in the center of the crab nebula. The record-holder pulsar with the shortest period T = 0.00155 s was discovered in 1982 in the constellation Chanterelle. The discovery of pulsars was marked in 1972 by the Nobel Prize [15, 16].

The frequency of the radio signal is associated with the rapid rotation of neutron stars. It is believed that the star-source of radiation rotates like a lighthouse lantern. This creates an intermittent emission. To explain the smallest period T = 0.00155 s, it is assumed that the star rotates at a huge number of revolutions n = 645 rev/s. In this case, there is a danger that it will be torn apart by centrifugal forces. The force of gravity is opposed to centrifugal forces. To prevent the destruction of the star, one has to assume that the radii of the pulsars are less than 20 km. The density of the matter of such a star approached the density of the matter of atomic nuclei $\rho = 10^{18}$ kg/m^3. It is these stars that are called neutron stars. Their masses are estimated to range from 1.4 to 3 solar masses.

A substance compressed to such a density, according to the scientists who developed the theory of neutron pulsars, turns into a mixture of neutrons with a small admixture of protons and electrons. The internal structure of a star is described very approximately, since physics does not have the necessary knowledge about the properties of neutron interaction under conditions of enormous compression. Nevertheless, it is believed that the neutron star is not a gaseous but a liquid sphere. Otherwise, one would have to assume that the gas in the center of the star is compressed to a denser state than the matter of atomic nuclei. This seems to go beyond the wildest fantasies. It is also believed that the neutron liquid is devoid of viscosity.

When developing your attitude towards neutron stars, it should be remembered that the densities and masses of these hypothetical stars have never been measured by anyone. The very fact of their existence is entirely due to the fact that no other explanation has been found, except for the rapid rotation of the star, for the observed discontinuity of the pulsar emission. Only gravity could keep the star from being destroyed by centrifugal forces. Apparently, the desire of a number of influential scientists to materialize a theoretical model of a neutron star also played a role.

In this regard, we will try to form our own idea of whether such small sizes of these stars are real and whether some of the observed "white dwarf" stars can act as pulsars. Let us consider the most common period of rotation of short-period pulsars, T = 1 s. If with such a period the white dwarf Wolf-457 ($m = 1{,}01 \cdot 10^{30}\,кг$, $r_o = 0{,}7 \cdot 10^6\,м$) star rotated and emitted radio waves, then the force of gravity on its surface would be many times more than the centrifugal force.

$$\frac{F_{тяж}}{F_{цб}} \geq \frac{f \cdot m_o}{r_o^3 \cdot \omega^2} = \frac{6{,}7 \cdot 10^{-11} \cdot 1{,}01 \cdot 10^{30}}{(0.7 \cdot 10^6)^3 \cdot (7 \cdot 10^{-5})^2} = 0{,}4 \cdot 10^{11}. \qquad (5.4.1)$$

This example shows that some white dwarfs with parameters close to the star Wolf-457 may well be short-period pulsars. The most common period of pulsations in nature and, therefore, the period of rotation T = 1s÷3s cannot lead to their destruction by centrifugal forces. It should be especially emphasized that these are real and observable, and not invented neutron stars.

5.5 The theory of dark gas about pulsars

The theory of gaseous dark matter that we are developing makes us doubt the correctness of the generally accepted explanation for the blinking of pulsars, their masses, densities and sizes (radii) .. According to this theory, the radii of neutron stars turned out much less than the minimum radius of visibility of stars.

The fact is that a pulsar star, like any other star, is a sink for dark gas. The dark gas flows down to the center of the star evenly along the radii. Therefore, the photons of light have to overcome the counter current, in whatever direction the light moves away from the star. It resembles a swimmer swimming upstream of a river. If the swimmer's speed does not exceed the speed of the water, then you can swim for as long as you like, but not one meter forward relative to the coast.

Radiation from pulsars is captured by instruments on Earth. Therefore, we assume that the radial velocity of the flow of the dark gas directed towards the star nowhere exceeds the speed of light $C = 3 \cdot 10^8$ m/s emitted by the star

$$V_{ro} = \frac{\alpha \cdot m_o}{4\pi\rho_e r_o^2} < C. \qquad (5.51)$$

If this condition was violated, the star could not be seen. Let's take the generally accepted values as the parameters of the pulsar: radius $r_o = 20km = 2 \cdot 10^4 m$ and mass equal to three solar masses

$m_o = 6 \cdot 10^{30} kg$. Density of gaseous dark matter is $\rho_e = 1{,}19 \cdot 10^9 kg/m^3$, coefficient. $\alpha = 1s^{-1}$.

Calculation using the formula (5.6.2) gives the following value of the radial velocity on the surface of the star

$$V_{ro} = \frac{\alpha \cdot m_o}{4\pi\rho_e r_o^2} = \frac{6 \cdot 10^{30}}{4 \cdot 3{,}14 \cdot 1{,}19 \cdot 10^9 (2 \cdot 10^4)^2} = 10^{12} м/c. \qquad (5.5.2)$$

The result of the calculation by equation (5.5.1) showed that the speed of the jets of dark gaseous matter is significantly (333 times) greater than the speed of light. Therefore, pulsars cannot be seen if they had the mass and size that astrophysics has awarded them. Stars of this size are only suitable for the role of "black holes".

From equation (5.5.1), we can express the minimum radius of the visible star

$$r_{o\min} = \sqrt{\frac{\alpha \cdot m_o}{4\pi \cdot \rho_e \cdot C}} = \sqrt{\frac{f \cdot m_o}{\alpha \cdot C}} \;. \qquad (5.5.3)$$

The minimum radius of a star with the mass of the Sun, with a decrease in which the star disappears from the field of view according to expression (5.5.3), will be $r_{o\ min}$ = 668,6 km.

As you can see, this radius is more than 30 times the maximum radius of neutron stars. So, out of 400 known pulsars, only three pose a problem if considered as white dwarfs. In this case, the pulsars PSR0845-45 with a period of T = 0.089s and PSR0531 + 21 with a period of T = 0.033s and, especially, the pulsar in the constellation Chanterelle with a period of T = 0.00155s do not satisfy criterion (5.5.1). This cannot be neglected. Therefore, another explanation of the observed phenomena should be found.

Modern astrophysics had no choice but to reduce the pulsar radii to 20 km to explain this phenomenon, since it is believed that the space around the stars is empty. Only radiation from other stars and weightless electromagnetic fields there is around . Only gravity can counteract centrifugal forces. Therefore, astrophysicists used the condition of equilibrium between centrifugal force and gravity acting on the pulsar.

In the theory of gaseous dark matter, neutron stars, like all other stars, are surrounded by a fairly dense field of dark gas. There is a high pressure in the dark gas and this pressure also counteracts the rupture of the rotating stars. In ordinary gas stars, this effect is small and can be neglected. It becomes noticeable and even a decisive factor if the surface of the star is surrounded by a continuous layer of dense matter, thrown to the periphery by centrifugal forces and compacted during the rapid rotation of the star. We believe that this layer is able to perceive the pressure of the surrounding field of dark gaseous matter and that the pressure of dark gaseous matter keeps the star from rupture by centrifugal forces.

Based on these considerations, due to the theory of gaseous dark matter, we will find a new condition for the equilibrium of a star rotating with a high angular velocity. To do this, refer to Fig.5.5.1. Select a segment of a star of unit width. Mass of this segment

$$dm_o = \rho_o r_o^2 \frac{d\theta}{2} . \quad (5.5.4)$$

This mass, (the center of mass is located at a distance $r_{цм}$=2/3·r_o from the axis of rotation; υ_o=r·ω), is rotating with an angular velocity ω. A centrifugal force is acted on this mass

$$dF_{цб} = \frac{U_o^2 \cdot dm_o}{\frac{2}{3} r_o} = \frac{\rho_o \cdot r_o^3 \cdot \omega^2 \cdot d\theta}{3} . \quad (5.5.5)$$

This force is balanced by the force of external pressure acting on the surface of the segment

$$dF_p = p_e r_o d\theta . \quad (5.5.6)$$

To prevent the segment of the star from being pulled out of the star by centrifugal force, the inequality must hold

$dF_{цб}/dF_p<1$. (5.5.7)

Substituting (5.2.5) and (5.2.67) into (5.2.7) we obtain

$$\frac{dF_{цб}}{dF_p} = \frac{\rho_0 \cdot r_o^2 \cdot \omega^2}{3 \cdot p_e} \le 1 . \qquad (5.5.8)$$

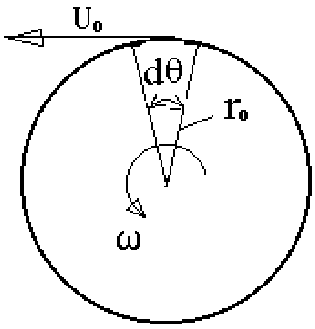


Fig. 5.5.1

The average value of the matter density of the star under consideration can be estimated as the ratio of its mass m_o to volume

$$\rho_o = 3 \cdot m_o / 4\pi \cdot r_o^3 \qquad (5.5.9)$$

Substituting this value in (5.5.8), we obtain the condition for the destruction of the star by centrifugal forces

$$\frac{dF_{цб}}{dF_p} = \frac{m_0 \cdot \omega^2}{4\pi \cdot r_o \cdot p_e} \le 1 . \qquad (5.5.10)$$

Pressure in gaseous dark matter $p_e = 6{,}426 \cdot 10^{25} N/m^2$. Next, we take into account that the densities of white dwarf stars lie within

$$\rho_o = 0{,}4 \cdot 10^8 kg/m_o^3 - 0{,}9 \cdot 10^{12} kg/m_o^3 . \qquad (5.5.11)$$

For our white dwarf, acting as a pulsar, we choose the density

$$\rho_o = 10^8 kg/m_o^3 . \qquad (5.5.12)$$

With such a density, the radius of the pulsar can be determined from the formula (5.5.9)

$$r_o = \sqrt[3]{\frac{3 \cdot m_o}{4\pi \cdot \rho_o}} . \qquad (5.5.13)$$

Assuming that condition (5.5.10) is satisfied for the pulsar under consideration, we assume that the angular velocity of the pulsar under consideration is the same as that of the most rapidly rotating pulsar from the constellation Chanterelle.

$$\omega_o = \frac{2\pi}{T} = \frac{6{,}28}{0{,}00155} = 4{,}05 \cdot 10^3 c^{-1}. \qquad (5.5.14)$$

From the condition of destruction of the star by centrifugal forces (5.6.10) we have

$$\frac{m_o}{r_o} = \frac{4\pi \cdot p_e}{\omega^2} = \frac{4 \cdot 3{,}14 \cdot 6{,}426 \cdot 10^{25}}{(4{,}05 \cdot 10^3)^2} = 4{,}92 \cdot 10^{19} \text{ кг/м}. \qquad (5.5.15)$$

Substitute in this expression the value of the radius of the pulsar (5.5.13) and then determine its mass

$$m_o = \sqrt{\frac{3}{4\pi \cdot \rho_o}(4{,}92 \cdot 10^{19})^3} = 1{,}686 \cdot 10^{25} \, кг. \qquad (5.5.16)$$

From (5.5.16) we determine the radius of the studied pulsar

$$r_o = \frac{1{,}686 \cdot 10^{25}}{4{,}92 \cdot 10^{19}} = 0{,}343 \cdot 10^6 m = 343 км. \qquad (5.5.17)$$

Thus, we have obtained a material object of the Universe with the density of a white dwarf, with a mass $m_o = 1{,}686 \cdot 10^{25} kg$ and radius that is 15 times greater than the radius assigned to pulsars by astrophysics today ($r_o \leq 20km$.). This is a visible object, not a black hole. This pulsar rotates as fast as the pulsar in the constellation Chanterelle. Despite its large size compared to the size of neutron stars, centrifugal forces cannot tear it apart.

5.6 The sources of short periodic radio and x-ray pulsations

This pulsar may have acquired such a high speed of rotation during the collapse (catastrophic compression) of a large rarefied space object. It can also be assumed that the brightest spot on its surface itself is a volcano that spewed out matter parallel to the surface. As a result of the reactive action of the ejected jet, this pulsar unwound.

Be that as it may, it is clear that the theory of gaseous dark matter expands the possibilities for explaining the phenomenon of very fast pulsations observed by astronomers in the constellation Chanterelle. It is not at all necessary to invent neutron stars that cannot be seen, measured, or understood how they work. Moreover, their sizes correspond to the sizes of black holes. Therefore it would be impossible to see them. But astronomers see them. Therefore, they must be at least as large as white dwarfs. Apparently, the main thing in recognizing them as real objects was the desire of a number of influential scientists to materialize the theoretical model of a neutron star.

It should be remembered that record-breaking pulsars are extremely rare in the Universe. These are unusual stars. Therefore, it is not so easy to pick up such a real space object in nature so that it, rotating with a speed of n = 645 rpm, is not torn apart by centrifugal forces. These forces are great even for earthly mechanisms made by people from the most durable materials. Nevertheless, the parameters of the pulsar obtained by us are the parameters of real visible objects of nature, such as white dwarf stars, capable of withstanding the action of centrifugal forces.

As an object of study, we take a cosmic body like Jupiter. Jupiter is characterized by the following parameters: $m_{ою} = 1{,}89 \cdot 10^{27}\,kg$ is mass, $r_{ою} = 7 \cdot 10^{7}\,m$ radius, average density. Jupiter's is $\rho_{ю} = 1{,}32 \cdot 10^{3}\,kg/m^{3}$. Own angular velocity [15,16] is $\omega_{ю} = 1{,}76 \cdot 10^{-4}\,s^{-1}$ (Jupiter makes a full revolution around its axis in just 9 hours 55 minutes).

Suppose that the pulsar was formed due to the explosion of a cosmic body like Jupiter with the same mass $m_{ою} = 1{,}89 \cdot 10^{27}\,kg$ and the same angular velocity of rotation $\omega_{ю} = 1{,}76 \cdot 10^{-4}\,s^{-1}$. We will increase the radius to the value $r_{ою} = 1{,}54 \cdot 10^{8}\,m$. This is a real cosmic body, similar to Jupiter. We believe that during the explosion, part of the mass of the cosmic body was discarded. The remaining mass of the pulsar was $m_{opul} = 1{,}69 \cdot 10^{25}\,kg$.

As a result of the explosion, the density of the pulsar increased and amounted to $\rho_{pul} = 10^8 kg/m^3$. The radius of the pulsar has become $r_{opul} = 0{,}34 \cdot 10^6 \, м$. From the law of conservation of angular momentum, we obtain the angular velocity of rotation of the resulting pulsar. It is equal to the angular velocity of rotation of the pulsar in the constellation Chanterelle

$$\omega_{pul} = \frac{m_{ою}\omega_{ю} r_{ою}^2}{m_{opul} r_{opul}^2} = \frac{1{,}89 \cdot 10^{27} 1{,}76 \cdot 10^{-4} (1{,}54 \cdot 10^8)^2}{1{,}69 \cdot 10^{25} (0{,}34 \cdot 10^6)^2} = 4{,}05 \cdot 10^3 s^{-1}$$

(5.6.1)

Due to the fact that the density of the resulting pulsar has become like that of white dwarfs, now the destruction of the pulsar by centrifugal forces is counteracted by the forces of pressure on its surface. Therefore, condition (5.5.10) must be satisfied. The calculation using this expression shows that the centrifugal force destroying the star is less than the pressure force restraining the destruction.

$$\frac{dF_{цб}}{dF_p} = \frac{m_0 \cdot \omega^2}{4\pi \cdot r_o \cdot p_e} = \frac{1{,}89 \cdot 10^{27} \cdot (4{,}05 \cdot 10^3)^2}{4\pi \cdot 1{,}54 \cdot 10^8 \cdot 6{,}426 \cdot 10^{25}} = 0{,}25.$$

(5.6.2)

Thus, we see that the high speed of rotation of the pulsar in the constellation Chanterelle could be formed as a result of catastrophic compression (collapse) of a real cosmic body like Jupiter. In this case, the resulting pulsar will not be torn apart by centrifugal forces.

Of course, the objection may immediately follow that Jupiter is not a star, but a planet. However, it is known that Jupiter emits twice as much heat into the surrounding space as it receives from the Sun. This is a sign of a star and can hardly be disputed by the fact that it has not cooled down over 4.5 billion years. Too much time has passed. Studies have shown that Jupiter, like the Sun, is composed of hydrogen and helium. From this point of view, Jupiter is a small star. It did not become self-luminous due to the fact that the energy of gravitational compression was insufficient for the occurrence of stable thermonuclear reactions in it. Jupiter, like other massive bodies of the Universe, heats up over time and in the future, increasing its mass and energy reserves, it can flare up as brightly as the Sun.

In passing, we note that Jupiter has a fairly significant radio emission. For the first time, Jupiter was recognized as a radio-emitting object in early 1955, when the Carnegie Institute researchers B.F. Burke and F.L. Franklin associated strong periodic bursts of radio noise with Jupiter at a wavelength of 13.5 m. A little later, the radio astronomer S.A. Schein established, that the frequency of bursts of radio emission corresponds to the period of rotation of Jupiter around its axis. This relationship fits well with the assumption of astrophysicists about the relationship between the periodicity of radio emissions from pulsars and the period of rotation of these stars.

The considered model of the star has the right to exist and can explain the nature of the pulsar in the constellation Chanterelle with a record number of revolutions n = 645 r / s. The rapid rotation of two other anomalous pulsars PSR0845-45 and PSR0531 + 21 with rotation periods of 0.089s and 0.033s is similarly explained.

It can be argued that all "white dwarfs" rotate with high angular velocities around their axes. If, for example, the Sun is compressed ($r_{oC}=7\cdot10^8$m, $\omega_C=2{,}9\cdot10^{-}6s^{-1}$) to the size of the Wolf-457 star ($r_{oВольф}=0{,}7\cdot10^6$m), then the period of its rotation is based on the conservation law moment of momentum would become

$$T=\frac{2\pi}{\omega}=\frac{6{,}28}{2{,}9}=2{,}165c, \tag{5.7.3}$$

which fits well into the most widespread range of pulsar rotation periods $T=1\div3$ s.

Of course, it is difficult to imagine such a large reduction in size to a value of 700 km, but it is even more difficult to imagine how these stars shrank to the size of 10÷20 km, which are now released by astrophysics to neutron stars or to the size of "black hole" stars less than 3 km. Although there is no limit to human fantasies. For example, the "big bang" theory suggests that the entire universe was once compressed into a primordial atom with negligible dimensions.

5.7 Quasars in the ocean of dark matter

The problem of quasars is multifaceted. Therefore, we investigate only a part of the features, with the modern explanation of which it is difficult to agree as the only possible ones. Before proceeding with the discussion of these features, let us formulate briefly, based on the materials of the book by AD Chernin [18], what is meant today by the term “quasar”.

Quasars are observed in the sky in powerful telescopes (radio telescopes) as compact (point) weakly luminous objects with very large redshifts in their spectra, reaching values $Z=\Delta\lambda/\lambda=0,16\dots6,4$. This means that the wavelength of the received radiation is up to 6 times the original wavelength. And this is not the limit. Quasars are believed to be related to galaxies. Powerful energy release processes occur in their cores, hundreds of times exceeding the energy release of our galaxy (the Milky Way). At the same time, which is especially important for our subsequent presentation, this radiation is born in a volume comparable to the volume of the solar system (small by cosmic standards).

A feature of most quasars is a significant change in their luminosity every few years and even more often. The variability of the luminosity made it possible to estimate the size of the emission region and indicate their upper limit. The methodology for this assessment can be found in [18]. As noted in [18], the quasar 3C273 has the highest luminosity in visible light (as of 1983). The area from which this radiation comes is estimated at 10^{16} m. Significant changes in the X-ray luminosity of the 3C273 quasar occur even faster. This allows us to estimate the size of the X-ray luminosity region as $3\cdot10^{13}$ m. One of the quasars has a record fast luminosity variability, which changes every 200 s. This corresponds to the size of its radiating region with a radius of $6\cdot10^{10}$ m. This is half the radius of the earth's orbit.

It is noted in [18] that, despite the unusual properties of quasars, by now a lot of evidence has accumulated that quasars are related to galaxies in terms of radiation power. They complete an unbroken chain from simple galaxies through radio galaxies, elliptical galaxies with active nuclei, Seyfert galaxies, BLNs, and finally quasars.

The fact that quasars emit lines of the same chemical elements as the Sun appears to be important for our further study. Considering that the radiation comes from the compact cores of quasars, this indicates the affinity of these cores with ordinary stars, possibly white dwarfs. In Section $ 4.4, we have already revealed many of the previously unknown patterns of ordinary spiral galaxies and galaxies with supermassive central black holes. Let us continue our analysis in relation to quasars. First of all, let us dwell on the large redshift values in their spectra.

Today astronomy associates these redshifts with E. Hubble's law and the theoretical conclusion of A.A. Friedman's theory about the relationship between the speed of galaxies moving away from us and the distances L to us

$$\frac{\Delta\lambda}{\lambda} = H \cdot L = \frac{V}{C} = Z \,, \tag{5.7.1}$$

where H=10^{-28} sm^{-1} = 10^{-26} m^{-1} is the Hubble constant. L -distance between the quasar and the Earth. $C = 3 \cdot 10^8$ m/s is the speed of light. V - the rate of removal of a quasar from the Earth, with which all objects in the Universe scatter, according to the developers of the Big Bang theory.

Since for quasars often Z>1, and for some of them Z reaches 6, then according to (5.7.1), the removal rates of these quasars should be 5-6 times higher than the speed of light. This contradicts general relativity and is a “taboo” for modern branches of science: physics, astronomy, astrophysics. In this regard, special reservations are made that formula (5.7.1) can be used only at speeds of galaxies (quasars) less than the speed of light.

In addition, it is noted that astrophysicists have invented a special formula that does not allow the acceleration velocities of galaxies to exceed the speed of light in calculations at any values of Z>1. It seems to me that astrophysicists in this matter are held captive by their own delusions and an ardent desire to remain within the framework of the theories of A.A. Friedman, A. Einstein and the Big Bang theory.

5.8 Gravitational redshift in the spectra of quasars

In cosmology, the opinion has been established that the source of radiation of quasars is an accretion disk around a supermassive black hole located in the center. It is believed that the observed redshift of quasars is greater than the cosmological one by the value of the gravitational shift predicted by A. Einstein in the general theory of relativity (GR). The large redshift in the spectra of quasars is determined not only by the laws of E. Hubble and Doppler. There is also a gravitational redshift of stars in accordance with Einstein's formula for redshift in the spectra of stars, which is not related to the distance between the source and receiver of radiation and the speed of their movement relative to each other. It depends only on how large and compact the mass of the emitting body is

$$Z=\Delta\lambda/\lambda=\frac{fm_o}{C^2}(1/r_o-1/L)\approx\frac{fm_o}{C^2 r_o} \quad . \tag{5.8.2}$$

We specifically draw the reader's attention to the dimensions of the emission regions of quasars obtained in astronomical observations, which indicate that the radiation comes from compact formations such as massive superstars

$$r_o=10^{16}\text{м}\ldots\ldots 6\cdot 10^{10}\text{м} \; . \tag{5.8.3}$$

The fixed range of redshifts of quasars is as follows

$$Z=0{,}16.........6{,}4 \; . \tag{5.8.4}$$

Working out our attitude to this problem, we notice that the parameters of black holes are related. Let us remember that stars (space objects) are called black holes, which supposedly have such large masses and small sizes that light cannot overcome gravity and leave the star. It is known that for one component to escape from the binary system of masses, its velocity must reach a certain critical value, called the second cosmic velocity. This speed is determined by the formula $V=\sqrt{\frac{2fm_o}{r_o}}$. If instead of the speed V in this expression we substitute the speed of light C = $3\cdot 10^8$ m / s, solve it with respect to the radius of the star ro, then we obtain the value of the gravitational radius of the star with mass m_o :

$$r_o=2fm_o/C^2. \tag{5.8.5}$$

If the radius of the star is less than this value, then the light wave or photon of light cannot leave it and the star must go out for the rest of the world. It is impossible to see the “black hole”. **Such black holes are called gravitational black holes.**

In addition, in the theory of dark matter (developed by us), it is assumed that any cosmic body is surrounded by gaseous dark matter and continuously absorbs it. As a result, the light emitted by the star must overcome the oncoming flow of dark matter, much like a swimmer swimming against the flow of water in a river. If the speed of the jets of dark matter directed to the center of the star reaches the speed of light and even more so exceeds it, then the light will not be able to overcome this counter current and the star will become invisible. Earlier, we obtained formula (2.2.9) for the radial velocity of dark gas to the center of the star

$$V_{ro} = \frac{f \cdot m_o}{\alpha \cdot r_o^2} \leq C. \tag{5.8.6}$$

Whence we get the expression for the radius of the star at the threshold of visibility

$$r_o \geq \sqrt{\frac{f \cdot m_o}{\alpha \cdot C}}\ . \tag{5.8.7}$$

If the radius of the star is equal to or less than this value, then the star will turn into a cosmological black hole. Let's equate the right sides of expressions (5.8.5) and (5.8.7). Then we solve the result with respect to the mass of the black hole

$$m_o = \frac{C^3}{4 \cdot f \cdot \alpha}\ . \tag{5.8.8}$$

In this formula, the speed of light $C = 3 \cdot 10^8 \, м / c$, the gravitational constant $f = 6{,}7 \cdot 10^{-11} H \cdot м^2 / кг^2$, the coefficient of the specific consumption of dark matter through the surface of the absorbing body $\alpha = 1c^{-1}$. A mass that satisfies both gravitational and cosmological conditions is called the equilibrium mass. It turns out to be equal

$$\overline{m}_o = 10^{35} кг\ . \tag{5.8.9}$$

Space objects with a mass exceeding $\overline{m}_o$ have gravitational radii determined by the formula (5.8.5). Moreover, they will be larger than the cosmological radii determined by formula (5.8.7). This means that the considered space object becomes a black hole earlier than formula (5.8.5) predicts. It would seem that the radii of black holes with less masses $\overline{m}_o$ should be calculated by formula (5.8.5), since in this case, the space object becomes a black hole earlier than predicted by formula (5.8.7). However, it was previously shown that when this rule is followed, you can get an absurd result.

For example, if we apply condition (5.8.5) to a hypothetical star formed as a result of collapse from a normal star with the initial parameters of the Sun: mass $m_{oC}=2\cdot10^{30}$ kg, $r_{oC}=7\cdot10^{8}$ m, $\omega_{oC}=2{,}9\cdot10^{-6}$ s^{-1}. Then, after the catastrophic compression of the star, these parameters will change to the parameters of a black hole with the same mass $m_{чд}=2\cdot10^{30}$ kg, but with a smaller radius $r_{чд}=3\cdot10^{3}$ m. The average density of this black hole is $\rho_{чд}=3m_{чд}/4\pi r_{чд}^{3}=1{,}8\cdot10^{20}$ kg/m^3. It turned out to be 180 times more than the density of the atomic nucleus (□-particle), which cannot be.

Further, from the condition of conservation of the angular momentum, we determine the new angular velocity of the black hole $\omega_{чд}=\omega_{oC}\cdot r_{oC}^{2}/r_{чд}^{2}=1{,}6\cdot10^{5}$ s^{-1}. Let us write down the condition for the destruction of a black hole by centrifugal forces. This will happen if the centrifugal force exceeds the force of gravity

$$F_{цб}/F_{тяж}=4\pi^{2}r_{чд}^{3}/f\cdot m_{чд}T^{2}=5{,}16>1. \qquad (5.8.10)$$

The rotation period of the black hole is $T=2\pi/\omega_{чд}=3{,}915\cdot10^{-5}$ s. $f=6{,}7\cdot10^{-11}$ $N\cdot m^2/kg^2$. As you can see, the considered black hole would in reality be torn apart by opposing forces. All this contradicts the statement existing in popular scientific literature that a star with the parameters of the Sun, having turned into a black hole, will collapse into a sphere with a tiny three-kilometer radius.

At the same time, the calculation by formula (5.8.7) for a star with the parameters of the Sun gives a quite plausible result. Indeed, the minimum radius of a star with the mass of the Sun, at which the star disappears from the field of view according to expression (5.8.7), will be $r_{o\ min}$ = 668 km. The value of the minimum radius $r_{o\ min}$ for stars with the mass of the Sun corresponds to the order of magnitude of the radii of actually observed stars such as white dwarfs. The smallest of the known white dwarfs, the Wolf 457 star [15], has a mass m_o

$= 1{,}01 \cdot 10^{30}$ kg and a radius of r_o= 700 km. The density of the black hole under consideration will be $\rho_{чд}=3m_{чд}/4\pi r_{чд}^3 = 1{,}6 \cdot 10^{12}$ kg/m^3. This density corresponds to the density of white dwarf stars. Such a star is not threatened with rupture by centrifugal forces.

Now let's get back to quasars. It is proved that quasars are close in their parameters to those of galactic nuclei. The mass of these nuclei is of order $m_{o-гал} = 10^{39}\,kg$. Quasars are visible objects. Therefore, their radii must exceed the radius of a gravitational black hole with such a mass $m_o = 10^{39}\,kg$. The radius of a black hole with this mass is

$$r_o = \frac{2f \cdot m_o}{(C^2)} = \frac{2 \cdot 6{,}7 \cdot 10^{-11} \cdot 10^{39}}{(3 \cdot 10^8)^2} = 1{,}48 \cdot 10^{12}\,м. \qquad (5.8.11)$$

This value of the radius is within the range of quasar radii recorded in astronomical observations (5.9.3). Another option is also possible. Since quasars are visible space objects and radii less than this value ($r_o = 6 \cdot 10^{10}\,m$) are recorded in observations of quasars, the mass of quasars corresponding to such a radius according to formula (5.8.5) should be less

$$m_o = \frac{r_o \cdot (C^2)}{2f} \le \frac{6 \cdot 10^{10} \cdot (3 \cdot 10^8)^2}{2 \cdot 6{,}7 \cdot 10^{-11}} \le 0{,}403 \cdot 10^{38}\,кг. \qquad (5.8.12)$$

The density of such an object will be $\rho_{чд}=3m_{чд}/4\pi r_{чд}^3 = 4{,}45 \cdot 10^4$ kg / m^3. This is the density of the white dwarf. In our opinion, the involvement of the accretion disk in understanding the nature of the emission of quasars was a necessary measure. This measure reconciles the assumption that there is an invisible black hole at the center with the irrefutable fact that quasars are visible. In the opinion of the developers of this assumption, the dimensions of the accretion disk are larger than the dimensions of the black hole and, therefore, the radiation from it makes the quasar visible.

In our study of this problem, we will try to stay within the framework of reliable data obtained in astronomical observations. According to these observations, a quasar is a compact space object of large mass with dimensions exceeding the size of a black hole. This makes the quasar visible. For this, we will perform simple estimates of gravitational and cosmological redshifts. This will allow us to understand the role of each of these phenomena. First, we calculate the value of the gravitational redshift by the formula (5.8.2) for the obtained values of the mass and radius of the star (quasar), which was at the threshold of visibility $m_o = 0{,}403 \cdot 10^{38}\,kg$ and $r_o = 6 \cdot 10^{10}\,m$

$$Z = \frac{\Delta\lambda}{\lambda} = \frac{f \cdot m_o}{r_o \cdot C^2} = \frac{6{,}7 \cdot 10^{-11} \cdot 0{,}403 \cdot 10^{38}}{6 \cdot 10^{10} \cdot (3 \cdot 10^8)^2} = 0{,}5\,. \qquad (5.8.13)$$

If we assume that the total redshift is equal to the redshift value Z = 3.78 recorded for the quasar 3C 273, then the rest of the redshift $Z_2 = 3{,}78 - 0{,}5 = 3{,}28$ should be formed due to the cosmological redshift in accordance with the Hubble law.

5.9 Influence of interstellar dark matter onto spread the light, wich was emitted by quasars

Our analysis has shown that the large redshift observed in astronomy in the spectra of quasars is possibly only partially related to Einstein's law for redshifts in the spectra of stars (5.8.2). We agree that a significant part of the redshift accumulates during motion light from the quasar to the Earth. This redshift in the spectra of distant galaxies and quasars is determined by the Hubble law (5.8.1). It should be recalled, however, that Hubble's Law did not in itself claim that the universe is expanding in accordance with the Big Bang theory. Earlier, we obtained a more accurate expression for this law (2.7.8), which connected the redshift in the spectra $\dfrac{\Delta\lambda}{\lambda}$ with the distance to the emitting object L

$$\underline{\Delta\lambda / \lambda = e^{\frac{\alpha}{k}t} - 1 = e^{C \cdot H \cdot t} - 1 = e^{H \cdot L} - 1}\;. \qquad (5.9.1)$$

Where $H = 10^{-26}$ **m^{-1}**, $L = C \cdot t$. $\dfrac{\alpha}{k} = 2{,}97 \cdot 10^{-18}$ **s^{-1}**.

The value $\frac{\Delta\lambda}{\lambda}$ is determined by the Balmer series lines in the spectra of these objects. Hubble's law (5.8.1) is obtained from expression (5.8.4) by expanding the quantity in a power series $e^{\frac{\alpha}{k}t}$ and keeping the terms in this expansion up to the first order of smallness. That is, Hubble's law is an approximation to the law (5.9.1) and therefore for very large distances it gives an incorrect result.

From the obtained by us more exact expression of the Hubble law (5.9.1), we note that over time, in contrast to the Hubble law, the wavelength increases nonlinearly. The more the light wave is on the way, the more intensively its length increases. This is explained by an increase in the mass of photons that make up the light wave. And this does not mean at all that the Universe is expanding, especially since this expansion occurs the more intensely, the further away from us its outer border is moved. Fig.5.9.1 shows a comparison of the increases in light wavelengths obtained for the linear Hubble law and using formulas (5.9.1), depending on the distances to radiation sources and the propagation time of light from distant galaxies to the Earth. As can be seen from this formula (5.9.1), the redshift in the spectra of galaxies and quasars grows exponentially.

As noted earlier, quasars for which $\frac{\Delta\lambda}{\lambda}$ tends to 6 have already been found. In accordance with formulas (5.9.1) and the Hubble formula, these offsets are different. The calculation using the Hubble formula (2.7.8), without any tweaks, contradicts the modern estimate of the size of the investigated parts of the universe, approximately equal to 15 light years. For example, the calculation by formulas (5.5.1) and (5.9.1) for the total value leads to the following results $\frac{\Delta\lambda}{\lambda} = 6$. From this value, you need to subtract the value of the gravitational redshift Z = 0.5 (according to (5.5.1)). The share of the cosmological red shift remains Z = 5.5.

Calculation using the Hubble formula (5.5.1) for $\frac{\Delta\lambda}{\lambda} = 5{,}5$ without any additional tweaks gives $L_{habbl} = \frac{\Delta\lambda/\lambda}{H^*} = \frac{5{,}5}{10^{-26}} = 5{,}5 \cdot 10^{26} [м] = 58{,}2$ billion light years.

(5.9.2)

Calculation by the formula of the theory of dark matter (5.9.1) gives a more correct result. For example for $\frac{\Delta\lambda}{\lambda} = 6 - 0{,}5 = 5{,}5$ we get

$$L = \frac{\ln\left(\frac{\Delta\lambda}{\lambda} + 1\right)}{H^*} = \frac{1{,}875}{10^{-26}} = 1{,}875 \cdot 10^{26} [м] = 19{,}84$$ billion light. years.

(5.9.3)

where. $1 млрд.лет = 10^{16} s$. Here, the distance L that light travels in time t is related by the formula $L = C \cdot t$.

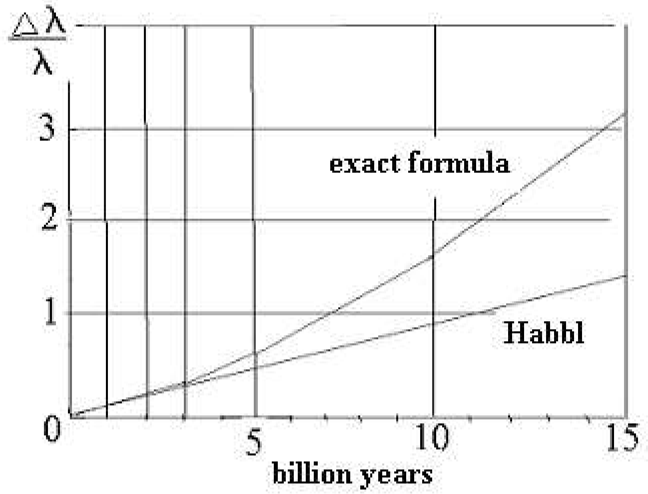


Рис.5.9.1

The fact that the calculation (5.9.1) showed a slightly overestimated result means only that for the considered quasar the value $\frac{\Delta\lambda}{\lambda}$ was less than 6, for example, Z = 3.78 (like the quasar 3C 273, discovered in 1982). In this case, the cosmological redshift will be Z = 3.78-0.5 = 3.28. Such a quasar, according to formula (5.9.3), would be at a distance from the Earth

$$L = \frac{\ln\left(\frac{\Delta\lambda}{\lambda}+1\right)}{H^*} = \frac{1{,}45}{10^{-26}} = 1{,}45\cdot10^{26}[м] = 15{,}3 \text{ billion light years .} \quad (5.9.4)$$

Those. at the edge of the visible universe. This is the limit for observational astronomy. Apparently, the technical capabilities of telescopes and other instruments currently do not allow us to see what is happening beyond this distance.

An important conclusion follows from the considered example that the cosmological redshift should be determined by the refined refined Hubble law (5.9.1) obtained by us. Applying Hubble's Law (5.5.1) can lead to a big mistake. This can be seen from (5.9.4).

Value $\frac{\alpha}{k} = 2{,}97 \cdot 10^{-18} [1/s]$. It turned out to be equal to the value of the Hubble constant $\overline{H} = H \cdot C = \frac{\alpha}{k} = 2{,}97 \cdot 10^{-18} [s^{-1}]$, obtained from observations of modern astronomy, [15; 16,18] for distant galaxies .. **<u>It is important to note that the value $\frac{\alpha}{k}$ we obtained from observations of the motion of the Moon and is in no way connected with the huge distances to galaxies, including the distances to quasars</u>**

Evaluating the results obtained, we see that large values of the redshift in the spectra of quasars are due to the simultaneous actions of gravity at the moment of wave emission and the interaction of interstellar dark matter on the path of the light wave from emitting space objects to the Earth at very large distances. Moreover, the proportion of gravitational redshift is relatively small. To explain the visibility of quasars and large redshifts in their spectra, there is no need to involve an accretion belt around a black hole in the center to the quasar model.

5.10 The radiation energy of quasars

Astrophysics suggests that the radio emission does not come from the quasar itself, but from the rays emanating from the accretion belt that surrounds it. Quasars are still some of the most mysterious objects that are located far beyond the galaxy. The only thing that has been proven for sure is that quasars emit an enormous amount of energy. Some sources claim that the power of energy radiation is equal to the power that emit 3 million suns! Some quasars emit 100 times more energy than all the stars in our Galaxy combined.

It is known from [15,16] that the Sun emits power in the form of light $N_{\Theta} = 3{,}8 \cdot 10^{26} W$. If we take as a basis that the quasar releases the power of energy 3 million times more than the Sun gives off, then the radiation power of the quasar will be

$$N = N_{\Theta} \cdot 3 \cdot 10^{6} = 1{,}14 \cdot 10^{33}\, Bm. \qquad (5.10.1)$$

In our theory of dark matter, it was previously shown that dark matter absorbed by any space objects brings in kinetic energy every second. Its value depends on the size and mass of the absorbing body. Earlier, a formula for the power of absorbed energy from the surrounding ocean of dark matter was obtained

$$N_{погл.} = \frac{dm}{dt} \cdot \frac{V^{*2}}{2} = \frac{f^{2} \cdot \frac{\alpha}{k} \cdot m_{o}^{3}}{\alpha^{2} \cdot r_{o}^{4}}. \qquad (5.10.2)$$

For the parameters of a space object (quasar) with mass, the radius of the radiation region can be determined by the formula

$$r_{o} \geq \sqrt{\frac{f \cdot m_{o}}{\alpha \cdot C}} = \sqrt{\frac{6{,}7 \cdot 10^{-11} \cdot 10^{35}}{3 \cdot 10^{8}}} = 1{,}49 \cdot 10^{8}\, m. \qquad (5.10.3)$$

The power of absorbed energy in accordance with the formula (5.10.2) will be

$$N_{погл.} = \frac{f^{2} \cdot \frac{\alpha}{k} \cdot m_{o}^{3}}{\alpha^{2} \cdot r_{o}^{4}} = \frac{(6{,}7 \cdot 10^{-11})^{2} \cdot 2{,}97 \cdot 10^{-18} \cdot (10^{35})^{3}}{(1{,}49 \cdot 10^{8})^{4}} = 2{,}7 \cdot 10^{34}\, Bm \qquad (5.10.4)$$

This power is 20 times higher than the amount of radiation of the quasar in the form of light, defined in (5.10.1). However, information about the radiation power is contradictory. According to other sources, the bolometric (integrated over the entire spectrum) luminosity of quasars can reach 10^{46}….10^{47} erg / s = 10^{39}….10^{40} W. On average, a quasar produces about 10 trillion times more energy per second than our Sun (and a million times more energy than the most powerful star known), and has variability in radiation across all wavelength ranges. To a large extent, the idea of the accretion of matter from the surrounding space by black holes (from a closely located second star captured by the attraction of a black hole in the center of a quasar) located inside quasars is due precisely to this huge energy release. **No other explanation was found for this.**

Every year black holes must absorb a mass equal of our Sun ($m_\Theta = 2 \cdot 10^{30}$). As soon as the mass sucked into the deadly funnel is absorbed, the released energy will be radiated out in radiation in two directions: along the south and north poles of the quasar. However, this process cannot take very long. If this mass escapes from a neighboring star with a mass of $m_o = 10^{35}$ kg, then the time required for all this mass to be completely consumed as a result of accretion will be equal to $t = \dfrac{m_o}{m_\Theta} = \dfrac{10^{35}}{2 \cdot 10^{30}} = 0{,}5 \cdot 10^5$ years. Those. for only 50 thousand years. How realistic is this?

Let's continue our research within the framework of our theory of dark matter and take into account that dark matter enters the quasar every second, increasing its mass by an amount Δm_o. As you know, the energy and mass of bodies are identical and interconnected by the formula

$$E=mC^2 . \tag{5.10.5}$$

This is equivalent to the fact that additional power is introduced into the quasar during time t

$$N_{grav} = \frac{E}{t} = \frac{\Delta m \cdot C^2}{t} . \tag{5.10.6}$$

The mass gain during time t can be determined from the expression (2.1.7)

m = $m_o \cdot e^{\frac{\alpha \cdot t}{k}}$ in the following form

$$\Delta m = m - m_o = m_o \left(\frac{m}{m_o} - 1\right) \approx \frac{\alpha}{k} \cdot m_o \cdot t . \tag{5.10.7}$$

Substituting (5.10.7) in (5.10.6), we obtain this gravitational power

$$N_{grav} = \frac{\alpha}{k} \cdot m_o \cdot C^2 . \tag{5.10.85}$$

For the considered hypothetical quasar with a mass of $m_o = 10^{39}$ kg, this power will be equal to $N = 0{,}267 \cdot 10^{39}$ W. If every second all the mass absorbed by the quasar according to (5.10.5) is converted into energy and then the power of this energy is re-emitted by the quasar into the surrounding space, then almost all the transcendent radiation power $N = (10^{39} .... 10^{40}) Bm$ is compensated by this absorbed energy. In this case, there is no need to attract an accretion belt around the quasar, from which radiation supposedly emanates. **The role of accretion of matter from a neighboring star is played by dark matter absorbed by the quasar from the surrounding space.**

It should also be taken into account that the energy obtained by converting the absorbed mass into energy could be stored inside the cosmic body for a long time, before it flared up and became a quasar. This stored energy will last for a very long time. **Unlike the accretion of matter from a neighboring star, the source of mass and energy due to the absorption of dark matter from space is practically inexhaustible**. If the quasar mass were an order of magnitude larger, then according to (5.10.8), the absorbed power together with dark matter would also be an order of magnitude larger.

5.11 Reason for the change in the brightness of quasars

The period of brightness oscillations of the radiation of a quasar with the fastest variability of the radiation intensity is 200 s, which is only 3 times different from the rotation period (according to our estimate) of supermassive black holes (5.3.12). This suggests that the rapid change in radiation intensity may be somehow related to the angular velocity of rotation of the quasars.

With the rapid rotation of a huge star, centrifugal forces $F_{ц.б.}$ will tend to break the star. They are hindered in this by the forces of gravity $F_{тяж}$. From the condition of equality of these forces on the surface of the quasar core, in accordance with this condition, we obtain the expression

$$\frac{F_{тяж}}{F_{ц.б.}} = \frac{f \cdot m_o \cdot T^2}{4 \cdot \pi^2 \cdot r_o^3} \geq 1. \qquad (5.11.1)$$

This expression allows us to write down the value of the limiting period of rotation of the quasar, at which the break still does not occur

$$T \geq \sqrt{\frac{4\pi^2 r_o^3}{fm_o}}\,. \qquad (5.11.2)$$

The limiting angular velocity of rotation of the quasar

$$\omega^* \leq \frac{2\pi}{T} \leq \sqrt{\frac{fm_o}{r_o^3}}\,. \qquad (5.11.3)$$

Let us take as the quasar mass the value $m_o=10^{39}$kg, the same as in supermassive black holes in the centers of galaxies (in accordance with modern views of astrophysics). As the radius, we will choose the average value from the range (5.3.8) $r_o=1{,}5\cdot 10^{12}$m. The peripheral speed of rotation of the outer edge of the quasar disk will be

$$U_o = r_o\omega* = \sqrt{\frac{fm_o}{r_o}} = 2{,}11\cdot 10^8 \text{ м}. \qquad (5.11.4)$$

Further, we recall that near any massive cosmic body there is a vortex of gaseous dark matter. The body is a drain hole for gaseous dark matter. This vortex unwinds the core of the quasar. In part 4, we obtained the formula

$$\omega=(2/3)\alpha\omega_в\cdot t+\omega_o, \qquad (5.11.5)$$

connecting the angular velocity of the star ω with the angular velocity of the vortex core of gaseous dark matter $\omega_в$ and the spinning time t. In our task

$$\omega^* = \sqrt{\frac{fm_o}{r_o^3}} = \sqrt{\frac{6{,}7\cdot 10^{-11}\cdot 10^{39}}{(1{,}5\cdot 10^{12})^3}} = 1{,}4\cdot 10^{-4}\,\text{c}^{-1}. \qquad (5.11.6)$$

We will assume that the change in the radiation intensity of the quasar occurs at a time when, due to the spin-up, the angular velocity of the quasar ω

will exceed the limiting angular velocity ω^*.. As a result, the balance between centrifugal force and gravity is disturbed and conditions are created for the ejection of large masses of electrons, hydrogen, neutral gases, etc. from the depths of the quasar core.

The masses of its matter leaving the star carry away the moment of momentum. Because of this, the angular velocity of the star decreases to almost zero $\omega_o \cong 0$. It takes some time for the galactic vortex of dark gas to spin the star again to an exorbitant angular velocity, resulting in a new ejection of matter. This time interval determines the change in the radiation intensity of quasars. The ejected jets or parts of the quasar core envelope, falling into an intense galactic vortex of dark gas, become sources of X-ray and radio radiation as they move away from the central star.

From the formula (5.11.5) we can determine the angular velocity of a cosmic vortex of a dark gas near a quasar, which is necessary to spin the core of a quasar up to an exorbitant angular velocity within one year

$$\omega_в = \frac{3}{2}\frac{\omega^* - \omega_o}{\alpha \cdot t} = 1{,}5\frac{1{,}4 \cdot 10^{-4}}{3{,}15 \cdot 10^{7}} = 0{,}67 \cdot 10^{-11} c^{-1}, \qquad (5.11.7)$$

where t=1year=$3{,}15 \cdot 10^7$s, α=1s^{-1}, ω_o=0, ω^*=$1{,}4 \cdot 10^{-4}$s^{-1}. We see that a very intense vortex of dark gas with a high angular velocity of rotation exists near the quasar, which could have formed at the moment of compression of rarefied matter into a dense massive central star under the influence of gravity. This star has not yet become a supermassive black hole, but is on the cusp (by cosmic standards) of this event. The average density of quasars with parameters $m_o = 10^{39}$ kg and $r_o = 6 \cdot 10^{10}$ m is of the order of the density of a white dwarf

$$\rho_{кваз} = \frac{3m_o}{4\pi \cdot r_o^3} = 1{,}1 \cdot 10^6 \text{ кг/м}^3 . \qquad (5.11.8)$$

The peculiarity is that due to the rapid rotation of a huge star, the heaviest fractions of its matter accumulate near the surface. Under the action of opposing centrifugal forces and gravity, these layers acquire a high density of the order of the density of white dwarf stars.

5.12 Some conclusions about the structure of quasars

1. The redshift in the spectra of quasars is not associated with the expansion of the space of the Universe, but is determined by the gravitational and cosmological redshift in the spectra of stars in accordance with the linear Hubble formula (2.7.9) and the refined Hubble formula (2.7.8). This redshift depends on the distance between the source and the receiver of radiation, and is also determined by the large compact mass of quasar nuclei and their relatively small size.

2.. Such an understanding of the large redshift in the spectra of galaxies and quasars frees the astrophysicists-supporters of general relativity from the need to find an explanation in order to break the connection between the change in wavelength with the speed of the divergence of the source from the light receiver and by the idea of the expansion of the Universe.

3. Quasars are probably located closer to us. In any case, the conclusion about the distances to quasars should be made based on the refined formula of E. Hubble (2.7.8) and take into account that the large redshift in the spectra of quasars is realized under the simultaneous action of the laws of Einstein and Hubble.

4. If the distances to quasars, indeed, are much smaller than those considered by modern astronomy on the basis of E. Hubble's formula (2.7.9), then the calculated radiation powers of quasars will decrease many times. This will happen because the calculation was based on the decrease in signal intensity inversely proportional to the square of the distance.

5. Quasars rotate rapidly. The appearance of light velocities is possible at the boundaries of quasar nuclei.

6. The large energy output of quasars can be explained without invoking the quasar model accepted for consideration by modern astrophysics, consisting of a black hole in the center with an accretion disk around the black hole that emits energy. **The role of the accretion disk in our theory is naturally performed by the process of swallowing dark matter by baryonic bodies. This process is**

basic in our theory of dark matter. He explains the nature of gravity, inertia, redshift in the spectra of stars and distant galaxies, and much more, including, allows you to expand your understanding of the nature of quasars.

7. A new condition for the existence of stars-black holes in outer space filled with dark matter (2.3.1) has been obtained. It is shown that it is caused by the impossibility for photons of light to overcome the counter flow of gaseous dark matter to the center of massive bodies if the speed of jets of dark matter reaches the speed of light. This condition gives a more correct result than the condition of the impossibility for light to overcome the gravity of a black hole with a mass of $\overline{m}_o \leq 10^{35}$ kg. For black holes with masses exceeding $\overline{m}_o \geq 10^{35}$ kg, the condition of impossibility for light to overcome the gravity of the black hole (2.3.1) should be applied.

5.13 About accretion and bursters.

The notion of accretion emerged as an interpretation of observations of unusual stars called bursters. Flaring X-ray stars were called bursters. As noted in [15,16], more than thirty busters are now known, eight of which belong to star clusters in our Galaxy. A feature of these stars is that their radiation is almost entirely concentrated in the X-ray range. The first of them was opened in 1962.

The burster has non-fading X-rays. Against this background, sharp bursts of radiation appear. Radiation bursts last for several seconds or minutes ($\Delta t=10$ s). The intervals between bursts do not go beyond several hours or days ($t_в=10^4$ s).

.Accretion was called the capture of matter by the gravitational field of a star. According to the idea of the Soviet astronomer I.S.Shklovsky (1966), the source of strong X-ray radiation is a member of a binary star system consisting of an ordinary visible star and an invisible neutron star. According to I.S.Shklovsky, the strong gravitational field of a neutron star is capable of stripping matter from the surface of a neighboring star. This substance, falling on a neutron star at high speed, undergoes strong compression and heating. Because of this, it is capable of emitting X-rays.

The so-called background luminosity of the burster L_o arises due to the heating of the surface of a neutron star when the matter captured from a neighboring star falls on it. If the mass of matter J falls on the surface of a neutron star per unit time

$$J \cong 10^{14} кг/с, \quad (5.13.1)$$

Then the kinetic energy imparted to the surface per unit of time will be

$$Q = 0{,}5 \cdot JV^2 \cong 0{,}13 \cdot J \cdot C^2 = 0{,}585 \cdot 10^{30} Вт, \quad (5.13.2)$$

The speed of falling matter in [15, 16] is estimated as half of the speed of light $V=0{,}5 \cdot C$. The heating of the surface of a neutron star by accreted matter is balanced by its cooling due to radiation ($Q=L_o$).

The problem for the theory of accretion is the low probability of the formation of a close binary system containing a neutron star. The fact is that a neutron star is formed during a supernova explosion and at the same time acquires a significant speed. Astrophysicists have calculated that for the formation of a double pair of neutron and ordinary stars, a simultaneous meeting of a neutron star with two more stars must occur. One of these stars must pick up the excess energy of the neutron star and fly away. And the second star must capture the neutron star with its gravitational field. This event has a negligible probability.

Now let's consider this problem from the point of view of the theory of dark matter. We have already noted that the theory of dark matter rejects the possibility of the existence of neutron stars with radii of the order of r_o=(10-20) km. Our analysis in Chapter 5.16 showed that stars of this size are invisible and are only suitable for the role of black hole stars. Astrophysics needed the appearance of neutron stars to explain the very rapid rotation of pulsar stars. In chapter 5.15 we had показано, что с ролью пульсаров отлично справляются звезды-белые карлики, чьи размеры на два порядка больше размеров нейтронных звезд. Эти звезды наблюдаются астрономами. Их жизненный цикл хорошо изучен. Известны особенности их внутреннего строения и их поведение.

When considering busters, we will not deviate from the direction we have adopted earlier and will try to prove that this time in the role of neutron stars are protruding the white dwarfs. Let's deal with background luminosity first. Recall that any star continuously absorbs dark gas from interstellar space, which directly on the surface of a very dense white dwarf goes into a state of baryonic matter. The amount of substance entering the surface is determined in accordance with the formula (2.1.7)

$$\Delta m = m - m_o = m_o(e^{\frac{\alpha}{k}t} - 1) = m_o \cdot \frac{\alpha}{k}t, \qquad (5.13.3)$$

where m and m_o are the masses of the star at the considered moment of time and at the moment of the beginning of the reference. Let's accept $m_o = 1{,}4 \cdot m_C = 2{,}8 \cdot 10^{30} kg$ (Mass of the Sun $m_C = 2 \cdot 10^{30}$ кг; $k = 3{,}36 \cdot 10^{17}$). The flux of matter falling on the surface of the white dwarf per unit time will be equal to

$$J = \frac{\Delta m}{t} = m_o \cdot \frac{\alpha}{k} = 0{,}833 \cdot 10^{13}\, кг/с\,. \qquad (5.13.4)$$

The speed with which matter crosses the surface of the star is determined by the formula (2.1.8)

$$V_{ro} = \frac{\alpha \cdot m_o}{4\pi\rho_e r_o^2} = 2{,}92 \cdot 10^8\, м/с, \qquad (5.13.5)$$

where the radius of the white dwarf is taken approximately the same as that of the Wolf-457 star, equal to $r_o = 8 \cdot 10^5$m. The energy supplied to the surface of the star per unit of time is equal to the kinetic energy of the flow of this mass

$$Q = 0{,}5JV_{ro}^2 = 0{,}592 \cdot 10^{30} Вт \qquad (5.13.6)$$

.Comparing (5.13.2) and (5.13.6), we see that the energy flow to the star along with the dark gas from the surrounding space is equal to the accretion flux required to feed the background radiation of the burster. Thus, there is no need to come up with an unlikely encounter with the distributed roles of three stars, including a hypothetical neutron star.

Let us see further how matters stand with bursts of X-ray energy. To do this, we will perform a simple approximate calculation. We have already noted that white dwarfs rotate rapidly. We assume that on the surface of a star with a mass and radius characteristic of white dwarf stars, there is an equilibrium of gravity and centrifugal force

$$\frac{m \cdot U_{б.к}^2}{r_o} = \frac{f \cdot m \cdot m_{б.к}}{r_o^2} . \qquad (5.13.7)$$

where m is the mass on the surface of the star; $U_{б.к}$ - peripheral speed of points on the surface arising from the rotation of the star; the mass of the white dwarf $m_{б.к.} = 2{,}8 \cdot 10^{30}$ kg; radius of the white dwarf $r_o=8 \cdot 10^5$m; $f=6{,}7 \cdot 10^{-11}$Nm^2 / kg^2. From this equation we have

$$U_{б.к}^* = \sqrt{\frac{f \cdot m_{б.к}}{r_o}} = 1{,}53 \cdot 10^8 \text{ м/с} . \qquad (5.13.8)$$

2nd space velocity for the considered white dwarf

$$V_к = \sqrt{\frac{2 f \cdot m_{б.к}}{r_o}} = 2{,}16 \cdot 10^8 \text{ м/с} . \qquad (5.13.9)$$

Let's consider this situation next. A cosmic vortex of dark gas around a white dwarf increases the angular velocity of rotation of the star from a value corresponding to the equilibrium of gravity and centrifugal force

$$\omega_{б.к}^* = U_{б.к}^* / r_o = 190 \text{ c}^{-1} . \qquad (5.13.10)$$

According to formula (5.1.11)

$$. \omega = \frac{\pi}{4} \alpha \cdot \omega_в \cdot t + \omega_o \qquad (5.13.11)$$

If, as a result of the spinning of the white dwarf by the vortex of d, the angular velocity exceeds the critical value (5.14.10), the condition for the ark gas balance of forces on the surface of the star will be violated in the direction of increasing the centrifugal force. As a result, part of the mass of the star will be torn away from it, taking with it the angular momentum. The star will decrease its angular velocity of rotation. Plasma (protons, electrons, etc.) detached from the surface of the white dwarf is picked up by the ether vortex and begins to move in spirals. In this case, charged particles begin to emit additional energy, which astronomers record on Earth in the form of flares.

There are two possible scenarios for the development of further events. If the separation of the plasma mass occurs at an angular velocity exceeding the critical angular velocity $\omega^{*}_{б.к}$, but less than the angular velocity corresponding to the 2nd cosmic velocity

$$\omega_к = V_к/r_o = 270\ c^{-1}, \tag{5.13.12}$$

then after a while this mass will again fall on the star, causing an additional (irregular) burst of energy. If the separation occurs at an angular velocity exceeding $\omega_к$, then this mass will leave the star.

Our method allows us to calculate the angular velocity of rotation of a cosmic vortex of a dark gas □in a white dwarf by the formula (4.1.12)

$$\omega_в = \frac{4}{\pi} \cdot \frac{\omega - \omega_o}{\alpha \cdot t}\ . \tag{5.13.13}$$

We do not know the value of the angular velocity ω_o after a part of the mass is detached from its surface. These values are likely to differ depending on the parameters of the star and the cosmic vortex of dark gas. Let us take $\omega_o=0$. As the time interval t between flares, we take the value $t=10^4$ s, which is characteristic of bursters [4]. Outbursts, as already noted, are associated with the release of matter under the influence of the spinning of the star.

$$\omega_B = 3 \cdot 190/2 \cdot 10^4 = 0{,}0285\ c^{-1}\ . \tag{5.13.14}$$

The period of rotation of the cosmic ether vortex will be

$$T_в = 2\pi/\omega_B = 220\ c\ . \tag{5.13.15}$$

The peripheral velocity of charged particles of plasma ejection is approximately equal to the peripheral velocity of the star's surface at the moment of ejection

$$U^*_{б.к} \cong \omega^*_{б.к} \cdot r_o = 190 \cdot (8 \cdot 10^5) = 1{,}52 \cdot 10^8 м/с \,. \quad (5.13.16)$$

The charged particles of the plasma ejection, rotating inside a vortex of dark gas around the burster at a near-light speed, should emit energy.

Part 6

The fundamental optical experiments in the concept of dark matter of the universe

Our study of the problem of the propagation of light over long cosmic distances is based on the assumption that the space between the baryonic bodies of the Universe (stars) is filled with “gaseous dark matter”. In essence, we are talking about the fact that in nature, in addition to solids, liquids and gases, there is a fourth continuous, elastic medium that fills all space. Dark matter is in a gaseous state. It is invisible, in much the same way that a person does not see the air around him. It is odorless and tasteless.

Nevertheless, in the previous sections of the book, the physical properties of this dark gaseous matter (dark gas) were determined using the mechanics of a continuous medium. They have some differences from the properties of terrestrial gases. The mechanism of interaction between dark matter and baryonic matter is considered. It is shown that baryonic matter continuously absorbs dark gas from the surrounding space. On this basis, explanations have been proposed for a number of mysterious natural phenomena, such as the nature of gravity, inertia, the structure of elementary particles, and others.

The interstellar solid elastic medium was abandoned in physics at the beginning of the 20th century, when the contradiction between the phenomenon of "stellar aberration" and the famous optical experiment of Michelson became clear. The contradiction consisted in the fact that the "stellar aberration" showed that the Earth in its motion did not drag the interstellar medium with it at all, and the Michelson experiment, on the contrary, showed that the Earth, when moving around the Sun, completely dragged this medium along with it. Physics of that time could not explain this contradiction.

As a result, physics abandoned the idea of the existence of a continuous elastic gaseous medium (ether) in the universe together with stars and other baryonic bodies. The space was considered empty. This ultimately led to a distorted understanding of many natural phenomena.

6.1 Propagation of light into a dark matter continuum . The light speed

Due to the fact that, according to modern concepts, a quantum of light is a chain of photons (interconnected by electromagnetic forces), it has not only wave, but also corpuscular properties. Therefore, the laws of relativity of Galileo and Newton on the addition of velocities during the movement of any material bodies, including photons, are applicable to its propagation in space. In this work, we will show that with such an understanding of the laws of light propagation, the contradiction between the phenomenon of “stellar aberration” and Michelson's experiment is eliminated. From our point of view, this removes the objections of Einstein and other relativist scientists against the possibility of gaseous dark matter and dark energy in space.

Our research was based on the presence of dark matter in the space between stars established by astrophysics. We assumed that dark matter is in a gaseous state and fills the entire space of the Universe fairly evenly. It is invisible, tasteless and odorless. It cannot be weighed because it easily penetrates the surrounding baryonic bodies, even such large ones as planets and stars. Jets of dark gaseous matter (dark gas), penetrating bodies through and through, are forced to flow outside only very dense nuclei of atoms and some other equally dense formations. However, it can be detected because it interacts with baryonic matter. In our opinion, this interaction consists in the fact that baryonic bodies continuously absorb dark gas. This leads to an increase in the mass of baryonic bodies and the emergence of dark gas flows in the space between them. The interaction of currents of dark gas with planets and stars determined the force of gravity and the force of inertia in baryonic bodies. This cannot be overlooked, although the nature of these phenomena has not yet been understood by physics.

Until now, we have not considered a significant objection to dark gaseous matter associated with contradictions in the interpretation of optical experiments associated with the phenomenon of stellar aberration and Michelson's experiment. On the basis of the first, it was concluded that the Earth does not carry the dark gas along with it in its movement around the Sun,, but the second, which completely carries it away. Therefore, one should deeper understand the physical nature of light, which is very contradictory. For this we turn to the history of astronomical and physical methods of determining the speed of light.

Recall that the first attempt to determine the speed of light was made in 1607 by Galileo. The only result of this attempt was to find out that the speed of light is very high. Subsequently, a number of more accurate methods were developed and implemented. In 1676, Röhmer's astronomical method was proposed, based on observations of deviations in the eclipse of Jupiter's satellites. This method gave an underestimated speed of light of 215,000 km / s. In the early 18th century, the stellar aberration method was developed. It made it possible to determine the speed of light as C = 303000 km / s. The error was about 3000 [km / s]. In our opinion, this is probably not an error, but a difference due to the influence of dark matter on light, depending on the difference in distances to the studied stars.

In 1849, Fizeau implemented the cogwheel method, which, when rotated, either passed a light beam between the teeth, then blocked it with the teeth. It was possible to choose the number of teeth, the speed of rotation of the wheel, the distance between the light source and the reflecting mirror so that the light on the screen did not disappear. Deciphering these readings, Fizeau obtained the speed of light $C = 299870 \pm 50$ km/s. Later this approach to solving the problem was improved by Foucault in the rotating mirror method and Michelson in the rotating prism method. Since all methods measured the speed of light in air, the results were corrected for the known refractive index of air. This made it possible to determine the speed of light in a void with very high accuracy ($C = 299776 \pm 4$ km/s). With more rough estimates, with sufficient accuracy, we can assume $C = 300000$km/s = $3{\cdot}10^{10}$ sm/s=$3{\cdot}10^{8m}$/s.

On the basis of these experiments in the minds of physicists and astronomers, the idea that the speed of light is a constant value, independent of the own speed of the light source and the reflecting surface, has become firmly established. This confidence was reinforced by the fact that this feature is also characteristic of the propagation of sound in air and other known gases and liquids. Therefore, it seemed quite natural that the propagation of light in the dark gas of interstellar space occurs similarly to the propagation of sound in air.

However, unable to reconcile these two experiments, astrophysicists, in accordance with the views of the theory of relativity, began to believe that there is empty space between the stars and light propagates in the void at a constant speed $C = 3{\cdot}10^8$ m/s. Its speed was considered limiting for light and material bodies. It did not depend on the own speed of the source and the reflecting surface.

But is it really so? At present, in astrophysics, the existence of dark matter in the space between stars and other baryonic bodies has been firmly established. You can't get away from this. Therefore, let's try again to take a fresh look at the results of methods for determining the speed of light. We note that a common feature of high-precision physical experiments is that the average speed of light was measured in them when a beam passed a fixed distance necessarily **in the forward and backward directions**. This means that if, say, in the forward direction the speed of light was greater than C by a certain amount V, and in the opposite direction by the same amount is less , then the average speed turned out to be equal to the speed C. **The speed V disappeared from the field of view of the researchers and could not be fixed with such an experimental technique, no matter how the distance between the source and the receiver of light decreased and no matter how the measurement accuracy increased.**

Therefore, it can be argued that these experiments, despite their diversity and the high accuracy of some of them, do not reject the possibility of light propagation relative to material bodies or gaseous dark matter between them at speeds different from the speed of light in emptiness. Apparently, in the history of science there are no known experiments, with the exception of the Doppler phenomenon, carried out specifically to study the laws of radiation and reflection of light by a moving light source and a reflecting surface

In a sense, physics has already taken a big step towards a departure from the dogma of the theory of relativity about the constancy of the speed of light, recognizing that the carrier of light are photons, that is, material bodies, and not waves like sound waves in gases and liquids. This alone requires a revision of the system of views on the laws of emission and reflection of light and forces us to return to the laws of addition of the velocities of bodies formulated by Galileo and Newton and adopted in classical mechanics for material bodies.

Continuing to develop the outlined tendency, we note that the photon leaves the atom emitting it with the speed of light (in emptiness) “C” relative to the atom itself. If the atom emitting light itself moves with the speed "V" relative to the observer and unperturbed dark gas around the atom, then the speed of the photon, as is known from human practice with the movement of material baryonic bodies, will be the vector sum of these speeds and can be written by the formula

$$\vec{\mathbf{C}}^{/} = \bar{\mathbf{C}} \pm \bar{\mathbf{V}}\,. \tag{6.1.1}$$

In this regard, one can try to clarify the formulations of the laws of radiation and reflection of light, without going into conflict with the known methods for determining the speed of light.

The law of light emission: When a light emission source moves relative to a quiet field of a dark gas and an observer associated with it with a speed V, the speed and direction of motion of a light wave relative to the field of a dark gas $\overline{C}'$ is determined by the vector sum of the speeds $\overline{C}$ and $\overline{V}$:

$$\vec{C}' = \vec{C} \pm \vec{V}\,. \tag{6.1.2}$$

Here C is the speed of propagation of light in a dark gas relative to the radiation source. It is equal to the speed of light in emptiness. The direction of propagation of light from the source is taken as positive and the sign “+” corresponds to it. If the light source moves in the opposite direction, then the sign “–” is attributed to it. From the formula it follows that the speed of light in a dark gas relative to the radiation source itself or an observer moving relative to a dark gas with the same speed V will be equal to C.

Law of light reflection: The law of light reflection must take into account the speed of movement of the reflecting surface relative to the radiation source. The “–” sign in front of the speed of the reflecting surface U corresponds to its movement in the direction of the light source, and “+” in the opposite direction. The speed of the incident light beam relative to the reflecting surface will in this case be expressed by the formula

$$\vec{C}_l = \vec{C}' \mp \vec{U} = \vec{C} \pm \vec{V} \mp \vec{U}. \qquad (6.1.3)$$

Here $\overline{V}$ and $\overline{U}$ are, respectively, the speed of the light source and the reflecting surface relative to the dark gas. The relative speed of fall C_l is equal to the relative speed of light reflection $C_l^{/}$. The angle of incidence is equal to the angle of reflection. The speed of the reflected light beam relative to the dark gas $C^{//}$, as in the case of radiation, is determined by the vector sum:

$$\vec{C}'' = \vec{C}_l' \pm \vec{U}. \qquad (6.1.4)$$

The "–" sign in front of the speed of the reflecting surface U corresponds to its movement in the direction of the light source, and "+" in the opposite direction. Therefore, as can be seen from (6.1.3), when the velocities V and U are equal, the speed of light relative to the source and the reflecting surface is equal to the speed of light in emptiness.

At the present time, apparently, the main prohibition for such a view of the speed of light is not experiment or astronomical observations, but the corresponding postulate of the theory of relativity. Therefore, we once again note the main thing from our point of view. There are no objective prohibitions based on experimental data or observations that the speed of propagation of light relative to a dark gas or material bodies could be greater or less than the speed of propagation of light in a void and depended on the speeds of the emitting and reflecting surfaces. Where will the rejection of the dogma about the constant speed of light in emptiness, independent of the speed of the source or the observer, lead us? How will the phenomenon of stellar aberration and Michelson's optical experiment look like in this case? We'll look at these issues in the following sections.

6.2 The clue to Michelson's experiment

Michelson's experiment was carried out with the aim of detecting the movement of the Earth relative to any gaseous medium (for example, gaseous dark matter or ether) in world space. It is known that the Earth moves in its orbit at a speed of about 30 km / s, participates in the general movement of the solar system relative to the center of the galaxy at a speed of 220 km / s and in the movement a herself galaxy.

The main idea of this study was the assumption that in the presence of a stationary dark gas, the motion of the Earth should lead to the appearance of a noticeable difference in the numerical values of some optical quantities when the light beam propagates along and across the direction of the Earth's motion. The speed of light was considered constant regardless of the speed of the emitting source and the reflecting surface. The interferometer played the main role in the experiment. The diagram of the Michelson interferometer is shown in Fig.6.2.1 in a simplified form.

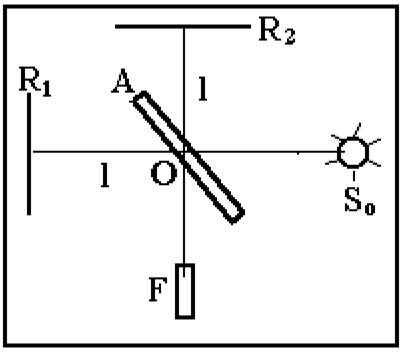


Fig.4.2.1

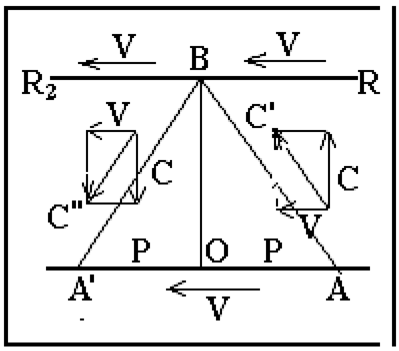


Fig.4.2.2

This interferometer and experimental technique are described in many books [3]. Note that Michelson and subsequent researchers did not find the expected difference. Based on this, it was concluded that either interstellar space is empty, or dark gas (ether) is carried away by the Earth. However, this last assumption contradicts the results of the stellar aberration phenomenon [3].

.In this book, the classical Michelson experiment is explained using the laws of radiation and reflection of light formulated in the previous section (see formulas (6.1.2) - (6.1.4)). A light source and a reflecting surface are moving relative to a dark gas . We believe that the Earth in its motion does not carry the dark gas along.

The ray coming from the source S_o is partly reflected at point 0 from the glass, slightly silvered plate A; then it is reflected from the mirror R_2, and part of it, having passed through A, enters the telescope located in F. Another part of the ray coming from the source S_o passes through A, she is reflected from the mirror R_1, she is again partly reflected at 0 and also falls into the tube F. The observer sees in F, interference fringes depending on the difference in the travel times of the paths $0R_10$ and $0R_20$ of the two beams. At a certain place in the focal plane of the tube F, one of the interference fringes should appear, corresponding to the path difference of the two beams.

It is quite clear that if the device is stationary relative to the dark gas, then the time spent by the light beams to move is the same, since each of them travels a path $2l$ with speed. C This time is equal. $t = 2l / C$

Let us now consider what influence the motion of the entire device together with the Earth in a motionless dark gas should have on the picture of the interference phenomenon. Suppose that this movement is parallel to one of the directions $0R_1$ or $0R_2$. Distances $0R_1$ and $0R_2$ are equal l. At the same time, we can imagine the light source as being at the point 0. Let the source and the mirror move in the direction of the straight line connecting them, with a speed V relative to the dark gas. According to formula (6.1.4), when leaving A, the speed of the light beam relative to the dark gas, taking into account the additional speed V, will be $C'=C+V$.

The speed relative to the device, which itself moves in the same direction with the speed V, turns out to be $C_l=C'-V=C$. Therefore, the time of travel l from 0 to R_1 is $t_1 = l / C_1 = l / C$. The light approaches the mirror with a relative speed $C_l'=C'-V=C$. According to formula (6.1.4), the reflected beam begins to move in the opposite direction with a speed C'' relative to the dark gas. Here $C''=C_l'-V=C-V$. The speed of the reflected light beam relative to the device, which is now moving towards the opposite with the speed V, will be $C_1'' = C'' + V = C$. Travel time l from R_1 to 0 is $t_1'' = l / C_1'' = l / C$.

The total time for the light beam to travel $2l$ from 0 to R1 and in the opposite direction: is $t_1=t_1'+t_2''=2l/C$. The movement of the device relative to the dark gas does not change the time it takes the beam to travel in the direction of the velocity V.

Let us turn to the case when the light source A (beam-splitting plate) and mirror R_2 move perpendicular to the direction of propagation of the light beam $0R_2$. A detailed fragment of the movement of the ray of light in this case is shown in Fig. 6.2.2. According to formula (6.1.2), the speed of the emitted ray of light in the direction AB, taking into account the direction and magnitude of the speed V of the movement of the light source, will be $C' = \sqrt{C^2 + V^2} = C\sqrt{1 + \frac{V^2}{C^2}}$.

Since the device moves in the direction R_2R_2 with a speed V, the relative speed of the incident light beam in this direction is zero, and in the direction perpendicular to the movement of the device, the speed of the incident beam is C. The reflected light beam has an angle of reflection equal to the angle of incidence. It has a speed equal in magnitude according to formula (6.1.4) to the speed of the incident ray $C'' = \sqrt{C^2 + V^2} = C\sqrt{1 + \frac{V^2}{C^2}}$, since the speed is U = V. The path that a ray of light travels back and forth in a dark gas will be

$$S = 2\sqrt{l^2 + p^2}. \qquad (4.2.1)$$

In the direction of the line B0, the light beam propagates at a speed of C, and in the direction of AA′ at a speed of V. Therefore, it is possible to make the proportion $p/l = V/C$, from where $p = l \cdot V/C$. Let's substitute this value in the formula (6.2.1). Then the path S will be written in the following form $S = S' = 2\sqrt{l^2 + l^2\frac{V^2}{C^2}} = 2l\sqrt{1 + \frac{V^2}{C^2}}$. The time it takes for a ray of light to travel this path is defined as $t_2 = \frac{S'}{C''} = \frac{2l}{C}\sqrt{\frac{1 + V^2/C^2}{1 + V^2/C^2}} = \frac{2l}{C}$. Comparing the result obtained with the time t_1, we find that $t_1 = t_2$.

So, due to the movement of the entire system, the travel times of light from the source to the mirror and back, in two mutually perpendicular directions, turn out to be the same and, moreover, equal to the travel time of these distances by light rays in the case when the device is stationary relative to the dark gas. Naturally, therefore, Michelson's experiment did not give a displacement of the interference fringes and did not reveal the expected influence of the Earth's motion in a motionless dark gas on the optical characteristics of the light beam. No matter how high the speed of the Earth relative to dark gaseous matter, Michelson's experiment cannot reveal this.

Given the large number of evidences of the presence of interstellar dark gas and its huge role in the formation of inertial forces, attractive forces, in the energy processes occurring in the Universe, it would be more correct to consider Michelson's experiment as an experimental proof of the laws of radiation and reflection of light formulated in this work. Moreover, if such an experiment had not been carried out, it should have been invented to test and confirm these laws.

It must be said frankly that physics itself invented difficulties, postulating the constancy of the speed of light, its independence from the speed of the source and the reflecting surface, and departing from the well-known principles of relativity of Galileo and Newton. By analogy with the propagation of sound in gases and liquids, light was considered a wave propagating in a gaseous dark gas. Therefore, it is quite natural for the speed of light to also recognize the property of constancy, regardless of the speed of the radiation source and the reflecting surface. Therefore, later in science, there was a struggle with seeming contradictions in the interpretation of the results of the experiments of stellar aberration and Michelson on the basis of an erroneous premise. The result of this struggle was the emergence of the bizarre theory of relativity with its paradoxes that contradict the life practice of mankind.

At present, advances in physics have led to the recognition after light, along with the wave properties is the corpuscular properties is also. This allows us to return to the principles of Galileo's relativity (Newtonian mechanics) in understanding the laws of radiation, propagation and reflection of light. The wave properties of light are manifested in the phenomena of interference, diffraction and polarization and are inherent in de Broglie waves accompanying flying photons.

All our previous studies have led us to the unambiguous conclusion that the speed of light depends on the speed of the source and the reflecting surface. It was the refusal to acknowledge this fact that led physics first to the crisis of the late nineteenth and early twentieth centuries, and then to the emergence of A. Einstein's general relativity with its paradoxes, which contradict the daily practice of mankind.

Naturally, we are not the first to be interested in this problem. In the history of science, there is a discussion that took place in the journal Physikalische Zeitschrift on the question of whether or not the speed of light depends on the speed of the source. At that time, the dependence $\bar{c}^{'} = \bar{c} \pm \vec{V}$ was justified by E. Freindich, Ritz and others. It formed the basis for the so-called ballistic hypothesis of Ritz [5]. The discussion was cut short by the 1st World War with a negative result for this point of view. The prevailing opinion was that the speed of light is constant in emptiness and does not depend on the speed of the source (C = const). The ballistic hypothesis of Ritz was rejected because of its apparent contradiction with spectroscopic observations of binary stars, substantiated in the work of de Sitter. We'll look at this issue later. .

3 The aberration of light

At the beginning of the 18th century, the English astronomer Bradley, observing the stars, noticed that there were changes in their position with a one-year period. This indicated a connection between this phenomenon and the movement of the Earth. All stars near the pole of the ecliptic describe circles of the same radius throughout the year, namely $.\alpha = 20'',5$ Observations have shown that the magnitude of the displacement does not depend on the distance from the Earth to the star. The star seems to lag behind the expected position by ¼ turn. This phenomenon has been called stellar aberration.

In 1728, Bradley found an explanation for the aberration. It is caused by the combination of the movement of light with the movement of the Earth in its orbit. To understand this, refer to Fig. 6.3.1

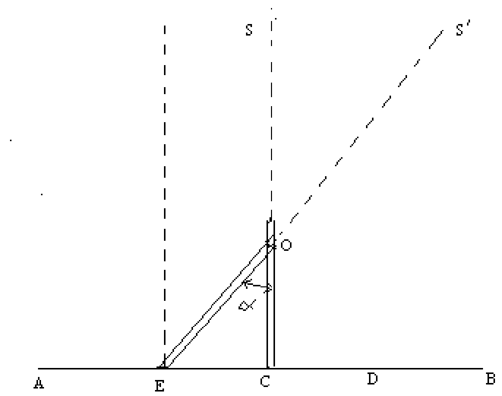


Fig.6.3.1

Let the observer place his pipe in the direction of CO, perpendicular to AB. Because the speed of light, although very high, but not infinite, then the light from the star, passing through the lens O, will reach the eyepiece C after a certain time interval t. But during this time the eyepiece will go from point C to point E. In order for the light from it to enter the observer's eye, it is necessary to move the eyepiece end of the tube to point E. The segment EC is equal to the path that the Earth travels in time t. Then the light will reach point C just at the moment when the eyepiece comes into it. Thus, we will see the star not in the CS direction, but in the direction ES'. It will be shifted in the direction where the Earth is moving at a given time.

Determine the amount of displacement. Let C denote the speed of light, V is the speed of the Earth. Light travels the OC path in time t, while the Earth travels the EC path at the same time. Hence

$$\frac{EC}{OC} = \frac{V}{C} = tg\alpha \, . \qquad (6.3.1)$$

The speed of light is $C = 3 \cdot 10^8 [m/s]$. Earth speed is $V = 29{,}7 [km/s]$. From formula (6) we obtain

$$\alpha = 20'',48 . \tag{6.3.2}$$

This value is called the aberration constant. These studies were carried out by Bradley on the assumption that the space between the Earth and the star is empty, and if it is filled with gas, then the Earth in its motion does not carry away this gas. Let's see how this result will be affected by our assumption that this space is filled with dark gaseous matter.

Earlier it was shown that in its orbit around the Sun, the Earth does not carry dark matter with it. Matter of the Earth, in comparison with the size of dark matter particles, has a very porous structure. The size of elementary particles of a dark gas is of the order $10^{-25} [m]$. While the sizes of the nuclei of baryon atoms are of the order $10^{-15} [m]$, and the distances between the nuclei of atoms are no less $2 \cdot 10^{-10} [m]$. Therefore, when baryonic bodies move, dark gas penetrates the Earth through and through, flowing around only very dense nuclei of atoms of terrestrial materials. Therefore, the dark gas surrounding the Earth is not carried away by the Earth and does not change Bradley's conclusions.

Along the way, we note that although the magnitude $\alpha = 20'',48$ is considered a constant, when measuring it, a slight difference in its magnitude was noted for different stars. This difference was interpreted as a measurement error. We believe that this is not a measurement error, but quite real differences depending on the distance to the stars, i.e. from the time the light wave travels through dark matter from the emitting star to the Earth. It was previously shown that the speed of light decreases with prolonged movement of photons through dark gaseous matter.

6.4 Sagnac experience

Michelson, despite the negative result of his famous experiment, believed in the existence of a continuous elastic medium in outer space (at that time it was called ether, a very highly rarefied medium that does not interact with material bodies. It was necessary for the propagation of light waves.) and soon developed the idea of a new rotational experiment to detect it. This experiment was carried out in 1911 by Sagnac. A schematic diagram of a Sagnac interferometer is shown in Fig. 6.4.1 The interferometer was assembled on a rotating platform and consisted of a light source, a beam-splitting plate Π, three mirrors 3_1,3_2,3_3 and a telescope. A beam splitting plate divided the light beam from the source into two coherent beams describing broken lines along the platform perimeter in opposite directions. Going around the circle and meeting again on the beam-splitting plate, the light rays were directed into the telescope to obtain an interference pattern. It was assumed that the rotation of the interferometer does not involve the interstellar medium in its motion and it remains stationary. It was expected that a shift of the spectral bands would appear in the interferometer and show the rotational motion of the instrument relative to the interstellar medium.

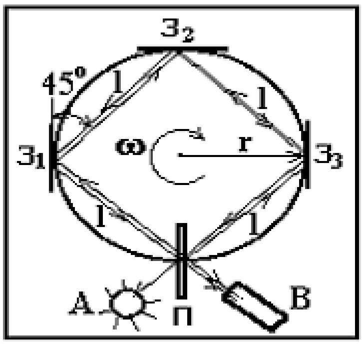


Fig. 6.4.1

In the experiment of Sagnac, a stunning, albeit expected, result was obtained, confirming the presence of a stationary interstellar medium. In what follows, we will use the terms "gaseous dark matter" or "dark gas" to denote it. This result was obtained with a high degree of accuracy. However, it was in irreconcilable contradiction with Michelson's experience. Surprisingly, the scientific world, which had just found a way out of the crisis of physics with the help of Einstein's theory of relativity and felt firm support under its feet, did not want to be plunged into a new crisis full of doubts and disagreements. As a result, the experience of Sagnac was ignored by most physicists and, moreover, was stubbornly hushed up in the educational and scientific literature. This gap needs to be corrected and Sagnac's experiment should be analyzed to make sure that it does not contradict the ideas advocated in this book about the laws of light propagation in gaseous dark matter. In accordance with the laws of radiation and reflection (6.1.2), (6.1.3), (6.1.4), the speed of light relative to stationary gaseous dark matter during the rotation of the platform will be:

in the direction of rotation

$$C_{+}^{'} = C + U \cdot Cos45^{o}; \qquad (6.4.1)$$

against the direction of rotation

$$C_{-}^{'} = C - U \cdot Cos45^{o}; \qquad (6.4.2)$$

Here U=ω·r is the peripheral velocity of the device together with the platform at a distance r from the axis to the circle with mirrors and a beam-splitting plate located on it.

The difference in the values of the velocities $C_{+}^{'}$ and $C_{-}^{'}$ was formed at the moment of emission of coherent rays on the beam-splitting plate Π. It does not change when the rays are reflected from mirrors $З_1$, $З_2$, $З_3$. The distances l traversed by the beam in a quiet dark gas also do not change when the mirror system rotates, since the mirrors move tangentially to the circle connecting them. Consequently, the difference in time of movement of the opposite rays will be

$$\Delta t = \frac{4\ell}{C - UCos45^{o}} - \frac{4\ell}{C + UCos45^{o}} = 8Cos45^{o}\frac{\ell U}{C^{2}}. \qquad (6.4.3)$$

This corresponds to the appearance of an optical difference in the path of the rays, containing as many lengths of the light wave λ, how many times the time of one period T of the light vibration is contained in the difference Δt. Let N be the number of stripes by which the entire system of stripes should shift.

Then

$$N = \frac{\Delta t}{T} = \frac{8Cos45^o \ell U}{C^2 T} = 8Cos45^o \frac{\ell}{\lambda}\frac{U}{C}, \qquad (6.4.4)$$

since λ=CT. This is the meaning that was obtained in the Sagnac experiment.

It should be noted that the theory presented in this article was able to explain and combine the phenomenon of stellar aberration, Michelson's experiment and Sagnac's experiment from a unified position. This eliminates the contradictions in their interpretation, which is an undoubted confirmation of the existence of gaseous dark matter in outer space and our ideas about the laws of light propagation.

By the way, for the perception of these ideas about light, it is enough to take just one more step towards expanding the ideas about the dualism of light - to abandon the dogma of the constancy of the speed of light. This is not scary, as it would mean a return to the usual and natural concept of the addition of velocities, used in everyday life, physics and mechanics. It is necessary to extend these ideas to the motion of photons and get away from the well-known paradoxes of Einstein's theory of relativity.

6.5 Doppler phenomenon into gaseous dark matter

The Doppler phenomenon is widely used in astronomy to determine the radial velocities of stars and nebulae in relation to the Earth, to determine the angular velocities of rotation of these objects, and in a number of other cases of science and technology. This phenomenon describes the relationship between vibrations emitted by a source and vibrations perceived by any recording device, if the source and the device move relative to each other.

In [3] it is noted: “so that oscillations can propagate from the source to the device in the form of waves, the device and the source must be immersed in a continuous elastic medium”. These ideas fit well into the picture of the propagation of light waves in a dark gas. It should be taken into account that the speed of propagation of light waves depends on the speed of the radiation source and is described by the law of radiation of light waves in a dark gas (6.1.2).

Let us agree to consider the velocity U of the source relative to the dark gas to be positive if the source approaches the device. If the source moves away from the device, its velocity will be considered negative. We introduce a similar condition for the sign of the instrument's velocity relative to the interstellar medium: when it approaches the source, we consider the velocity to be positive, while moving away from the source, negative.

Let the recording device and the source move simultaneously relative to the dark gas field in which light waves propagate. The radiation source moves towards the recording device with a velocity U>0 relative to the dark gas field. The recording device can move in the same direction relative to the dark gas field with a speed V<0 or towards the source with a speed V> 0. In accordance with this and taking into account the law (6.1.2), the relative speed of the light wave relative to the device moving towards the opposite direction will be C+U+V. The number of waves that passed the device per unit of time (frequency)

$$\nu' = \frac{C+U+V}{\lambda} = \frac{1}{T}\left(1+\frac{U}{C}+\frac{V}{C}\right) = \frac{1+V/C}{1-U/C}\nu.$$

If the device is removed, then the relative speed of the heavy light wave will be C+U-V. The number of waves passing by the device (frequency) per unit time, in this case, will be

$$\nu' = \frac{C+U-V}{\lambda} = \frac{1}{T}\left(1+\frac{U}{C}-\frac{V}{C}\right) = \frac{1-V/C}{1-U/C}\nu.$$

Thus, □□ depends differently on the speed of the device V and the speed of the source U relative to the field of gaseous dark matter. The formulas obtained here coincide with the formulas of [1] for waves propagating in an elastic medium with a constant velocity, independent of the intrinsic velocity of the radiation source. Therefore, their practical use will not differ from normal practice.

6.6 Confirmation of the dependence of the speed of light from speed of source of astronomical observations of signals from binary stars

This section presents our interpretation of the results of observations of signals emitted by binary stars. It is based on the report of P.S. Chikin. [39] at the international conference "Modern problems of natural science" St. Petersburg, 2000. In our opinion, these results confirm our early studies of the nature of light, which showed the dependence of the speed of light on the speed of the light source and the speed of the reflecting surface. Our studies have shown that with such an understanding of the laws of light propagation, contradictions between the phenomenon of stellar aberration and Michelson's experiment, which led physics to a crisis in the late 18th and early 19th centuries, are eliminated.

Our previous research led us to the unambiguous conclusion that the speed of light depends on the speed of the source and the reflecting surface. It was the refusal to recognize this fact that led physics first to the crisis of the late nineteenth and early twentieth centuries, and then to the emergence of A. Einstein's general relativity (OTO) with its paradoxes that contradict the daily practice of mankind. Naturally, we are not the first to be interested in this problem. In the history of science, there is a discussion that took place in the journal Physikalische Zeitschrift on the question of whether or not the speed of light depends on the speed of the source. While addiction

$$\bar{c}' = \bar{c} \pm \vec{V} \tag{6.6.1}$$

justified by E. Freindich, Ritz and others. It formed the basis of the so-called ballistic hypothesis of Ritz. The discussion was cut short by the 1st World War with a negative result for this point of view. The prevailing opinion was that the speed of light is constant in emptiness and does not depend on the speed of the source (C = const). The Ritz ballistic hypothesis was rejected because of its apparent contradiction with spectroscopic observations of binary stars, substantiated in the work of de Sitter [15, 16].

The essence of de Sitter's reasoning becomes clear from the analysis of observations of the motion of binary stars. Figure 6.6.1 shows a simplified diagram of this phenomenon. In the center O is a heavy, weakly luminous star, around which another brighter star revolves in a circular orbit, successively occupying positions A, B, F, D, etc. The light from this bright star reaches the observer. Spectroscopic binary stars are determined by splitting their spectrum into two, shifted relative to each other due to the Doppler effect, since the emitting star moves either towards the observer or away from him.

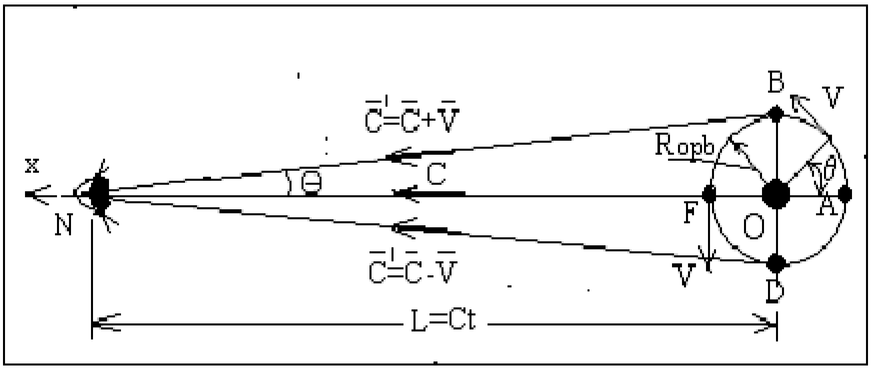


Fig.6.6.1

According to Ritz's ballistic hypothesis, a ray of light emitted by a bright star from point D moves towards the observer with a reduced speed $\vec{C}' = \vec{C} - \vec{V}$.. The signal from point D reaches the observer in time t_1=L/(C-V). Here L is the distance from a binary star to an observer on Earth. It is many times larger than the dimensions of the binary star's orbit. After that, the bright star moves from point D to point B during the half-period T/2. The signal emerging from point B comes to the observer in time $t_2=T/2+L/(C+V)$, counted from the moment the star leaves point D.

The time interval between the receipt of two signals that came to the observer from points D and B is determined by the difference between the times t_2 and t_1

$$\Delta t=T/2+L/(C+V)-L/(C-V)\cong T/2-2VL/C^2, \qquad (6.6.2)$$

If we now assume that $T=4VL/C^2$, then the time interval will disappear. The signal from points D and B will arrive at the observer simultaneously. In this case, according to H.Tirrmga, the signal should have been completely mixed and it would have been impossible to observe the line spectra of the stars. In fact, the value of Δt for a number of spectroscopic binaries is very large.

To express my attitude to this problem, I would like to note one essential, in my opinion, difference between the article presented and the ballistic hypothesis of Ritz. Recall that Ritz put forward his ballistic hypothesis of light at a time when light was considered a wave, like a sound wave in air. It is known that the latter propagates in air at the speed of sound, which does not depend on the speed of the source. Therefore, at that time it was completely incomprehensible why it should be assumed that the light wave leaves the radiation source at a constant speed relative to the source, and not relative to the surrounding field of the luminiferous interstellar continuous medium. At that time it was believed (until the appearance of A. Einstein's STR in 1915) that the Universe was filled with a light-conducting medium-ether.

In this work, the laws of radiation and propagation of light are only a part of the theory of gaseous dark matter that we are developing. This part is very important, but it is not divorced from the rest of the theory. It is important to emphasize that formula (6.6.1) logically follows from our ideas about the structure of the atom and the process of formation of photons-carriers of light. According to these concepts, photons leave the excited atom with a speed of $C=3\cdot10^8$ m/s. This is the speed of the jets of dark gas at the upper boundary of the gas vortex of the atom. Photons are formed from these jets. Further, being material particles, photons move in space, are reflected and re-emitted by other material surfaces in accordance with the laws of relativity of Galileo-Newton

This, apparently, can explain the failure of Ritz's ballistic hypothesis. Since it did not have an evidence base that light leaves the radiation source at a constant speed relative to the source itself, it never became a theory. All the efforts of the critics of this hypothesis were therefore reduced to searching for contradictions in the hypothesis itself. And this contradiction was found in the spectra of binary stars.

Of course, binary stars are very distant from us, which reduces the accuracy and reliability of the evidence used by the critics. For this reason, many factors of nature can influence the light signal as it forms and then travels through the vast cosmic distances from star to Earth. The work of Pavel Sergeevich Chikin [39] is quite detailed and demonstrative in this sense. Let us dwell on this work in more detail, and repeat his reasoning after the author. In our opinion, this work refutes de Sitter's arguments and confirms the correctness of expression (6.6.1). Based on this expression, she significantly advances knowledge about the nature of binary stars, uniting them into one group with the Cepheids.

In contrast to de Sitter, in the work of P.S. Chikin, the radiation from a binary star is considered not only at two characteristic points B and D (Fig. 6.6.1), but during the entire revolution of a bright star around a heavy dim star. The projection of the speed of a bright star onto the ox direction connecting the binary star and an observer on Earth is written as

$$V_{хдоб}=V\cdot\sin\varphi \,. \tag{4.6.3}$$

A packet of light waves emitted by a bright component in one orbital period is considered. Point A is taken as the reference point. In this case, at the initial moment, the packet length will be $l=C\cdot T$, where C is the speed of light without the addition of the speed of the emitting star. At first, the amplitude of the light waves is very large and is equal to the orbital radius Rorb of the emitting star. As the chain of light waves moves towards the observer, the amplitude of the sinusoid will decrease, since rays NB and ND converge at point N (author's note). At the time the signal is received by the observer, it is already very small (determined by the design of the spectrometer). In view of the fact that $L>R_{орб}$, we can approximately assume $\theta\cong0$. (Fig.6.6.1). According to formula (6.6.1), different parts of the packet move towards the observer at different speeds. As a consequence, the velocity in the direction of the ox axis of any point of the train will be

$C_x^{/}$ =C+$V_{Хдоб}$=C+V·sinφ . (6.6.4)

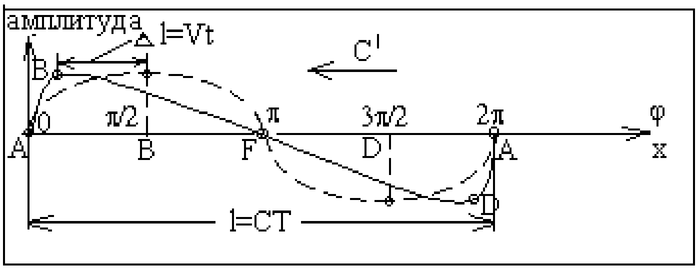


Рис.6.6..2

Any point of a sinusoid in a packet of light waves due to the difference in velocities $C^{/}$ will shift in the direction of the ox axis. With the passage of time t as the packet of light waves moves from the star to the observer, this displacement relative to its initial position will amount to

Δl=$V_{хдоб}$·=V·t·sinφ . (6.6.5)

The observer will receive signals of various shapes depending on the magnitude of the orbital velocity V, the period of revolution of the bright star around the dark heavy star T and the time moving of the packet of light waves travels from the star to the observer t. The most typical waveforms are shown in Fig. (6.6.2… 6.6.5). The shape of the chain of light waves already discussed in Fig. 6.6.2 is the most common. It corresponds to the inequality

Vt<CT/4 . (4.6.6)

The closer the Vt value approaches the CT/4 value, stronger point B runs towards the beginning of the wave packet (point A), and point D lags behind, moving towards the end of the packet (point A). All subsequent packets of light waves will have the same shape. In [39], one very important observation was noted, consisting in the correspondence of the shapes of light wave packets obtained in Fig.6.6.2 with the distributions of radial velocities actually observed by astronomers of Cepheids and, in particular, the Cepheid δ Cephei (V = 20 km/s). If

$$Vt=CT/4 \ \text{(de Sitter case)}, \tag{6.6.7}$$

then at the moment of receiving the signal, point B reaches point A in the direction of the ox axis. In this case, the sequence of light wave packets will take the form shown in Fig. 6.6.3. The figure shows that the anterior points of each next packet caught up with the back points of the anterior packets. But, what is important to emphasize, the wave packets themselves did not change their length, since points A and F are moving at the same speed $C = 3 \cdot 10^8$ m/s. At the same time, we see a pronounced cyclicality of these light signals. It is these cyclic signals, which have a nonzero length in space, that are recorded by the observer's spectrometer.

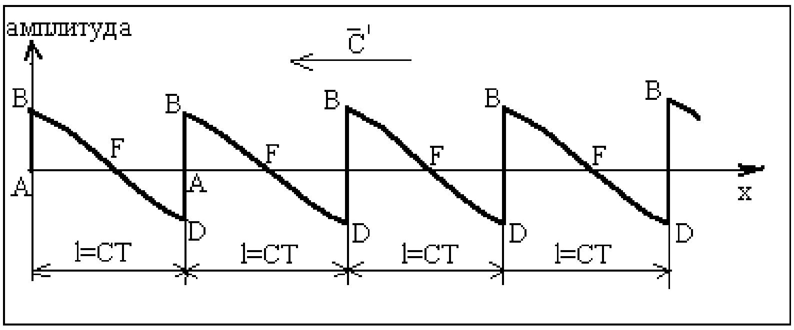


Fig.6.6.3

It is clearly seen from Fig. 6.6.3 that in the de Sitter case, in the sections of wave packets from points A to points F, the spectral lines shift towards the violet part of the spectrum, since they carry information about an approaching radiation source. In the section from F to A, the shift of the spectrum lines occurs towards infrared radiation, since they carry information about the receding radiation source. In this case, no signal mixing will occur, since we are not talking about the addition of light waves only at points A and B, but about light waves along wave packets consisting of the radiation of a whole star. And these packets of light waves, as seen in Fig.4.6.2 and 4.6.4 do not overlap (author's note).

The flaw in de Sitter's reasoning was precisely that he did not consider the entire sequence in time of the formation of signals from a binary star, but limited himself only to signals from two points of the orbit of a bright star B and D (Fig. 6.6.1). Figure 6.6.4 shows packets of light waves obtained for the case

$$Vt>CT/4. \qquad (6.6.8)$$

In [39] it was noted that their shape corresponds to the distribution of radial velocities of the Cepheid RR Lyrae (V = 50 km / s, T = 0.567 days) and the Cepheid W Virgo. When a star moves towards an observer, the maximum of positive radial velocities in their spectra always appears somewhat earlier than the lowest negative additional velocities. At the same time, the brightness of the star increases and corresponds to the lines (of hydrogen or metals) in the spectra of stars with very high temperatures due to the shift of the latter towards the violet end of the spectrum.

When a binary star moves away from the observer, its brightness decreases and the lines (hydrogen, metals) become weaker, shifting towards the red end of the spectrum. But even before these lines disappear completely, a new series of lines are already found in the spectrum, shifted towards the violet end, and so on. This, as follows from Fig.6.6.4, is a consequence of the rearrangement of parts of the package of light radiation. Point B comes to the observer earlier than point A (the beginning of the packet), and point D lags behind point A (the beginning of the next packet of light radiation). Astronomers have identified thousands of stars with such spectra. This is a very common phenomenon in the universe.

Therefore, we can fully agree with the conclusion of [39] that when using the velocity addition law (6.6.1), the line spectrum of binary stars will be observed in all cases determined by laws (6.6.6), (6.6.7) and (6.6.8), including the special case of de Sitter.

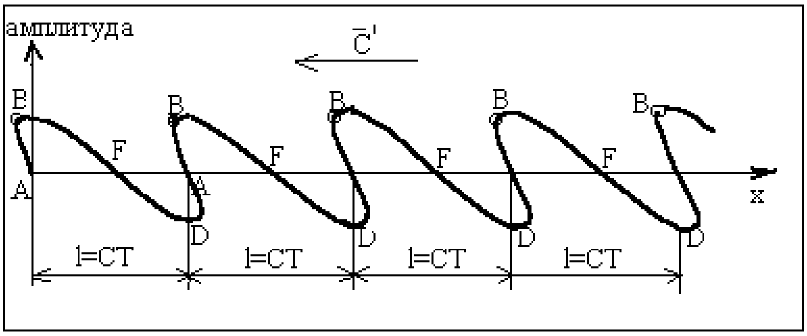


Рис.6.6.4

Further, the author of [39] compares the features of the change in the brightness of various Cepheids with the shape of light wave packets obtained on the basis of expression (6.6.1) from binary stars moving not only in circular but also in elliptical orbits, as well as both stars around a common center ... Observing their coincidence, he comes to the conclusion that in nature there are no pulsations of the Cepheid radii at all. In his opinion, Cepheids are spectroscopic binary stars, in which the emission of only one bright component is recorded.

The confirmation of the correctness of this point of view is the removal of the contradiction in the statistics of the observed stars. It consists in the fact that in the region of our galaxy (Milky Way) with a radius of 10 parsecs around the Sun every second star is a double star, and outside this radius there are very few double stars. Instead, a large number of pulsating stars appear. Given that the Sun is an ordinary star in the Milky Way, this feature is surprising. In addition, the distance of 10 parsecs is also a subjective, purely human limitation, since it is determined by the capabilities of telescopes (observational astronomy).

Explaining the nature of the pulsation of Cepheids on the basis of equation (6.6.1) by the fact that they are binary stars removes this abnormal and inexplicable heterogeneity of the population of the Universe with these stars. Let me remind you that within 10 parsecs of the Sun (Earth), binary stars are called visual binaries because they can be observed with telescopes. Outside this vast distance, binaries are called spectral binaries, because spectral observations of them remain the only available. For this reason, these observations admit different interpretations of the nature of the features observed in these spectra.

There were many such interpretations. The first attempt to substantiate the change in the brightness of Cepheids by the motion of an emitting star in an elliptical orbit around a weaker component was made in 1894 by astrophysicist A.A. Belopolsky in his doctoral dissertation [15]. This hypothesis competed with another hypothesis explaining the possibility of changing the brightness of stars by periodic pulsations of their volume. It was put forward in 1879 by the theorist in the field of the internal structure of stars A. Ritter. These hypotheses competed with each other with varying success. Both have many difficulties and many supporters. We will not go into the intricacies of this discussion. The pulsation hypothesis prevailed. This is not least due to the fact that the supporters of binary stars remained in the position of independence of the speed of light from the orbital speed of the emitting star.

The second reason is rather psychological. The developers and supporters of each of these hypotheses believe that there can be only one reason for the pulsations of stars and it excludes the other. Therefore, if among the huge number of observed stars, several cases are revealed that do not fit into any hypothesis, then this hypothesis is declared untenable. In our opinion, both hypotheses reflect the realities of the Universe. Those. among the variable stars there are stars with pulsating volumes, as well as binary stars. In the latter, the brightness pulsations are caused either by eclipses of one of the components by the other, or due to the fact that the front and rear parts of the trains of light waves move in accordance with equations (6.6.2) and (6.6.4) with different velocities and, as a result, have different energy.

Probably, there is some confusion in the statistics of stars due to the huge distance and the inability to make out mysterious objects. In any case, the state of knowledge in this area of □□science does not allow to unambiguously state anything about the dependence of the speed of light on the speed of the source. More reliable evidence of this dependence is the observed agreement between the phenomenon of stellar aberration, the experiments of Michelson, Sagnac, Doppler and others carried out on Earth [1,2,3]. It is important that dependence (6.6.1) does not go beyond the earthly practice of humanity.

6.7 Gravitational redshift in spectra of stars

The so-called gravitational redshift is observed in the spectra of stars. Einstein proposed the following formula to determine its value,

$$\frac{\Delta\lambda}{\lambda} = \frac{fm}{r_o C^2}. \qquad (6.7.1)$$

The confirmation of this formula by observations of the solar spectrum and mainly the spectrum of the satellite of Sirius, which has a large mass and small size, is one of four experimental proofs of the validity of the theory of relativity. Let us show that this formula can be obtained using the concept of a wave of light, consisting of a chain of photons and subject to the force of attraction. We will also show that the reason for this effect is the well-studied tidal forces that cause the ebb and flow of the Earth's oceans.

We assume that the light wave has a mass evenly distributed along its length. As a result, gravity acceleration $j = fm/r^2$ acts on each point of the wave (Fig.6.7.1), creating tidal forces tending to stretch the wave. Here m is the mass of the star; r is the radial distance from the center of mass m to the considered point of the light wave.

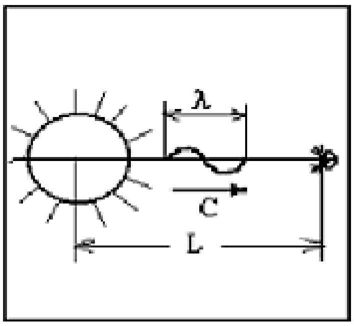


Fig.6.7.1

The speed of the points of the light wave without taking into account the forces of gravity is $C = 3{\cdot}10^8$ m/s. Taking into account the action of acceleration from the forces of gravity of the star, the velocity can be written in the form

$$V=C+\int_o^t \frac{fm}{r^2}dt\ , \qquad (6.7.2)$$

where

$$r = r_o + C \cdot t, \quad dt = \frac{dr}{C}\ . \qquad (6.7.3)$$

Substitute (6.7.3) into (6.7.2) and perform the integration. The integration constant is zero. Therefore

$$V = C - f \cdot m / C \cdot r\ . \qquad (6.7.4)$$

Under the influence of the acceleration of gravity, tidal forces act on the light wave, tending to stretch the wave. The speed with which the leading edge will go forward from the rear edge

$$\Delta V = V_f - V_z = (C - \frac{f \cdot m}{C \cdot r}) - (C - \frac{f \cdot m}{C(r-\lambda)}) = \frac{\lambda \cdot f \cdot m}{C \cdot r^2}\ .$$

Here λ is the wavelength at the initial moment of time in a quiet dark gas. The increment in wavelength over the time of passage from the light source to the observer can be written as

$$\Delta\lambda = \int_0^t \Delta V dt = \frac{fm\lambda}{C}\int_o^t \frac{dt}{r^2} = \frac{fm\lambda}{C^2}\left(\frac{1}{r_o} - \frac{1}{L}\right). \qquad (6.7.5)$$

Taking into account that L >> r_o, we obtain the formula

$$\frac{\Delta\lambda}{\lambda} = \frac{f \cdot m}{C^2 r_o}\ . \qquad (6.7.6)$$

This formula completely coincides with the corresponding Einstein's formula (6.7.6) and therefore does not need any comments, although formula (6.7.5) has a more rigorous form. Along the way, I note that the explanation of the “gravitational redshift” by tidal forces well known in earthly practice leaves no room for the effects of the theory of relativity, whose reliability is proved by this effect itself

Otherwise, both of these effects would have to work, and the gain in wavelength Δλ, obtained experimentally, would have to be 2 times greater. This is actually not the case.

6.8 Moving a light wave past massive body

In astronomy, it has been established that a ray of light passing by massive bodies is bent. In the theory of relativity, a formula is proposed for calculating the angle of deflection of a ray of light passing from a star to an observer past a body with mass M:

$$\psi = \frac{4f \cdot M}{h \cdot C^2} , \qquad (6.8.1)$$

where h is the distance between the center of the massive body and the ray of light (Fig.6.8.1). f -constant gravitation. C -the speed of light in emptiness.

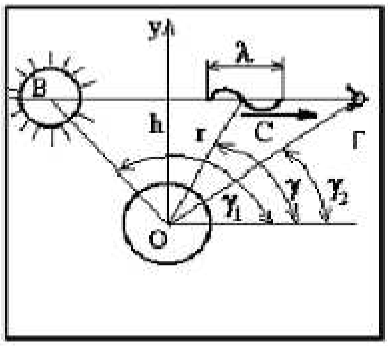


Fig.6.8.1

This formula can only be verified for the Sun. Therefore, it is usually written for the mass and radius of the Sun. If a ray of light passes directly next to the surface of the Sun ($h = r_o$, where r_o is the radius of the Sun), then the deflection of the ray $\psi_o = 1{,}75''$ is maximum. For other distances, this value must be corrected by the value of h/r_o

$$\psi_C = \psi_o /(h/r_o) . \tag{6.8.2}$$

It is known that Soldner [3] gave a solution to the problem of the deflection of light when passing by a massive body, proceeding from Newton's law, imagining that a wave of light has mass. He got a result that is half the angle □o predicted by Einstein

$$\psi_1 = 2fM/(hC^2) , \tag{6.8.3}$$

$$\psi_{o1} = 0{,}5 \cdot \psi_o = 0{,}875'' . \tag{6.8.4}$$

In accordance with Fig. 6.8.1, on any part of the beam during the time dt, the light wave travels a path $dx = C \cdot dt$ and is displaced in the perpendicular direction by a distance $dy = -V_r \cdot dt$. The increment in the speed of displacement of the wave of light in the direction of the negative axis y in time dt is equal to $dV_r = -j_r \sin\gamma \cdot dt$. Here $j_r = f\dfrac{M}{r^2}$ represents the acceleration of gravity of bodies towards the center of the Sun. f - constant gravitation. Taking into account the considered calculations, the magnitude of the increase in the angle of inclination of the tangent to the trajectory of the light ray $d\psi_1$ will be equal to the derivative from V_r of the coordinate x multiplied by the elementary time dt

$$d\psi_1 = \frac{dV_r}{dx} \cdot dt = -\frac{j_r \sin\gamma \cdot dt}{C \cdot dt} \cdot dt = -\frac{f \cdot M \cdot \sin\gamma}{C \cdot r^2} dt \tag{6.8.5}$$

As shown in Fig.6.8.1

$r = \dfrac{h}{\sin\gamma}$, $tg\gamma = \dfrac{h}{L} = \dfrac{h}{C \cdot t}$. From where $t = \dfrac{h}{C \cdot tg\gamma}$. $dt = -\dfrac{h \cdot d\gamma}{C \cdot \sin^2\gamma}$.

(6.8.6)

We substitute them into expression (6.8.5) for $d\psi_1$ and integrate it within the range from $\gamma_1=\pi$ to $\gamma_2=0$. We get the angle of rotation of the beam of light, due to the force of gravity to the center of the star

$$\psi_1 = -\frac{fM}{hC^2}\int_{\pi}^{0}\sin\gamma \cdot d\gamma = \frac{2fM}{hC^2}. \qquad (6.8.7)$$

As a result, we obtained an expression for the angle of rotation of a ray of light, similar to that of Soldner, who also considered a wave of light subject to gravity. He considered the movement of a wave of light as the movement of a material point in the gravity field of a star. However, at the same time, Soldner did not take into account that the mass of the light wave is continuously and uniformly distributed along the wavelength in the form of a chain of photons. When changing the angle of rotation of the wave, it acquired the inertia of rotation. During the time of its passage from the star to the Earth, the wave of light, in addition to its motion along the trajectory, also rotated by inertia. Soldner and his contemporaries physicists did not take this into account at the time.

To understand this, let us return to Fig. 6.8.1 and expression (6.8.5) for the elementary angle of rotation of the light wave $d\psi_1$ in time dt. These quantities determine the angular velocity of rotation of the wave at any point of the light beam $\omega = \frac{d\psi_1}{dt}$

$$\omega = \frac{d\psi_1}{dt} = -\frac{f \cdot M \cdot \sin\gamma}{C \cdot r^2} = -\frac{f \cdot M \cdot \sin^3\gamma}{C \cdot h^2}\ . \qquad (6.8.8)$$

From (6.8.8) we obtain the expression for the increment of the angle $d\psi_1$ when the angle changes $d\gamma$ as a result of the rotation of the wave of light

$$d\psi_2 = \omega \cdot dt = -\frac{f \cdot M \cdot \sin^3\gamma}{C \cdot h^2}dt. \qquad (6.8.9)$$

Substitute in (6.8.8) the value dt from (6.8.6). Finally, we obtain the expression for the increment of the angle $d\psi_1$ when the angle $d\gamma$ changes as a result of the rotation of the wave of light

$$d\psi_2 = \omega \cdot dt = -\frac{f \cdot M \cdot \sin^3\gamma}{C \cdot h^2} dt = -\frac{f \cdot M \cdot \sin\gamma}{C^2 \cdot h} d\gamma . \qquad (6.8.10)$$

We will integrate this expression in the range from $\gamma = 180^o$ to $\gamma = 0^o$. We obtain the value of the angle of rotation of a wave of light for the entire time of its movement from a star past the Sun to an observer on Earth, caused by the inertia of rotation of a material wave of light

$$\psi_2 = \frac{f \cdot M}{C^2 \cdot h} \int_{-180^o}^{180^o} \sin\gamma \cdot d\gamma = -\frac{2f \cdot M}{C^2 \cdot h} . \qquad (6.8.11)$$

The sign (-) on the right side shows that a ray of light passing over the Sun is deflected downward and added to the corner ψ_1 . As a result, the total angle of the beam rotation will be equal to the sum of the modules of these angles

$$\psi = \psi_1 + \psi_2 = \frac{4f \cdot M}{C^2 \cdot h} . \qquad (6.8.12)$$

The resulting formula (6.8.12) coincides with the formula (6.8.1) of Einstein's theory of relativity and, therefore, does not need additional experimental verification and confirmation. This result is obtained on the basis of Newton's law of gravity well known in human practice and the concept of inertia of rotation of massive bodies. It leaves no room for the effects of the theory of relativity, whose validity is proven by this effect itself. Otherwise, both of these effects would have to work, and the rotation of the light beam when passing by a massive body, obtained experimentally, would have to be 2 times larger. This is actually not the case.

In conclusion, I note that it is the effect of the curvature of a ray of light that the relativists explain the curvature of space around massive cosmic bodies. They believe that light travels along curved space. However, it is not entirely clear why light cannot move in the transverse direction or why it cannot move in a forward direction, crossing curved space. After all, curved space, even in the understanding of relativists, is not one-dimensional or two-dimensional?

In other words, relativists, instead of properly understanding the properties of light, took a completely exotic path. In their conclusions, it turned out to be easier for them to compress all the matter and energy of the Universe to an incredibly huge density into a small volume of an elementary particle, then explode it, force the material space-time to expand, curved this space around the stars. They explained gravitation by the curvature of space. In what curved space does a ball thrown upward fall down to Earth? At the same time, they are not at all embarrassed by the fact that all this contradicts the earthly practice of man. As if some laws of nature operate on the Earth and in the solar system, but completely different laws related to the speeds of bodies operate in parts of the Universe far from us. This is contrary to common sense and the experience of mankind.

6.9 The decrease in the speed of light as it propagates from a radiation source to an observer on Earth

In the previous sections, the law of the change in the mass of all bodies in the Universe, including the phaatons of light, from time was obtained

$$m = m_o \cdot e^{\frac{\alpha \cdot t}{k}} . \tag{6.9.1}$$

The velychina $\frac{\alpha}{k} = 2{,}97 \cdot 10^{-18} c^{-1}$. With an increase in the mass of photons, the speed of light C' decreases, since the photons of light at the length of the light wave carry with them the momentum received at the moment of radiation and this momentum J remains constant throughout the entire time of movement

$$C' = \frac{m_o C}{m} = \frac{m_o C}{m_o e^{\frac{\alpha}{k}t}} \approx \frac{C}{1 + \frac{\alpha}{k}t}. \qquad (6.9.2)$$

Here $C = 3 \cdot 10^8 [m/s]$ is the speed of light at a moment $t = 0$.

Recall that 1 billion years $3{,}15 \cdot 10^{16}$ [s]. Therefore, after 1 billion years, according to formula (4.9.2), the speed of a photon of light will be $C' = 2{,}74 \cdot 10^8 [m/s]$, which is quite a bit different from the speed of light on Earth. After 10 billion years, the speed of light coming to us from a distant star will be $C' = 1{,}53 \cdot 10^8 [m/s]$, that is, it will be only half of the initial speed. In 15 billion years, light coming from the outskirts of the Universe will have a speed $C' = 1{,}25 \cdot 10^8 [m/s]$, that is slightly more than 40% of the Earth's speed of light. Using the obtained law of decreasing the speed of light in the process of its propagation from a distant star to the Earth, it was possible to reveal the true nature of the redshift in the spectra of distant galaxies and to refine the Hubble law (2.7.9)

$$\Delta\lambda / \lambda = e^{\frac{\alpha}{k}t} - 1 = e^{H \cdot t} - 1 = e^{\frac{H}{C} \cdot L} - 1. \qquad (6.9.3)$$

6.10. The correction of the method of “standard candles "

This issue is raised due to the fact that the interpretation of the spectra of distant stars that showed large redshifts were interpreted on the basis of this method as a more accelerated expansion of space near the edge of the Universe in comparison with the linear Hubble law. There is no explanation for this; nevertheless, a Nobel Prize was awarded for this research.

Let me remind you that in 2011 the Nobel Prize in Physics was awarded for the discovery of the acceleration with time of the expansion of the Universe to the Americans Saul Perlmutter from the University of California at Berkeley (headed the Supernovae for Cosmology observational project) and Adam Reyes from Johns Hopkins University in Baltimore (the Search supernovae at large redshifts "). And also to Brian Schmidt of the Australian National University (project "Search for supernovae at large redshifts").

The essence of their research, as I understand it, was that supernova explosions were observed with large redshifts in the spectra. In this case, two methods were used to determine the distances to these objects:

- the first one made it possible to determine these distances from the redshift in the spectra based on the Hubble law

$$L = \frac{\Delta\lambda / \lambda}{H} \ , \tag{6.10.1}$$

where $H = 10^{-28}$ 1/sm is the redshift constant (Hubble constant).

- the second consisted to observe the luminosity of La-type supernovae, which have the property of a "standard candle", ie. have approximately the same luminosity, wherever they are. Then, by observing the brightness, the distances to them can be determined. To the surprise of the researchers, these methods gave different distances for the same stars. The discrepancies were so great that they could not be attributed to measurement errors. As a result of the analysis of the data obtained, these researchers came to the conclusion that at very large distances, the Universe is expanding much faster than predicted by Hubble's law.

This solution was also supported by the fact that, thanks to the acceleration of the expansion of the Universe, the relativists were able to introduce the λ-term into Einstein's equations anew. λ-term was introduced by A. Einstein into his equations in order to make the Universe stationary (he himself later admitted this as his biggest mistake). Now it bears the name "cosmological constant" and is a physical constant, which, according to relativists, characterizes the properties of the vacuum. From our point of view, this conclusion is erroneous.

The "standard candle" method used to determine the distance between an observer on Earth and a star uses the property of stars of the type LA to have approximately the same luminosity J_m, wherever they are. The apparent brightness of the star depends on the luminosity. It is known that the brightness of stars decreases in inverse proportion to the square of the distance from the star to the observer. Therefore, this method uses the relationship between the apparent brightness J_m of a star and its distance D from the Earth.

$$\frac{j_M}{j_m} = \frac{D^2}{D_o^2}, \tag{6.10.2}$$

where D_o is the distance corresponding to the absolute value of brightness J_M. The closer a star of the type LA is to Earth, the brighter it is. The further it is, the duller it looks. To compare the true brightness of the stars, it is necessary to calculate what brightness they would have if all were at the same distance. According to international agreement, 10 parsecs are taken for such a distance. (Parsec is short for parallax - second. This distance to a star is approximately $3{,}1 \cdot 10^{13}[km]$. Light travels one parsec every 3.26 years). The absolute brightness of the type stars LA is known. If the brightness of a star visible from Earth J_m is measured, then using the formula (6.10.2), you can calculate the distance to a star of the type LA and other stars from this constellation.

This method does not take into account the influence of dark matter in interstellar space on light waves on their way from a star to an observer on Earth. The property of a wave of light (quantum) discovered by us to decrease its speed while moving along the ray was not known to the developers of the "standard candle" method. Therefore, it was not taken into account in relation to the apparent brightness of a star and its distance from us.

However, it is clear that such an influence exists, since a decrease in the speed of light, occurring over vast distances measured in billions of light years, will decrease the kinetic energy of the mass of photons that make up any wave of light. In this case, the total energy will be conserved due to the growth of the internal energy of the increasing mass of photons. It is kinetic energy that determines the apparent brightness of a star. To make sure of this, we write down the kinetic energy of the mass of photons m that make up a light wave on the way from a star of the type LA to Earth in the following form

$$E = \frac{mC^{/2}}{2} = \frac{(mC^{/}) \cdot C^{/}}{2} = \frac{I \cdot C^{/}}{2}. \quad (6.10.2)$$

We have already noted that the momentum of the mass of photons that make up a wave of light remains unchanged along the beam of light $I = Const$. Therefore, relation (6.10.2) can be written, taking into account (6.9.2), in the form

$$E = Const \cdot C^{/} = Const \cdot \frac{C}{e^{\frac{\alpha}{k}t}}. \quad (6.10.3)$$

It can be seen from this ratio that the kinetic energy of light quanta decreases with time, during which they are on their way from the star to the Earth. Consequently, the brightness of the star will decrease in comparison with the expected one calculated on the basis of expression (6.10.1). Based on the study, you can build a graph in Fig.6.10.1. This graph will clearly show the decrease in the apparent brightness of the observed star

$$\frac{E}{E_o} = \frac{1}{e^{\frac{\alpha}{k}t}}. \quad (6.10.4)$$

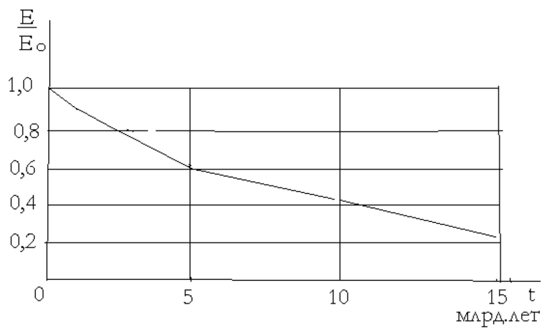


Fig..6.10.1

Depending on the residence time of the light wave (quantum) in the path within 1 [billion years] decrease in brightness compared to. with the expected less than 10%. But the longer the light is on its way, the dimmer than expected the star that emitted it will be. At the edge of the visible universe, the star will already be very dim, because its brightness will decrease by $3/4$. This is a consequence of the interaction of photons of the light wave with dark matter.

Due to the decrease in the speed of light along the ray, the distance that light travels in time t turns out to be less than if it were moving at a constant speed C. Taking this circumstance into account, the distance D can be written as

$$D = \int_0^t C^{/} dt = \frac{C}{\alpha / k}(1 - \frac{1}{e^{\frac{\alpha}{k}t}}) . \qquad (6.10.5)$$

Fig.6.10.2 shows how the distance traveled by a ray of light increases in reality, taking into account the influence of dark matter according to formula (6.10.1), and how this distance would increase if we assume that light travels at a constant speed in empty space.

From relation (6.10.1) we express the time t of motion of the light wave through the distance D that it travels during this time

$$t = \frac{1}{\alpha / k} \ln\left(\frac{1}{1 - \frac{D \cdot \alpha / k}{C}} \right) . \qquad (6.10.6)$$

Let us substitute this time into expression (6.10.4) for the luminosity ratio

$$\frac{E}{E_o} = \frac{1}{e^{\ln \frac{C}{C - D \cdot \alpha / k}}} . \qquad (6.10.7)$$

To obtain the final calculation formula in the "standard candle" method, taking into account the influence of dark matter on the apparent brightness of stars, you need to combine formulas (6.10.1) and (6.10.7)

$$\frac{J_m}{J_M} = \frac{D_o^2}{D^2} \cdot \frac{1}{e^{\lg \frac{C}{C - D \cdot \alpha / k}}} \quad . \tag{6.10.8}$$

The effect of dark matter on the apparent brightness of a star is determined by the second factor in this formula. This influence begins to affect very large distances from the emitting star, measured in billions of light years. The values of this factor are the correction to brightness, which astronomers currently take for the apparent brightness of a star.

From (6.10.8) it can be seen that stars (type La) near the visible boundary of the Universe will look much dimmer in comparison with the brightness expected on the basis of the law (6.10.1).

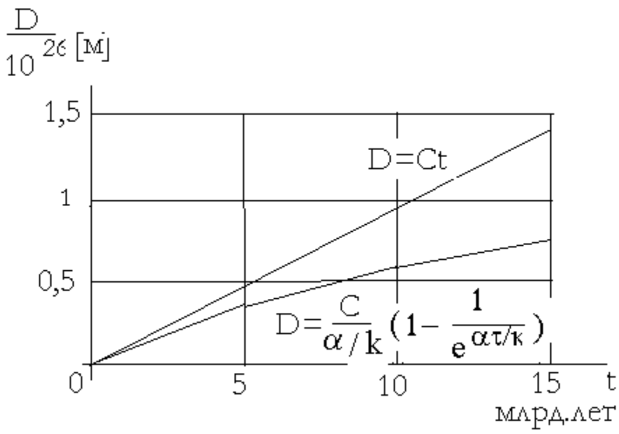


Fig.6.10.2

<u>In the previous section, we showed that the lower observed brightness of stars compared to the expected is due to the influence of dark matter in interstellar space on the local speed of light. A decrease in this speed leads to a decrease in the kinetic energy of the mass of photons that make up the light wave (light quantum). This in turn reduces the apparent brightness of the stars.</u>

It must be said that Hubble's law itself did not claim that the universe was expanding. He only established a connection between the distance from Earth to distant galaxies and the redshift in the spectra of light coming from these galaxies. The belief that the universe is expanding arose already during the interpretation of this law on the basis of Doppler's law. An analogy was drawn between the change in the wavelength of the light $\Delta\lambda$ wave and the intrinsic speed of removal of the light source from the observer V in accordance with the Doppler law

$$\frac{\Delta\lambda}{\lambda} = \frac{V}{a}, \qquad (6.10.9)$$

obtained for sound propagation in air. Here a is the speed of sound in calm air. This was a tribute to the misconception that light travels in space (even empty space) in the form of a wave, and not due to the movement of photons. With regard to the propagation of light, this law was rewritten to the form

$$\frac{\Delta\lambda}{\lambda} = \frac{V}{C}, \qquad (6.10.10)$$

where the speed of sound in air was replaced by the speed of light. This analogy suited astrophysics until the deciphering of spectra from distant galaxies began to give values $\frac{\Delta\lambda}{\lambda}$ significantly greater than unity. This meant speeding V over speed C. To avoid violating the postulate of the theory of relativity that it is impossible for emitting objects to exceed the speed of light in a vacuum, another formula was invented for the Doppler law

$$1+\frac{\Delta\lambda}{\lambda} = \frac{1-V/C}{\sqrt{1-V^2/C^2}} . \qquad (6.10.11)$$

This formula at any value $\frac{\Delta\lambda}{\lambda}$ did not allow the speed V to exceed the speed of light C.

Returning further to the more accurate form of the Hubble law (2.7.7) obtained by us, we note that over time, in contrast to the Hubble law (2.7.9), the wavelength increases nonlinearly. The more the light wave is on the way, the more intensively its length increases. This is explained by an increase in the mass of photons that make up the light wave.

And this does not mean at all that the Universe is expanding, especially since this expansion occurs the more intensely, the further away from us its outer border is moved. Figure 6.10.3 shows a comparison of the increases in the wavelengths of light, obtained by formulas (6.10.1) and (6.10.5), depending on the distance to radiation sources and the propagation time of light from distant galaxies to the Earth

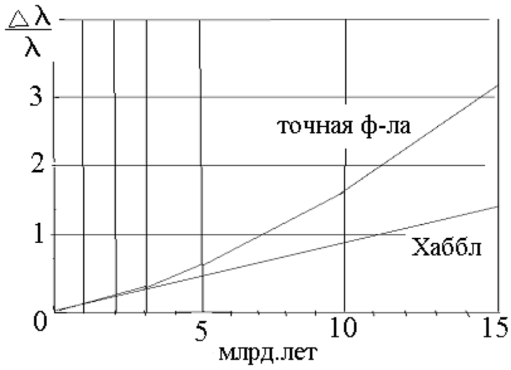


Fig.6..10.3

6.11 The Olbers paradox

Let's consider another unexplained global problem. This is the so-called paradox of Heinrich Olbers, formulated by him in 1826. According to Olbers, there is a contradiction between the observed dark night sky and an infinite number of stars evenly (on a cosmic scale) distributed in space. Olbers noted that with an infinite number of stars, the night sky should appear completely covered with sparkling dots and be as bright as the sun.

An attempt to explain the paradox by the fact that the intensity of light from distant stars decreases in proportion to the square of the distance from the observer and the illumination should decrease does not stand up to criticism. The reason is that, as the distance from the observer increases, so many times more visible stars fall into his field of view that the attenuation of light is completely compensated by the increase in their number.

The second argument, that light from stars is absorbed by interstellar gas and dust clouds, is also not consistent. Even if there are a lot of these clouds, the dust, absorbing radiation, would soon heat up to such temperatures that it itself would begin to glow like stars. So this argument does not cancel the contradiction between the simplest observation of the dark sky and the assumption of the infinity of the Universe with an even distribution of an infinite number of stars and galaxies in it. To date, $n=10^{21}$ stars have already been discovered. The distance scale, based on the comparative intensities of stars and galaxies, does not show any boundaries of the visible universe.

Let us highlight the main thing in the problem under consideration. For its solution, only those stars that emit visible light It is with this that the contradictions between the dark sky and the illumination from the stars, noted in the Olbers paradox, are associated. Note that the wavelengths of visible light are in the range

$$\lambda = (3{,}8....6{,}6)10^{-7}[м]. \qquad (6.11.1)$$

Beyond the lower limit, ultraviolet radiation begins, and beyond the upper limit, infrared. These ranges are no longer visible to the human eye and, therefore, rays with such wavelengths can no longer illuminate the night sky.

Next, let's remember about Hubble's law. According to this law, the farther a star or galaxy is from us, the stronger the “redshift” in its spectra will be, i.e. an increase in the wavelength of light entering the observer is observed. This is an observational astronomical fact. It does not depend on its interpretation by the scattering of galaxies in the "big bang" theory or the deceleration of light due to an increase in the mass of photons when it moves through space of gaseous dark matter. Taking this into account, we find that the limiting ratio of the increment of the wavelength of light to its length within the range the transition of visible light from ultraviolet to infrared cannot exceed the value

$$\frac{\Delta\lambda}{\lambda} = \frac{(6{,}6-3{,}8)10^{-7}}{3{,}8\cdot 10^{-7}} = \frac{2{,}8\cdot 10^{-7}}{3{,}8\cdot 10^{-7}} = 0{,}737. \qquad (6.11.2)$$

Beyond this value, light ceases to be visible and therefore ceases to illuminate the sky. According to formulas (2.6.1) and (2.7.8), the distance to the most distant visible stars at cannot exceed the values

By Hubble

$$L_{habl} = 0{,}737 \cdot 10^{28}\,см = 0{,}238 \cdot 10^{10}\,Пк$$

According to the refined formula

$$L_{ef} = 0{,}55 \cdot 10^{28}\,см = 0{,}177 \cdot 10^{10}\,Пк$$

These distances correspond to the time of movement of photons of light

By Hubble

$$t_{habl} = L_{habl} / C \cdot 3{,}15 \cdot 10^{16} = 7{,}8 \text{ млрд.свет.лет}$$

According to the refined formula

$$t_{ef} = L_{ef} / C \cdot 3{,}15 \cdot 10^{16} = 5{,}8 \text{ млрд.свет.лет}$$

It follows from the above analysis that the illumination of the sky depends on a limited number of stars, despite their infinite number in the Universe. These are the stars that emit light visible on Earth in the range (6.11.1). Moreover, the greater the distance from the observer, the fewer such stars become. Only very bright stars, emitting in the ultraviolet range, remain visible. Moreover, this light reaches us in a less bright infrared range. Therefore, the night sky remains black, decorated with individual bright stars. This explains Olbers' paradox.

12 The paradox of N.A. Kozyrev about the possibility instant signaling from distant stars to Earth

In 1976, at a symposium in Byurakan, N.A. Kozyrev reported on his unusual astronomical observations. He determined the position of the star by the optical method and with the help of a telescope - a reflector he created. Signals from a number of astronomical objects were simultaneously observed at three different directions of the reflector telescope. The first position, marked in Fig.

6.12.1 with the index "1", corresponded to the optical image of the object, i.e. the position of the object at the moment it emits the light that has reached the observer (signal "from the past"). The second position, marked with the index "2", corresponded to the "true" position of the object, i.e. its position at the time of signal observation (signal "from the present"). The third position, marked with the index "3", corresponded to the position of the object at the moment when the light emitted at the observation point reaches the object (signal "from the future"). The angular distances between these three points turned out to be equal to the ratio of the tangential speed of the object to the speed of light. The diagram of these signals is shown in Figure 6.12.1.

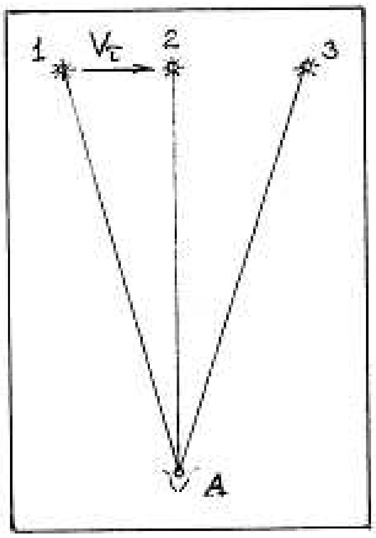


Fig..6.12.1

We do not intend to question the results obtained by N.A. Kozyrev and disassemble the structure of his reflector telescope, since the observation results have been confirmed by several independent research groups. To explain this phenomenon, N.A. Kozyrev himself and other astrophysicists put forward the most incredible assumptions about instantaneous signal transmission or special properties of time, endowing it with energy and the possibility of influencing the course of physical processes taking place in the Universe. We will show that this phenomenon can be explained within the framework of natural ideas about time as the duration of certain events by comparing with the duration of well-studied cyclical processes, for example, the movement of the clock hand, etc.

The basis of our research is the assumption that the solution to the Kozyrev paradox is hidden in the properties of the emitting object itself. If you carefully ponder Kozyrev's method of astronomical observations, you can immediately see that simultaneously the signals he receives from three different positions of the star differ in their properties. Some of them are optical. Others have a different nature, although they spread in the surrounding space at the speed of light in emptiness and obey the well-known laws of reflection and refraction of light. These rays can penetrate surfaces that are impenetrable to light. In this regard, we believe that these rays are emitted by different parts of the emitting astronomical object.

In accordance with Kozyrev's observations, we believe that the optical beam and the rays perceived by Kozyrev's reflector telescope are emitted by the astronomical object "2" in the direction of the Earth at an angle (Fig. 6.12.2)

$$I_1 = \arcsin \frac{V_\tau}{C} \tag{6.12.1}$$

to the vertical drawn from point "2" This direction takes into account the star's own tangential speed. The optical beam appears to be emitted from the surface of the star FG. Therefore, it does not change its direction up to point A, in which the observer with an optical telescope was.

The ray, perceived by Kozyrev's telescope-reflector, partially without refraction crosses the surface of the star FG and then hits point A. The second part of this ray is refracted at the outer boundary of the emitting astronomical object F-G. This boundary is separat the transparent matter of this object and open space. In Figure 6.12.2, these beams are shaped like "2" -C-A and "2" -C-E. Apparently, these rays are emitted from the deep interior of the star. Therefore, before entering free space, they make their way through the transparent mass of stellar matter and only then fall into the "empty" space.

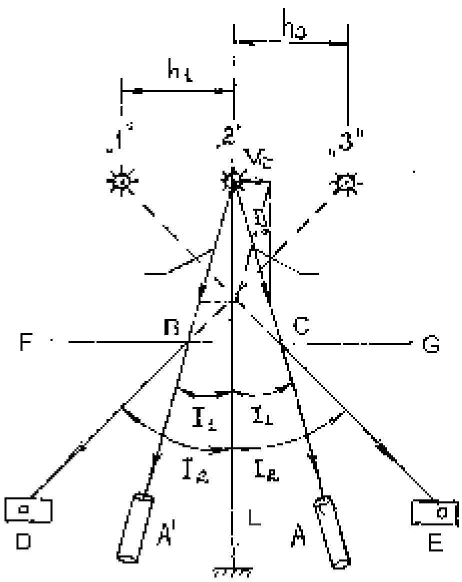


Fig.6.12.2

As a result, two beams come to the observer at different angles simultaneously. In Fig.6.12.2, one beam "2" -C-A comes at an angle. The second ray "2" -C-E approaches the observer at an angle. Based on this observation, the researcher mentally continues the CE beam to point "1" and concludes that one ray supposedly left point "1" (signal "from the past"), in which, in his opinion, the light beam was emitted by an emitting astronomical object billions of years ago. Another beam "2" -C-A left point "2" and is a signal "from the present time". He left this place where, according to the observer, the star should simply come, orbiting at a tangential speed during the time the light beam moves from the star to the observer.

Let's check our assumption. For this we refer to Fig. 6.12.2. In this figure, the rays caught with the optical telescope and the Kozyrev reflector telescope are shown. The rays captured with the Kozyrev reflector telescope first pass through the transparent matter of the star with a refractive index $n_1 \geq n_2$.

The value $n_2 = 1$ is the refractive index of "empty" space (vacuum). Beam "2" -C is directed at the Earth at an angle $I_1 \geq 0$. At the outer boundary (surface) of the F-G star, this beam splits into two rays . One part of the beam does not undergo refraction and continues to move in the direction of the incident ray "2" -C (ray CA). The other part of the beam is refracted and continues to move towards the observer in the direction of the C-E beam at an angle I_2 in accordance with the law of refraction of rays [1]

$$\frac{\sin I_1}{\sin I_2} = \frac{n_2}{n_1} . \qquad (6.12.2)$$

To an observer on Earth, it appears that this C-E ray came from a star in position "1", although it came out of the position of star "2".

The distance between these two positions "1" and "2" is designated by "h1". The distance between the position of the star at the moment of emission and the Earth will be denoted by "L". It should be borne in mind that although in Fig. 6.12.2 points D,, A, E are in different places, compared with the distance L between the star and the Earth, these distances can be neglected and it can be assumed that they are all, as it were, in the same point. Taking this into account, we write down the obvious relations for determining the distance "h1"

$$h_1 = L(tgI_2 - tgI_2) \approx L(\sin I_2 - \sin I_1) . \qquad (6.12.3)$$

The angles I_1 and I_2 are very small. They are measured in a few seconds. This allows replacing in expression (6.12.3) the tangents of these angles by their sines. From the law of refraction of rays (6.12.1) we have

$$\sin I_2 = \sin I_1 \cdot \frac{n_1}{n_2} . \qquad (6.12.4)$$

Substituting (6.12.4) into (6.12.3), we obtain

$$h_1 = L\sin I_1(\frac{n_1}{n_2} - 1)\,. \tag{6.12.5}$$

The beam, perceived by Kozyrev's telescope, leaving the emitting star without refraction and coming to the observer on the Earth, has a speed equal to the speed of light in emptiness $C = 3 \cdot 10^8\, м/c$. The speed of the star is V_τ. Therefore, the angle I_1 determining the direction of this ray to the Earth, in accordance with (6.12.1), is written as

$$\sin I_1 = \frac{V_\tau}{C}\,. \tag{6.12.6}$$

Substituting (6.12.6) into (6.12.5), we obtain

$$h_1 = L \cdot \frac{V_\tau}{C}(\frac{n_1}{n_2} - 1)\,. \tag{6.12.7}$$

The angular distance between points "1" and "2" can be obtained as

$$\Delta I = I_2 - I_1 = \frac{h_1}{L} = \frac{V_\tau}{C}(\frac{n_1}{n_2} - 1)\,. \tag{6.12.8}$$

It is proportional to the ratio of the tangential speed of the star to the speed of light in the "void". If $n_1 = 2$ (the value of the refractive index of the glass fluctuates within n = 1.4 ... .1.7), then, as noted in Kozyrev's astronomical observations, the angular distance is equal to this ratio

$$\Delta I = I_2 - I_1 = \frac{h_1}{L} = \frac{V_\tau}{C}\,. \tag{6.12.9}$$

It is quite obvious that both beams "2" -C-A and "2" -C-E reach the observer on Earth at the same time, because were emitted by a star from position "2" at the same time, more precisely, in the form of one beam.

In addition to beams "2" -CE and "2" -CA, emitted by the star from position "2" in the direction of its motion beams "2" –B-D and "2" -B- A', also released by the star from position "2" »In the direction of the Earth, but in the opposite direction to the movement of the star. Beam "2" -B leaves the star in position "2" at an angle

$$I_1 = \arcsin\frac{V_\tau}{C}. \quad (6.12.10)$$

The beam perceived by Kozyrev's reflector telescope at point B is split into two beams. One without refraction hits the point A' where it is fixed by the Kozyrev telescope. The second ray, after refraction at point B, takes the B-D direction, where it is also recorded by the Kozyrev telescope. Analyzing the received signals, the researcher mentally continues the B-D beam in the direction of the star and concludes that the "3" –B-D beam came from point "3", where, in his opinion, the star will only come at the moment when the light emitted at the observation point reaches to the object (signal "from the future").

Continuing our reasoning in the same order in which we considered the path of rays emitted by a star in the direction of its forward motion, we can write

$$h_3 = L(tgI_2 - tgI_1) \approx L(\sin I_2 - \sin I_1). \quad (6.12.11)$$

From the law of refraction of rays (6.12.1) according to [1] we have

$$\sin I_2 = \sin I_1 \cdot \frac{n_1}{n_2}. \quad (6.12.12)$$

Substituting (6.12.11) into (6.12.10), we obtain

$$h_3 = L\sin I_1\left(\frac{n_1}{n_2} - 1\right). \quad (6.12.13)$$

The beam, perceived by Kozyrev's telescope, leaving the emitting star without refraction and coming to the observer on the Earth, has a speed equal to the speed of light in emptiness $C = 3\cdot 10^8\, м/c$. The speed of the star is V_τ. Therefore, the angle I_1, which determines the direction of the ray "2" -B-A' to the Earth in the direction opposite to the motion of the star, is written as

$$\sin I_1 = \frac{V_\tau}{C}. \quad (6.12.14)$$

Подставим (6.12.13) в (6.12.12), получим

$$h_3 = L \cdot \frac{V_\tau}{C} (\frac{n_1}{n_2} - 1) . \qquad (6.12.15)$$

The angular distance between points "2" and "3" can be obtained as

$$\Delta I = I_3 - I_2 = \frac{h_1}{L} = \frac{V_\tau}{C} (\frac{n_1}{n_2} - 1) . \qquad (6.12.16)$$

It is proportional to the ratio of the tangential speed of the star to the speed of light in the "void". If $n_1 = 2$, then, as noted in Kozyrev's astronomical observations, the angular distance is equal to this ratio

$$\Delta I = I_2 - I_1 = \frac{h_1}{L} = \frac{V_\tau}{C} . \qquad (6.12.17)$$

It is quite obvious that both rays, emitted by the star in the direction opposite to its own motion, reach the observer on Earth simultaneously, since were emitted by a star from position "2" at the same time, more precisely, in the form of one beam. Therefore, there is no need to endow time with properties unusual for it. It only seems to an observer on Earth that this ray came from point "3", although it left the position of star "2". Let us recall that the distance between the true position of the star and the Earth at the moment of emission is denoted by "L". It should be borne in mind that although in Fig.2 points D, A, A', E are located in different places, compared with the distance L between the star and the Earth, these distances can be neglected and it is assumed that they are all, as it were, at the same point. The angular distances $\Delta I = I_2 - I_1 = I_3 - I_2$ are very small. They are measured not even in degrees, but in seconds.

The optical telescope appears to be insensitive to such a small change in the direction of the light beam. The optical ray received from the star is logically attributed to the position of the star "1", i.e. a signal from the past. From the analysis it follows that to explain the astronomical paradox of Kozyrev about the simultaneous receipt of signals from supposedly three positions of the star: "past", "present" and "future", there is no need to endow time with properties unusual for it. And also there is no need to assume that signals from space objects can be transmitted in space instantly, i.e. with infinitely high speeds, greater than the speed of light in emptiness. The reason for this optical illusion was the refraction of the rays perceived by the telescope-reflector, unnoticed by Kozyrev, at the boundary between the stellar media and "empty" space, which coincides with the star's surface.

6.13 The spaceships Paradox Pioneer-1 and Pioneer-2

In Sections 2.5 and 6.9, we concluded that photons of light are slowly decelerated as they move through the field of gaseous dark matter. The magnitude of the acceleration of deceleration of photons can be determined using the formula

$$J_C=-\alpha\cdot C/k=-8{,}91\cdot 10^{-8}\text{см/с}^2\ . \qquad (6.13.1)$$

In this regard, I recall the so-called abnormal acceleration of deceleration of the American spacecraft Pioneer-10 and Pioneer-11, moving away from the Sun and the Earth. The Internet gives the numerical value of this constant acceleration of deceleration

$$J_{\text{Пионер}}\cong-8{,}5\cdot 10^{-8}\text{см/с}^2\ . \qquad (6.13.2)$$

The conclusion about this acceleration was made from the Doppler interpretation of the measurements of the frequency of the radio signal from these spacecraft. The result is considered paradoxical, because contradicts the Doppler effect. It is known that the frequency of a signal emitted by a receding source should decrease.

What happened, apparently, is the following. At the initial moment of time, according to the Doppler effect, for a signal source (spacecraft) moving away from the Earth, the wavelength increased by the value $\Delta\lambda_o$ and became equal to $\lambda_1=\lambda_o+\Delta\lambda_o$.. (Here λ_o is the wavelength for a stationary source and observer). But the further the source flew away, the lower the velocity C' скоростью according to (6.9.2) the signal passed by the observer on Earth. The oscillation period T did not change. (T = Const). Therefore, the wavelength $\lambda'=C'T$ decreased in comparison with its initial length λ_1.

American scientists considered the speed of light to be constant and interpreted this observation as a decrease in the increase in wavelength compared to the initial value of $\Delta\lambda_{o.}$. (C = Const) by decreasing the period of oscillations $T'<T$. And this automatically, based on the Doppler formula $((U/C=\Delta\lambda'/\lambda)$, led them to the conclusion that the speed of the spacecraft U had decreased over time.

The ignorance by American scientists that light and radio signals are inhibited by the field of gaseous a dark matter left them no choice and freedom of action in explaining this paradox. As a result, the deceleration of the radio signal by the field of gaseous a dark matter was interpreted by them as deceleration of radiation sources, that is, the spacecraft themselves "Pioner-10" and "Pioner-11". A small discrepancy between the numerical values (6.13.1) and (6.13.2), amounting to less than 5%, can be explained by measurement errors.

Part 7

On the structure and properties of elementary particles in the light of the concept of dark matter

This part of the book continues to develop the ideas expressed earlier. It is assumed that the universe is filled with dark matter. Dark matter is in a gaseous state. Baryonic bodies exist in the ocean of dark matter. The main elementary particles are found in nature in a free or weakly bound state. These include protons and neutrons that are part of atomic nuclei, as well as electrons, positrons, photons. They are stable, long-lived particles. They have mass and, in addition to the neutron, according to modern concepts, are endowed with a positive or negative electric charge. Photons also participate in electromagnetic interactions.

There are solid nuclei inside the elementary particles. They continuously absorb dark gaseous matter from the surrounding space. On their surface, a phase transformation of large volumes of gaseous dark matter into small volumes of solid (liquid) nuclei takes place. This leads to a constant increase in the mass of baryonic matter. The absorbed gaseous dark matter, flowing down into the nuclei, curls up into vortices. These vortices surround solid cores. Gaseous dark matter enters the atomic nucleus with a high circumferential speed and spins the atomic nucleus.

We consider the rotational motion of the nuclei of atoms and other elementary particles as a very important phenomenon that affects a lot, and possibly everything in the world order. This is not taken into account by science today. In this book, we will try to fill this gap as much as possible.

As a result, a force interaction arises between the dark gas of the surrounding space, as well as the radial flows of the dark gas directed to the center of the nuclei of elementary particles and the vortices of the dark gas surrounding the nuclei. Radial flows determine the forces of attraction between bodies, described by the law of universal gravitation. The article attempts to expand our understanding of the mechanisms of this interaction, based on gas dynamics. Such particles in gas dynamics are modeled by a vortex stream. In addition, the book attempts to better understand the internal structure of elementary particles,

7.1 Vortex structure of the hydrogen atom.

Based on the idea of the unity of the world, let's see if there are any suitable analogies around us that can suggest the correct direction of research in search of an answer to the question of how the simplest hydrogen atom and other elementary particles are arranged. Vortexes arising in continuous gas and liquid media are of great interest in this direction. It is vortices that can be considered as local formations that differ sharply in their properties from the surrounding gas or liquid field. Vortexes can be very hard if jets of gas or liquid move inside them at very high speeds. It is known that soft, calm water, organized in a high-speed jet, is capable of eroding the banks and the bottom of reservoirs, cutting steel and other hard materials. The jets of gas can also be very solid. The whirlwinds are capable of destroying houses on their way, uprooting trees, overturning cars and causing other destruction.

At the center of the hydrogen atom is a liquid (solid) nucleus. The nucleus of the atom continuously absorbs gaseous dark matter from the surrounding space and, as a result, increases its mass. In place of the absorbed masses of dark gas, new masses of gas rush along the radii. The radial flow towards the center of the core is unstable. Therefore, it curls up into a whirlwind. The dark gas enters the atomic nucleus at high circumferential velocity and spins the atomic nucleus.

Let us make a rough estimate of the circumferential velocity of dark gas jets without taking into account its compressibility at the boundary of the atom using the Bernoulli equation

$$p_{A-V} + \frac{\rho_e U_{A-V}^2}{2} = p_e = const \, . \tag{7.1.1}$$

In this equation p_{A-V} is the pressure at the boundary of the atom, U_{A-V} is the circumferential velocity at the boundary of the atom, $\rho_e = 1{,}19 \cdot 10^9$ [kg / m^3] is the density of the unperturbed dark gas, $p_e = 6{,}426 \cdot 10^{25}$ [N / m2] is the pressure of the unperturbed dark gas. From this equation, you can express the speed

$$U_{A-V} = \sqrt{\frac{2(p_e - p_{A-V})}{\rho_e}} \, . \tag{7.1.2}$$

From equation (7.1.1) it follows that with increasing speed U_{A-V}, the pressure p_{A-V} decreases. If the pressure inside the atom is zero $p_{A-V} = 0$, then from equation (7.1.2) we obtain the following velocity value

$$U_{A-V} = \sqrt{\frac{2 \cdot 6{,}426 \cdot 10^{25}}{1{,}19 \cdot 10^9}} = 3{,}286 \cdot 10^8 \text{ [m/s]} \, . \tag{7.1.3}$$

If we take $p_{A-V} = 1{,}07 \cdot 10^{25}$ [N / m2], then the speed U_{A-V} will be equal to the speed of light C

$$U_{A-V} = \sqrt{\frac{2\cdot(6{,}426-1{,}07)\cdot 10^{25}}{1{,}19\cdot 10^{9}}} = 3\cdot 10^{8} \text{ [m/s] .} \qquad (3.1.4)$$

The obtained value of the velocity fully justifies our assumption about the enormous velocity of the dark gas in the vortex near the atom. When the dark gas jets reach a peripheral speed equal to the speed of light m / s (possibly slightly higher speed), the pressure in the center of the vortex decreases very strongly. (approaching zero). Therefore, the chaotic motion of its atoms decays in a dark gas. As a result, gaseous dark matter begins to pass into its liquid phase, replenishing the mass of the atomic nucleus. Due to the small intrinsic dimensions of dark matter atoms, they are located close to each other in liquid dark matter and, as a result, occupy a completely insignificant volume of dense liquid (solid) dark matter.

Liquid dark matter acquires the properties of baryonic matter. It is subject to the force of gravity, forces of inertia. Its density reaches the same value as that of protons and neutrons. The speed of jets of dark matter relative to the surface of the rotating nucleus of the atom is zero. Therefore, when liquid dark matter is absorbed by the nucleus of an atom, there is no change in the momentum of the absorbed masses. Dark matter is absorbed by an atom without the forceful action of jets of dark matter on the nucleus of the atom. The core rotation rate remains unchanged.

If this process is launched, then a long-lived elementary particle is obtained. All matter in the Universe consists of combinations of these particles. Figure 7.1.1 shows a diagram of the hydrogen atom. The angular velocity of rotation of an atom (with a radius $r_A \approx 10^{-10}\, m$, [1,2]) is defined as

$$\omega_A = \frac{U_A}{r_A} = \frac{3\cdot 10^{8}}{10^{-10}} = 3\cdot 10^{18} c^{-1}. \qquad (7.1.5)$$

If the angular velocity has not reached the desired value and the mechanism for the transition of gaseous dark matter into the liquid phase has not started, then a short-lived elementary particle is obtained. Since there is still a large rarefaction in its center at the initial moment, for a very short time it also becomes a vortex and therefore gains mass. However, the particle overflows with gaseous dark matter almost instantly. The pressure inside the vortex ring increases and the vortex collapses. An elementary particle ceases to exist.

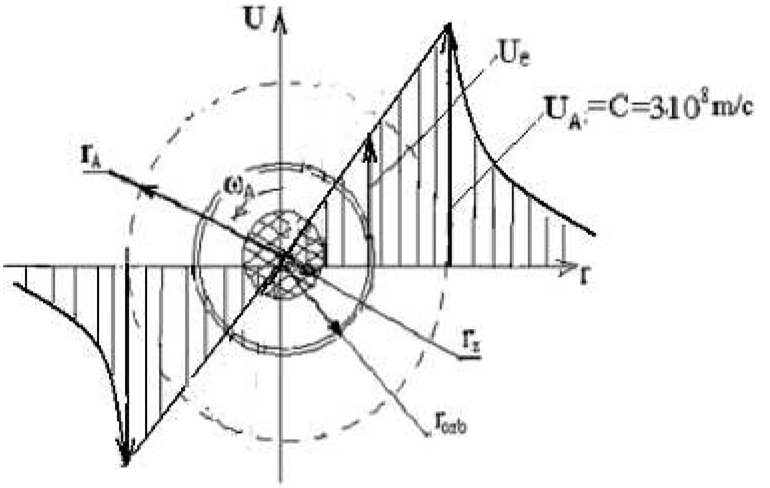


Fig.7.1.1

We assume that the electron inside the atom is also a vortex, inside which there is a nucleus of liquid dark matter. It, like the nucleus of an atom, is surrounded by a vortex of dark gas and continuously absorbs this gas. An electron with strong excitation of an atom can leave a hydrogen atom (and any other atom of a baryonic substance). Outside the atom, the electron retains its high angular velocity $\omega_{el}=dU_{el}/dr_{el}=dU_A/dr_A=3\cdot1018s^{-1}$.

The figure shows that in the center there is a liquid (solid) spherical core with a radius $r_z = r_{oA} \approx 10^{-15} m$. The rest is occupied by a cloud of electrons. (Sphere with radius $r_A \approx 10^{-10} m$). r_{orb} is the radius of the electron orbit ($r_{orb} = r_{o-el}$). Circumferential velocities u_z, u_e and u_A accordingly at the boundaries of the atomic nucleus, orbits of the electron and atom ω_A is the angular velocity of rotation of the atom. The mass of the electron is known $m_{el} = 9{,}11 \cdot 10^{-31} kg$.

7.2 About Rutherford's nuclear model of the atom.

One of the mysteries of the theory presented here, based on the concept of dark matter, is the question of how to explain the deviation of α-particles emitted by uranium nuclei when flying through a thin metal foil observed in the famous experiment of Rutherford? In the experiment, scattering of α-particles in matter was observed, which was determined by flares (oscillations) on a screen covered with a substance capable of glowing when particles hit it. Individual α-particles were scattered at an angle of ϑ up to 150 °.

In the nuclear model of the atom by Rutherford and the vortex model of the atom in the outlined theory of dark gaseous matter, a liquid (solid) nucleus is located in the center. Rutherford's model endows the nucleus of the hydrogen atom - the proton (and other atoms) with a positive electrical charge. With the help of this charge, negatively charged electrons are held in their orbits, rotating around the nucleus at high speeds.

Rutherford assumed that the α-particle striking an atom of the gold foil material is repelled from it by nuclear electric forces, since the atomic nucleus and the α-particle, according to his ideas, had positive charges proportional to the number of protons in the nucleus P = Z. Z-atomic number of a chemical element in the periodic table. For the α-particle $Z_2 = 2$, for gold $Z_{79} = 79$. Electrons, due to the smallness of their masses, were not taken into account (Fig. 7.1.1). It was assumed that the kinetic energy of the □-particle is converted into the potential energy of repulsion. This determined the minimum distance, that is, the size of the area occupied by the core.

In the vortex model of the atom, there are no positive and negative charges. The question is, if there are no charged particles, then where did the force come from that deflects the α-particles emitted by uranium nuclei when flying through a thin metal foil? As a result of this, as already noted, scattering of α-particles in space was observed, which was determined by flashes (oscillations) on a screen covered with a substance capable of glowing when particles hit it.

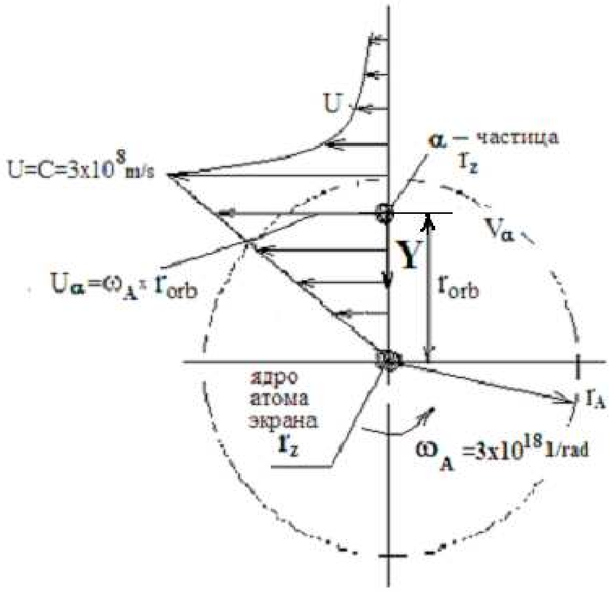
Based on the ideas defended in this book, we offer our own version of the explanation of the experience of Rutherford. To do this, we return to the statement that the presence of circumferential velocity in a vortex of dark gas surrounding the nucleus of an atom leads to the unwinding of atomic nuclei (hydrogen). According to the theory of gaseous dark matter, a particle (helium nucleus) is surrounded by gaseous elementary vortices of dark matter. The metal foil atom, through which the α-particle flies, is also surrounded by an elementary vortex of dark gaseous matter (Fig. 7.2.1).

Earlier it was shown that baryonic bodies experience a force interaction with the surrounding dark gas only at the moments of acceleration or deceleration, as well as if these bodies are flown around by dark gas jets with nonzero velocities. In our case, the частицы α-particles fly without acceleration, but any atom of the metal foil through which the α-particle flies is surrounded by an elementary vortex of dark gaseous matter (Fig. 7.2.1).

Flying at a distance r from the center near the nucleus of an atom of the screen material (gold foil), the α-particle is flown around by a stream of dark gas at a speed $U = \frac{U_A \cdot r_A}{r} = \frac{\omega_A \cdot r_A^2}{r}$. On the outer boundary of the atom, the circumferential speed of the jets of dark gas is equal to the speed of light $U_A = \omega_A \cdot r_A = C = 3 \cdot 10^8 m/s$. We take the value of the radius of the screen atom as that of the hydrogen atom $r_A = 10^{-10} m$. The radius of the hydrogen atom r_A coincides with the radius of the vortex core r_{rot}. The dark gas inside the vortex core rotates according to the law of rotation of a rigid body. Let us estimate the angular velocity of rotation of the core of a vortex of a dark gas the value $\omega_A = \frac{C}{r_A} = 3 \cdot 10^{-18} s^{-1}$. Naturally, at the moment of the passage of the α-particle through the foil, the jets of dark gas exert a force on it.

In aerodynamics, the theorem is proven of N.E. Zhukovsky on lift force, which states that any body in a fluid or gas flow is affected by a transverse (wing lift force- when considering the flight of an aircraft) force Y, if the velocity circulation calculated along the perimeter of the body is not to zero. This force is equal to the product of the density and the velocity of the flow around the $\alpha-$particle by the circulation velocity, calculated along the contour of the $\alpha-$particle

$$У = \rho \cdot V \cdot \Gamma \cdot l \ . \qquad (7.2.1)$$



.Fig.7.2.1 Passage α- particles past the atomic nucleus.

In our case, the density of gaseous dark matter $\rho_e = 1{,}19 \cdot 10^9 \, kg / m^3$, the speed of the jets of dark gas at the distance of the radius of the $\alpha-$particle orbit $U_\alpha = \omega_A \cdot r_{orb}$, we take as the width of the body $l = 2 \cdot r_A$. According to the theory of dark matter, any -particle (the nucleus of a helium atom) is surrounded by an elementary vortex of gaseous dark matter. This vortex has an axis of rotation and spins the $\alpha-$particle up to the same angular velocity of rotation with which any atom (hydrogen) of the screen rotates

$\omega_A = 3 \cdot 10^{18} s^{-1}$. The $\alpha -$particle flies through the screen in the direction of its axis of rotation with speed V_α. (In Figure 7.2.1 this speed is not visible). The circulation of velocity along the outer contour of a $\alpha -$particle can be written in the following form

$$\Gamma_\alpha = 2\pi \cdot r_z \cdot U_A = 2\pi \cdot \omega_A \cdot r_z^2 . \tag{7.2.2}$$

Here the radius of the $\alpha -$particle is the same as the radius of the nucleus r_z of the hydrogen atom. Angular velocity of rotation of α-particles (the core of the vortex surrounding the nucleus of the atom and α-particle) $\omega_z = 3 \cdot 10^{18} м / c$. Taking these considerations and values into account, the normal force acting on the α-particle at the moment of its flight through the gold foil atom perpendicular to the direction of flight speed according to formula (7.2.1) will be written in the form

$$Y = \rho_e \cdot U_\alpha \cdot \Gamma_\alpha \cdot 2 \cdot r_A = 1{,}34 \cdot 10^{37} \cdot r_z^2 \cdot r_{orb} . \tag{3.2.3}$$

For this force to be able to deflect the-particle at large angles ϑ, it is necessary that it be of the same order as the centrifugal force acting in the opposite direction. Atom radius is $r_A = 10^{-10} m$. The speed of the α-particle at the moment of its flight through the screen is denoted by $V_\alpha = 10^6 m / s$. Let's make these forces equal

$$\frac{m_A V_\alpha^2}{r_{opb}} = Y . \tag{7.2.4}$$

In our case, this condition will be written as

$$\frac{m_A \cdot V_\alpha^2}{r_{opb}} = 1{,}34 \cdot 10^{37} r_z^2 \cdot r_{orb} . \tag{7.2.5}$$

Here $m_\alpha = 1{,}67 \cdot 10^{-27} kg$ (mass is α-particle). Let us take (the radius of the first Bohr electron orbit) as the radius of the α-particle orbit

$r_{orb} = 10^{-11} m$. From this equation, the radius of the α -particle nucleus can be expressed. It is the same as the nucleus of an atom.

$$r_z = \sqrt[2]{\frac{1{,}67 \cdot 10^{-27} \cdot 10^{12}}{1.345 \cdot 10^{37} \cdot (10^{-11})^2}} = 1{,}11 \cdot 10^{-15} m . \qquad (7.2.6)$$

The result obtained is close to Rutherford's estimate [1,2] ($r_{oz} = 10^{-14}.....10^{-15} m$). The direction of action of the normal Zhukovsky force depends on the direction of rotation of the dark gas jets inside the vortex ring of the atom (screen) and α -particle. If the direction of rotation of the jets is reversed in the atom of the metal foil material through which the α -particle flies, then the force Y will begin to repulse the α -particle, and not attract. The foil material probably contains such atoms.

The considered transverse force, determined by the Zhukovsky theorem, according to the terminology accepted in physics, is an intra-atomic force. It can not only deflect passing elementary particles, but also keep them near each other. This will form more complex nuclei, atoms and molecules. Common vortices of dark gaseous matter can form around the combined nuclei, creating stable formations. This force is due to the internal structure of the atom and elementary particles and the properties of the intermediate medium of a dark gas. This fundamentally distinguishes it from the forces between the electrically charged atomic nucleus and the α-particle in the Rutherford model.

Namely, gas vortices determine the force interaction between particles. A bond of a liquid core and a gas vortex of a dark gas, which is a hydrogen atom, is so strong that it can withstand collisions with atoms of the foil material in Rutherford's experiment. These forces prevent the atoms from breaking apart by centrifugal forces.

About the electron Let's try to apply formula (7.2.4) to the motion of an electron inside an atom. An electron moves around the nucleus of an atom in a circle. When analyzing this phenomenon, we recall that in Section 2.13 it was shown that the force Fg, with which the flow of dark matter acts on a non-rotating material body, is directed towards the flow of dark gas and does not depend on the magnitude and direction of the velocity of uniform motion of bodies. However, when flowing around a rotating body, this force changes the direction of its action.

We assume that an electron, like a hydrogen atom, is a vortex with a liquid (solid) core in the center. The electron spins rapidly. A spinning electron, blown by jets of dark vortex gas that exists around the nucleus of an atom, is a Flettner cylinder in the gas stream. When the electron rotates, the surface speed on one side of the electron is added up with the speed of the dark gas jets, and on the opposite side it is subtracted from it. This difference in velocity generates a force perpendicular to the flow. The Magnus effect arises. The Magnus effect is a physical phenomenon that occurs when a liquid or gas flows around a rotating body. A force is generated that acts on the body and is directed perpendicular to the direction of the flow. This force is determined by the theorem of N.E. Zhukovsky.

When moving in a circle, the centrifugal force and the Zhukovsky force act on the electron. These forces are equal in magnitude, but opposite in direction

$$\frac{m_{el}V_{el}^2}{r_{orb}} = Y_{el} \ . \tag{7.2.7}$$

Therefore, the Zhukovsky force that holds the electron in its orbit, in accordance with expression (7.2.1), can be written in the following form

$$Y_{el} = \rho_e \cdot \omega_A \cdot r_{orb} \cdot \varGamma_{el} \cdot 2r_{el} \, . \tag{7.2.8}$$

At the moment of ejection of an electron from an excited atom, it acquires the same angular velocity of rotation of the jets of dark gas around the axis as that of the atom, since

$$\omega_{u\text{-}el}=dU_{u\text{-}el}/dr_{el}=dU_{u\text{-}a}/dr_a=3\cdot 10^{18}\ s^{-1} \ . \tag{7.2.9}$$

We write the velocity circulation along the electron contour in the following form

$$\varGamma_{el} = 2\pi \cdot r_{el} \cdot \omega_A r_{el} \, . \tag{7.2.10}$$

We substitute these calculations into expression (7.2.7) and then resolve it with respect to the electron radius

$$r_{el} = \sqrt[3]{\frac{m_{el} \cdot V_{el}^2}{4\pi \cdot \rho_e \cdot r_{orb}^2 \cdot \omega_A^2}} \ , \tag{7.2.11}$$

where $m_{el} = 9{,}11 \cdot 10^{-31}$ kg, As the speed of the electron, we take $V_{el} = 10^6$ m / s, the density of the dark gas is $\rho_e = 1{,}19 \cdot 10^9$ kg/m^3, the orbital radius is $r_{orb} = 10^{-11}$ m, $\omega_A = 3 \cdot 10^{18}$ s^{-1} The calculation showed

$$r_{el} = 4 \cdot 10^{-15} \text{ м} . \tag{7.2.12}$$

It is likely that the speed of an electron in an orbit with a radius r_{orb} is equal to the circumferential speed of a jet of dark gas $V_\alpha = U_A = r_{orb} \cdot \omega_A$. In this case, the radius of the electron will be

$$r_{el} = \sqrt[3]{\frac{m_{el}}{4\pi \cdot \rho_e}} = 4{,}8 \cdot 10^{-13} \text{ м} . \tag{3.2.13}$$

The size of an electron lies within $r_{el} = 4 \cdot 10^{-15} ..... 4{,}8 \cdot 10^{-13}$ m.

Along with the performed evaluative analysis of the structure of the hydrogen atom in the framework of the planetary model of the Rutherford atom, much says that the electron may have the shape of a ring with the radius of the electron's orbit r_{orb} and the radius of the cross section of the ring r_{o-el}. This scheme of the hydrogen atom to a certain extent corresponds to Bohr's ideas [1, 2] about an electron cloud or an electron smeared along its orbit inside the atom. In this case, there will be no contradictions between the laws of classical mechanics and the mechanics of the microworld, in which an electron, which has an electric charge and rotates with centrifugal acceleration in orbit inside the atom, nevertheless does not emit radiant energy. Everything is in harmony.

In this case, the volume of the electron ring is $W = 2\pi^2 r_{orb} r_{o-el}^2$. Mass inside the ring is $m_{el} = 2\pi^2 \rho_o r_{orb} r_{o-el}^2 = 9{,}11 \cdot 10^{-31}$ kg. Here the electron density is $\rho_o = 10^{18}$ kg / m3. It is the same as the nucleus of an atom. As the radius of the orbit, we take the value of the radius of the first Bohr orbit $r_{orb} = 0{,}5 \cdot 10^{-10}$ m. Next, we can determine the radius of the cross section of the electron ring $r_{o-el} = \sqrt{m_{el} / 2\pi^2 \rho_o r_{orb}} = 0{,}3 \cdot 10^{-19}$ m.

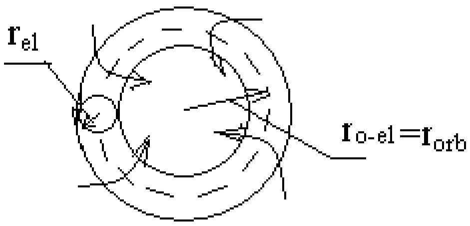


Fig.7.2.2

The angular momentum of the mass of the vortex ring of an electron rotating around the nucleus of an atom $I_{el} = m_{el} U_{orb} r_{orb} = m_{el} \omega_{el} r_{orb}^2 = 6{,}83 \cdot 10^{-33}$ [$kg \cdot m^2 / s$]. The angular velocity of rotation of the vortex ring of an electron is the same as the angular velocity in a vortex of a dark gas in an atom around a nucleus $\omega_{el} = \omega_A = 3 \cdot 10^{18}$ [s^{-1}]. As a result, the parameters of the vortex ring of the electron will be

$$r_{o-el} = 0{,}3 \cdot 10^{-19} \text{ [m]}, \quad r_{orb} = 0{,}5 \cdot 10^{-10} \text{ [m]}, \quad m_{el} = 9{,}11 \cdot 10^{-31} \text{ [kg]},$$
$$\omega_{el} = \omega_A = 3 \cdot 10^{18} \text{ [s}^{-1}\text{]}. \quad I_{el} = 6{,}83 \cdot 10^{-33} \text{ [} kg \cdot m^2 / s \text{]}. \qquad (7.2.14)$$

The vortex model of the hydrogen atom proposed here will be improved and discussed in detail from different positions in the subsequent sections of the book.

7.3 On the dualism of corpuscular and wave properties of elementary particles.

In modern physics, it is believed that any moving particle of matter is associated with some oscillatory, that is, with a wave process. This statement is based on the results of the experiments of Davisson, Jermer and a number of other researchers on the study of electron scattering on a single crystal of nickel and de Broglie's hypothesis on the wave properties of particles of matter [1,2,3].

The reason is that when electrons are reflected from the crystal surface, a violation of the laws of geometric optics was found. The experimental scheme can be found in [1,2,3]. At a given angle of incidence, electrons are reflected from the crystal surface at different angles. If we construct a diagram of the distribution in the directions of the number of electrons scattered during reflection from a crystal target, then it will resemble an X-ray diffraction pattern. In the diagram, the length of the radius drawn from the center of the target is taken proportional to the number of electrons reflected at a given angle.

What is surprising about this diagram is that in some directions there are maxima in the number of reflected electrons, and in others, minima. And this despite the fact that the distribution of electrons in the beam was initially uniform. This phenomenon has been called diffraction by analogy with the diffraction of light and X-rays. Later it turned out that other elementary particles, for example, protons, atoms and individual molecules, are also subject to diffraction.

It is even more surprising that diffraction patterns are observed not only for beams of simultaneously moving particles, but also for single particles alternately flying onto the crystal screen. After multiple “bombardment” of the metal film of the single crystal with single electrons, the same diffraction pattern was observed as in the passage of the beam. How one electron affects another, and even after a time interval, when it is already in a completely different place, is unknown.

French scientist de Broglie, trying to reconcile the wave and quantum theories, put forward the hypothesis that the wave-particle duality characteristic of light and the electromagnetic field is universal. According to this hypothesis, wave propagation is associated with any particle with mass m and moving with velocity V. Its length is determined by the famous de Broglie formula

$$\lambda = \frac{h}{mV} \ , \qquad (7.3.1)$$

where $h=6{,}626\cdot10^{-34}J\cdot s=б{,}54\cdot10^{-27}erg\cdot s$ is Planck's constant. It is included in Bohr's second postulate, which states that an electron can rotate around an atom nucleus only in circular orbits for which the equality

$$2\pi r_{opb} U_{opb}\, m_{el}=nh, \qquad (7.3.2)$$

where m_{el} is the electron mass; r_{opb} is the radius of the orbit of this electron as it rotates around the nucleus of the atom; U_{orb} is the circumferential speed of an electron in orbit; n is an integer called a quantum number. However, assuming that any motion of a particle is associated with wave motion, physics does not know what exactly vibrates, how and where the vibration occurs, what is the connection between the wave and the particle, and how their interaction occurs. The problem with de Broglie's wave mechanics is that the true nature of the two constituent parts of dualism, as well as their mutual relationship, remains a complete mystery.

Many attempts have been made to answer these questions. So Schrödinger assumed that the particle itself is nothing more than a place of concentration of waves (wave packet), but later abandoned it. De Broglie himself considered wave motion to be a real phenomenon occurring in space, inside which there is a material particle. At the same time, he connected the intensity of the wave motion at each point of this space with the degree of probability of finding a particle at this point. From this it followed that the particle is guided by a wave. Heisenberg and Bohr believed that the wave accompanying the particle does not represent a physical phenomenon at all, but only symbolically denotes the duality of the particle's properties. All this is rather vague.

Before making any own assumptions about the physical nature of de Broglie waves, let us recall some well-known concepts of the atom and the electron. Thus, Rutherford's planetary model of the atom assumes that there is a heavy nucleus in the center, around which light (compared to the nucleus) electrons revolve in their orbits. They are held nearby by electrostatic forces. Under the influence of external factors (heating, strong collisions, and so on), the atom comes into an excited state and one or more electrons can fly out of it. Circumferential speed of rotation of an electron around the nucleus

$$U_{opb}=\omega_a \cdot r_{opb} \,, \qquad (7.3.3)$$

where ω_a is the angular velocity of rotation of the electron around the nucleus.r_{orb} is the radius of the electron orbit. It is also known that an electron rotates around its own axis with an angular velocity ω_{el}.

Next, select the point B on the surface of the electron, as shown in Fig. 7.3.1 (you can take any point on the surface of the electron outside the axis).

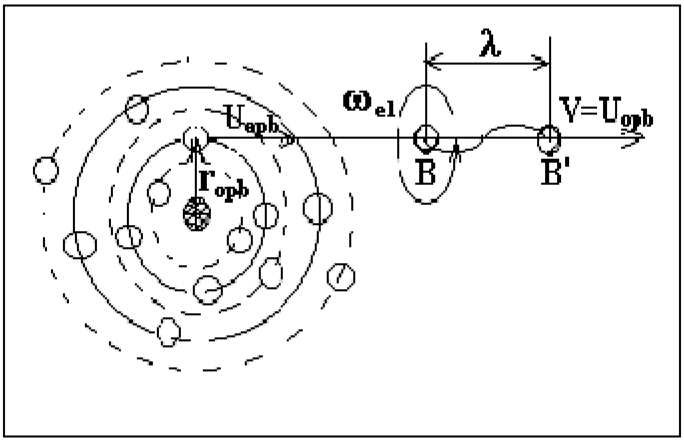


Fig.7.3.1

As a result of the addition of the speeds of translational and rotational motions, point B will describe a curve close to a sinusoid. Cyclicity appears in of an electron movement, which is an indispensable condition for the formation and functioning of any wave. The period of oscillation will be equal to the time of a complete revolution of the electron around its axis

$$T=\frac{2\pi \cdot \mathbf{r}_{o-el}}{\omega_{el}\mathbf{r}_{o-el}}=\frac{2\pi}{\omega_{el}} \,. \qquad (7.3.4)$$

The wavelength will be

$$\lambda = \mathbf{VT} = \frac{2\pi\mathbf{V}}{\omega_{\mathbf{el}}}, \tag{3.4.5}$$

where V is the flight speed, $r_{o\text{-}el}$ is the electron radius. At first glance, de Broglie's formula (7.3.1) and the developed research formula (7.3.5) have nothing in common. But is it?

Let us check the assumption that these formulas, under certain assumptions, transform into one another. For this, the right-hand side of formula (7.3.5) is multiplied and divided by the same value $V \cdot r_{orb} \cdot U_{opb} \cdot m_{el}$. As a result, taking into account (7.3.2), we obtain

$$\lambda = \frac{2\pi\mathbf{V}}{\omega_{\mathbf{el}}} \cdot \frac{\mathbf{V} \cdot \mathbf{r_{opb}} \mathbf{U_{opb}} \mathbf{m_{el}}}{\mathbf{V} \cdot \mathbf{r_{opb}} \mathbf{U_{opb}} \mathbf{m_{el}}} = \frac{\mathbf{nh}}{\mathbf{m_{el}} \mathbf{V}} \cdot \frac{\mathbf{V}^2}{\omega_{\mathbf{el}} \mathbf{r_{opb}} \mathbf{U_{opb}}}. \tag{7.3.6}$$

It is obvious that the electron leaves the excited atom with the same speed with which it rotated in a circular orbit inside the atom

$$V = U_{opb} = \omega_a \cdot r_{opb}. \tag{7.3.7}$$

Taking this consideration into account, formula (7.3.6) will be rewritten to the form

$$\lambda = \frac{\mathbf{nh}}{\mathbf{m_{el}} \mathbf{V}} \cdot \frac{\mathbf{U^2_{opb}}}{\omega_{\mathbf{el}} \mathbf{r_{opb}} \mathbf{U_{opb}}} = \frac{\omega_{\mathbf{a}}}{\omega_{\mathbf{el}}} \cdot \frac{\mathbf{nh}}{\mathbf{m_{el}} \mathbf{V}}. \tag{7.3.8}$$

If we assume that the angular velocities ω_a and ω_{el} are related to each other through the quantum number

$$\omega_{el} = n\omega_a, \tag{7.3.9}$$

then formula (7.3.7) takes the form

$$\lambda = \frac{\mathbf{h}}{\mathbf{m_{el}} \mathbf{V}}. \tag{7.3.10}$$

The resulting formula completely coincides with de Broglie's formula for the wavelength of a flying electron. If we omit the subscripts “el”, then we get the generally accepted form of de Broglie's formula used to determine the wavelength accompanying any flying elementary particle with mass m and velocity V

$$\lambda = \frac{h}{mV} \tag{7.3.11}$$

De Broglie's formula and Bohr's first postulate were tested experimentally and recognized by the scientific world. This frees us from having to check the validity of the resulting formula. The coincidence of formulas (7.3.1) and (7.3.11), one of which (7.3.11) was obtained theoretically, and the other (7.3.1) from the processing of experimental data is not accidental. The conducted research allows us to conclude that the dualism of the properties of elementary particles is due to two components of their motion, namely, translational with a velocity V and rotational around its axis with an angular velocity ω.

The answer to the question of how the rotational motion of an electron sorts the reflected electrons into groups with their maximum and minimum concentration according to the values of the reflection angles can be obtained from an analogy with the rebound of a twisted and nowisted ball in tennis or ping-pong. For an nospinned ball and, therefore, a reflected electron, the flight speed V does not play a big role. Regardless of this speed, the angle of incidence is equal to the angle of reflection. It is useless to look for a particle sorting mechanism here. Rotational motion is a different matter. The angular velocities of rotation of electrons in their seemingly uniform beam, however, are not the same. They depend on the value of the quantum number "n", that is, from which orbit inside the atom they fly out. To verify this, we equate the right-hand sides of formulas (7.3.1) and (7.3.5)

$$\lambda = \frac{\mathbf{h}}{\mathbf{m_{el}} \cdot \mathbf{V}} = \frac{2\pi \cdot \mathbf{V}}{\boldsymbol{\omega}_{\mathbf{el}}}. \tag{7.3.12}$$

We replace the velocity V with the help of (7.3.7) and ω_a by ω_{el} with the help of (7.3.9), we obtain

$$\omega_{el} = \frac{n^2 \cdot h}{2\pi \cdot m_{el} \cdot r_{opb}^2} = \frac{\pi \cdot e^4 \cdot m_{el}}{2n^2 h^3 \varepsilon_o^2}. \tag{7.3.13}$$

Here e is the electron charge, □o is the electric constant. The value of the radii of the allowed stationary orbits of electrons inside the atom is substituted as ropb [1,2]. The formula shows that the larger the quantum number, the lower the angular velocity of the electron rotation. Therefore, the reflection of these electrons from the crystal screen will also be different. Therefore, in spite of the apparent homogeneity of the electron beam directed at the screen in the experiment, it is not homogeneous in terms of the angular velocities and the number of electrons with the same quantum number values. Moreover, the process of reflection of electrons from the screen is not related to whether the electrons fly simultaneously as a beam or sequentially one after another with a time interval. The important thing is how many of them fly out from the same orbits and, therefore, how many of them have the same values of the quantum number and angular velocities of rotation.

It is not surprising in this formulation of the problem that other elementary particles and even some atoms also violate the laws of geometric optics when reflected from a crystal screen. This does not mean at all that they have wave properties, as suggested by de Broglie and other famous physicists after him. The reason here is the presence of rotation of these particles around their axes of rotation.

Apparently, all elementary particles rotate very quickly. The reason for this rotation is the interaction of particles with the surrounding gaseous dark matter. This interaction consists in the fact that all baryonic particles continuously absorb dark matter. In this case, radial flows to the centers of the particles are formed. These flows are unstable. Therefore, they quickly curl up into vortices. We observe a similar picture every time we release water from the bath through the drain. The nuclei of particles of baryonic matter (atoms, electrons, photons) rotate very quickly, because the dark gaseous matter absorbed on their outer boundary enters them with a high peripheral speed and transfers its momentum to them.

From which it can be concluded that the problem of the dualism of corpuscular and wave properties of elementary particles and some atoms is possibly a contrived problem that arose due to de Broglie's incorrect interpretation of the experience of Davisson and Jermer.

7.4 The nature of the radiant energy quantum

Under the influence of external causes (heating, strong collisions, and so on), the atom comes into an excited state and one or more electrons can fly out of it. The circumferential speed of rotation of an electron around its axis

$$U_e = U_{orb} = \omega_{el} r_{orb} = \omega_{el} \cdot r_{o-el} . \qquad (7.4.1)$$

.After leaving the atom, the electron flies forward with a speed equal to the speed that it had, moving in its orbit around the nucleus of the atom $V_{el} = U_{orb}$ before it left the atom.

$$V_{el} = U_e = U_{orb} = \omega_{el} \cdot r_{orb} = \omega_{el} \cdot r_{o-el} . \qquad (7.4.2)$$

Next, we determine the energy of an electron rotating with an angular velocity ω_{el} and escaping from an excited atom with a translational velocity V_{el}. It is equal to the sum of the kinetic energy of translational motion $E_{\kappa} = \frac{m_{el} V_{el}^2}{2}$ and the rotation energy of an electron $E_{\text{вр}} = \frac{J_{el} \omega_{el}^2}{2}$ of an annular shape

$$\mathrm{E} = \frac{\mathrm{m_{el} V_{el}^2}}{2} + \frac{\mathrm{J_{el} \omega_{el}^2}}{2} . \qquad (7.4.3)$$

Here m_{el} is the mass of the electron, V_{el} is the speed of translational motion of the electron, ω_{el} is the angular speed of rotation of the electron around its axis. The electron has the shape of an annular torus (donut) with a centerline radius $r_{o-el} = r_{orb}$. Then the moment of inertia of such a torus will be written as

$$J_{el} = m_{el} \cdot r_{o-el}^2 . \qquad (7.4.4)$$

Next, we write down Bohr's second postulate, which states that an electron can rotate around an atomic nucleus only along circular orbits for which the equality

$$2\pi r_{opb} U_{opb} m_{el} = nh, \tag{7.4.5}$$

where h=6,626·10^{-34} [j·s]= б,54·10^{-27} [erg·s] is Planck's constant; m_{el} is the electron mass; r_{opb} - the radius of the orbit of this electron when rotating around the nucleus of the atom ($r_{orb} = r_{o-el}$); U_{orb} is the circumferential speed of an electron in orbit; n is an integer called a quantum number.

The kinetic energy of the translational motion of the electron, taking into account relations (7.4.1) and (7.4.3), will be

$$E_{\kappa} = \frac{m_{el} V_{el}^2}{2} = mU_{opb} \frac{U_{opb}}{2} = \frac{nh}{2\pi \cdot r_{opb}} \frac{U_{opb}}{2} \ . \tag{7.4.6}$$

Next, select the point B on the surface of the ring electron (you can take any point on the surface of the electron outside the axis). As a result of adding the speeds of the translational and rotational motions of the electron, point B will describe a curve close to a sinusoid. Cyclicity appears in its movement, which is an indispensable condition for the formation and functioning of any wave. The period of oscillation will be equal to the time of a complete revolution of the electron around its axis. It is inversely proportional to the vibration frequency ϑ

$$T = \frac{2\pi \cdot r_{o-el}}{\omega_{el} r_{o-el}} = \frac{2\pi}{\omega_{el}} = \frac{1}{\vartheta} \, . \tag{7.4.7}$$

Далее с учетом (7.4.1), (7.4.5) и (7.4.7) получаем

$$E_{\kappa} = \frac{m_{el} V_{el}^2}{2} = \frac{nh}{2\pi \cdot r_{opb}} \cdot \frac{\omega_{el} r_{opb}}{2} = \frac{n \cdot h}{2} \cdot \frac{\omega_{el}}{2\pi} = \frac{1}{2} n \cdot h \vartheta \, . \tag{7.4.8}$$

The energy of rotation of an electron is written in the form

$$E_{вр} = \frac{J_{el}\omega_{el}^2}{2} = \frac{m_{el} r_{o-el}^2 \omega_{el}^2}{2} = \frac{m_{el} r_{orb}^2 \omega_{el}^2}{2} = \frac{nh}{2\pi \cdot r_{orb}} \cdot \frac{\omega_{el} r_{orb}}{2} = \frac{1}{2} n \cdot h\vartheta. \tag{7.4.9}$$

Finally, the total energy of an electron flying with a velocity V_{el} and rotating with an angular velocity ω_{el} will be

$$E=E_к+E_{вр}=\frac{m_{el}V_{el}^2}{2}+\frac{J_{el}\omega_{el}^2}{2}=n\cdot h\vartheta, \tag{7.4.10}$$

If $n=1$, then the energy of a flying and rotating electron is the energy of a quantum of radiant energy

$$E = h\vartheta. \tag{7.4.11}$$

It is known that in 1905 Einstein expressed the idea that the flow of radiant energy consists of separate quanta that are not connected with each other. Those. according to his ideas, separate unrelated shreds of radiant energy are flying, differing only in the amount of energy contained in them $\varepsilon = h \cdot \vartheta$. Einstein did not know what these shreds of energy .

The conducted research and formulas (7.4.10 and 7.4.11) fills Einstein's intuitive ideas about a quantum of radiant energy with real meaning. The quantum energy turned out to be equal to the sum of the kinetic energies of the translational and rotational motions of the electron. In this sense, electrons may indeed be unrelated to each other. Particularly interesting is the role of the rotational motion of the electron, which is caused by the vortices of dark gaseous matter near the nucleus of the atom. In Rutherford's model of the atom, there is no other mechanism to replenish the energy of an electron escaping from an atom to the value of a quantum of radiant energy, except for its rotation. Our idea of □□de Broglie waves is also associated with the rotation of the electron and connects a quantum of radiant energy with frequency and wavelength.

7.5 The spin of electron

According to [1,3], the spin of an electron or L_{eB} other elementary particle is called the angular momentum of an electron M_{el}, due to its quantum nature. The spin projection on the direction of induction "B" of the external magnetic field can take on only two values

$$L_{eB} = n\bar{h} = \pm \frac{nh}{2\pi}. \qquad (7.5.1)$$

The angular momentum of a toroidal electron will be

$$M_{el} = m_{el} U_{el} r_{o-el} = m_{el} \omega_{el} r_{o-el}^2. \qquad (7.5.2)$$

From Bohr's second postulate (7.5.5) with the help of (7.5.2) we can write

$$\frac{nh}{2\pi} = m_{el} \cdot r_{opb} U_{opb} = m_{el} \omega_{el} r_{opb}^2. \qquad (7.5.3)$$

Recall that $h=6,626\cdot10^{-34}$ [j·s] is Planck's constant; m_{el} is the electron mass; $r_{orb} = r_{o-el}$ - radius of the orbit of this electron when rotating around the nucleus of the atom ($r_{orb} = r_{o-el}$); $U_{orb} = U_{el}$ –the circumferential speed of an electron in orbit; n is an integer called a quantum number. Comparing expressions (7.5.2) and (7.5.3) we obtain an expression for the angular momentum

$$M_{el} = \frac{nh}{2\pi} = n\bar{h}. \qquad (7.5.4)$$

As you can see, the angular momentum of the electron turned out to be equal to the electron spin

$$L_{eB} = M_{el}. \qquad (7.5.5)$$

The magnitude of the angular momentum of a ring-shaped electron is determined by the angular velocity of rotation ω_{el}. Those. again we can note the important role of the rotational motions of elementary particles.

As noted in [1,2,3], the concept of spin as the angular momentum of an electron of spherical shape with parameters $m_o = 9,1\cdot10^{-31}\,кг$, $r_o = r_{el} = 10^{-15}\,м$ when using these formulas, contradicts the theory of relativity, since the speeds with which a point on the diameter of an electron-boll must rotate around their central axis exceeds the speed of light in vacuum C=3·10^8 m/s. Indeed, the angular momentum of a homogeneous ball is known. It is written by the formula $m_o = 9{,}1\cdot 10^{-31} kg$, $r_o = r_{el} = 10^{-15} m$ Whence ω=0,29·10^{27} s^{-1}.

Circumferential speed

$$U = r_o \cdot \omega = 0{,}29\cdot 10^{12}\ м/с >> C\ . \tag{7.5.6}$$

This is not the case in the considered model of a ring electron. For the first Bohr orbit, n = 1. Besides, $m_{el} = 9{,}11\cdot 10^{-31} кг$, $r_{o-el} = r_{orb} = 5{,}29\cdot 10^{-11} м$, $h = 6{,}63\cdot 10^{-34}\ Дж\cdot c$. According to formulas (7.5.2) and (7.5.4), the angular velocity $\omega_{el} = 4{,}14\cdot 10^{16} c^{-1}$.

($U_{el} = \omega_{el}\cdot r_{o-el} = 2{,}19\cdot 10^{6}\ м/ < C$).The circumferential speed of an electron in this orbit and the speed of its further flight after ejection from an excited atom will be $V = U_{orb} = \omega_{el}\cdot r_{orb} = 2{,}19\cdot 10^{6}\ м/c < C$. At other values of the quantum number "n", that is, when electrons escape from other orbits around the atomic nucleus, their peripheral velocities will be of the same order.

7.6 A few notes about Photons

Moving on to photons as carriers of light, we note that photons are much smaller in size and mass than electrons. According to quantum theory, the main characteristics of a photon are its energy ε_f and momentum p_f

$$\varepsilon_f = m_f C^2 = h\vartheta = \frac{hC}{\lambda_o}\ , \tag{7.6.1}$$

$$p_f = \frac{h\vartheta}{C} = \frac{h}{\lambda_o}, \tag{3.6.2}$$

Here ϑ is the frequency of the light electromagnetic wave; λ_o - the length of the wave of light in the void; h is the Planck constant. Einstein believed that the flow of radiant energy consists of separate quanta, not connected with each other and flying at the speed of light. That is, according to his ideas, separate unconnected scraps of radiant energy are flying.

This representation does not allow to simply and clearly explain the interaction of two rays, their mutual amplification or annihilation, which takes place in nature and is clearly obtained according to the wave theory of light as a result of the addition of two oppositely directed identical oscillations. It is important to understand that the basic formula of quantum theory, which relates the energy of a quantum ϑ with the frequency and wavelength λ_o, does not make any sense.

$$\varepsilon = h\vartheta \qquad (7.6.3)$$

Indeed, quanta are flying, that is, scraps of radiant energy that differ from each other only in the amount of energy ε they contain. There is no question of any frequency ϑ and wavelength λ here. The flight of quanta does not contain an element of periodicity, without which the very concept of wavelength is meaningless. Therefore, for quantum theory as it exists today, the wavelength λ is simply a number obtained by an experimental method, completely incomprehensible to this theory. It serves to move from the language of quantum theory to the language of wave theory and vice versa. The formula of quantum theory for determining the frequency of the de Broglie wave is also poorly understood

$$\vartheta = \frac{mC^2}{h}. \qquad (7.6.4)$$

According to this formula, all energy equivalent to mass m which is equal $h\vartheta$ to the energy of an imaginary quantum of radiant energy, the frequency of which is equal to the frequency of the phase wave, which is not radiant energy.

The mass of a photon moving at the speed of light can be estimated from expression (7.6.1) as $m_f = \dfrac{h}{C\lambda_o} = 0{,}368 \cdot 10^{-35} kg$ (for the wavelength

$\lambda_o = 6 \cdot 10^{-7} m$). It is important to note that Rutherford's model of the atom does not contain photons. However, it is atoms and molecules consisting of atoms that emit photons during the transition from excited energy states to states with lower energy. This allows us to assume that photons are formed at the time of their emission. Electrons serve as the material for their creation. Escaping photons carry away a part of the excess energy accumulated in the atom in the form of the sum of kinetic energy and rotation energy.

We have already seen that electrons inside an unexcited atom have speeds two orders of magnitude less than the speed of photons, equal to the speed of light in a vacuum. Therefore, the appearance of speeds of the order of the speed of light inside atoms can be expected only if, as a result of heating (for example, a filament in incandescent lamps) in the atoms, the angular velocities of the atomic nucleus ω_A and the angular velocities the ring nucleus of the electron ω_{el} begin to increase.

When the circumferential speed of the electron in its orbit inside the atom reaches the speed of light, there is a partial or complete decay of the electron into a chain of smaller photons. This speed becomes the speed of their translational motion after they leave the atom. (If there was a partial decay, then the remaining reduced electron goes to another orbit, which is due to it in terms of its size and the value of the new quantum number. Apparently, the electron can just as easily replenish its mass and size due to absorbed photons). This hypothesis is also supported by the fact that photons are emitted during acceleration and deceleration of charged particles, as well as during the decay of some particles and the destruction of an electron-positron pair.

Further, we assume that the photon, like the electron, has a ring shape. It moves in space with speed $C = 3 \cdot 10^8 m/s$. The wavelength of light can be written as the product of the speed of light and the period of oscillation $\lambda = C \cdot T$. We represent the oscillation period T as the time during which the photon makes a complete revolution around its axis $T = \frac{2\pi \cdot r_f}{U_f} = \frac{2\pi \cdot r_f}{\omega_f \cdot r_f} = \frac{2\pi}{\omega_f}$. Here $U_f = \omega_f \cdot r_f$ is the circumferential velocity of the annular photon nucleus. r_f is the radius of the photon ring. Let's substitute the value of the period of oscillation T in the expression for the wavelength of light. The wavelength of visible light is known. It lies within $\lambda = (3{,}8 - 6{,}6)\cdot 10^{-7}\, m$. Let's choose $\lambda = 6\cdot 10^{-7}\, m$. As a result, the wavelength of light will be written as . $\lambda = C\cdot T = \dfrac{2\pi C}{\omega_f}$ Whence the angular velocity of rotation of the photon will be

$$\omega_f = \frac{2\pi\cdot C}{\lambda} = \frac{6{,}28\cdot 3\cdot 10^{8}}{6\cdot 10^{-7}} = 3{,}14\cdot 10^{15}\, s^{-1}. \qquad (7.6.5)$$

The well-known formulas of quantum mechanics do not allow this. The rotation of photons plays an important role in the wave properties of light. Based on the considered considerations, it can be assumed that a chain of rotating photons is distributed at the wavelength of light and that such a wave, therefore, has mass and energy. (kinetic energy of translational motion and energy of rotation). This wave can be called a "heavy light wave".

The mass of a photon moving at the speed of light can be estimated from expression (3.7.1) as

$$m_f = \frac{h}{C\lambda_o} = 0{,}368\cdot 10^{-35}\, кг \text{ (for wavelength } \lambda_o = 6\cdot 10^{-7}\, м\text{).} \qquad (7.6.6)$$

The size of a photon can be roughly estimated, given that the masses are proportional to cubes of linear dimensions. The radius of the photon ring will be.

$$r_{of} = r_{o-el}\sqrt[3]{m_f / m_{o-el}} = 5{,}292\cdot 10^{-11}\cdot \sqrt[3]{\frac{0{,}368\cdot 10^{-35}}{0{,}911\cdot 10^{-30}}} = 1{,}825\cdot 10^{-12}\, м. \qquad (7.6.7)$$

You can also define the radius of the cross section of the photon ring. To do this, imagine the mass of a photon as the volume of the torus multiplied by the density of the photon nucleus $m_f = 2\pi^2 r_f^2 r_{of}\rho_f$. The density of the photon nucleus is the same as the density of the nucleus of the hydrogen atom ($\rho_f = 10^{18}\, kg/m^3$). The radius of the section of the photon nucleus ring is r_f denoted by. It will be equal $r_f = 3{,}16\cdot 10^{-22}\, m$. The dense annular photon core is surrounded by an annular vortex of dark matter. In general, this vortex ring formation is a photon. If the photons are located close to each other along the wavelength, then their number can be determined as $k = \frac{\lambda}{2 \cdot r_{of}} = \frac{6 \cdot 10^{-7}}{2 \cdot 1{,}825 \cdot 10^{-12}} = 1{,}64 \cdot 10^{5}$. This is, of course, an overstated number.

7.7 The polarization of light

The models of electron and photon developed in this book are thin rings with radii r_{el} and r_f and radii of cross sections r_{o-el} and r_{o-f}. The quantity $r_{el} = 0{,}529 \cdot 10^{-10} m$ for n = 1. Assuming that the density of the material of these electrons and photons is the same and equal to their density in the spherical electron and photon models, we can determine the remaining dimensions:

$$r_{el} = 0{,}529 \cdot 10^{-10}\,м, \quad r_{o-el} = 2{,}95 \cdot 10^{-20}\,м,$$

$$r_f = 1{,}825 \cdot 10^{-12}\,м \qquad r_{o-f} = 3{,}16 \cdot 10^{-22}\,м.$$

If the density is taken less, then these dimensions can increase significantly. The rings of electrons and photons escaping from the atoms rotate rapidly around their axes of symmetry. The gyroscopic moment maintains their orientation in flight. It is quite clear that If the density is taken less, then these dimensions can increase significantly. The rings of electrons and photons escaping from the atoms rotate rapidly around their axes of symmetry. The gyroscopic moment maintains their orientation in flight. It is quite clear that through an obstacle, for example, a transparent tourmaline crystal [1, 2], as if containing narrow, extended, parallel passages, will pass through only those photons whose planes of rotation are parallel to these slits. If, behind the first tourmaline crystal, a second crystal with slits directed perpendicular to the slits of the steam one is placed, then the photon disks that have retained the same orientation will not be able to fly through them due to the large size of the disks.

It is also clear that through rotating rings of photons will be reflected in different ways from two plates with mutually perpendicular planes of incidence.

In the wave theory of light, these differences in reflection and transmission through slits are interpreted as a sign of the transverse nature of the oscillations of light waves and are called light polarization. This was, apparently, a consequence of the historically established stable concept of light as a wave process similar to the propagation of sound in air. Since the polar properties of light did not agree with the longitudinal nature of sound waves, this was an additional argument to abandon the idea of an interstellar gaseous continuous medium (dark matter) of outer space as a light-conducting medium. As a result, the doctrine of the dualism of wave and corpuscular properties of light appeared, reconciling wave and corpuscular theories. Later, wave properties were also attributed to electrons and other moving particles, despite the impossibility of finding an acceptable explanation for what vibrates around or within the particle itself.

In the proposed theory, the polarity of the properties of light is clearly explained by differences in the shape of photons, that is, the carriers of light themselves, in the planes of their rotation and in the transverse directions. De Broglie's formula is also clearly obtained and the nature of the dualism of wave and corpuscular properties of an electron and other particles is explained. The nature of a quantum of radiant energy is also associated with the carriers of the energy of the particles associated with it in the form of the sum of the kinetic energy and the energy of rotation of the flying and rotating particles (or a group of particles (photons) united by a common quantum).

Part 8

Electromagnetic interactions

Einstein spent the last 30 years of his life searching, within the framework of the general theory of relativity (GR), for the possibility of combining fundamental interactions (at that time, gravity and electromagnetism). In his research, Einstein believed that all fundamental interactions are derivatives of a certain Unified field, which is carried by the four-dimensional space-time. Einstein succeeded in presenting the nature of gravity as a curvature of four-dimensional space-time. However, he failed to combine gravity with electromagnetism using these ideas , within the framework of the general theory of relativity (GR),. Modern physicists continue to try to build an even more grandiose theory that should combine four fundamental interactions, including gravitational forces, inertial forces, nuclear forces, electromagnetism, and electroweak forces.

We offer our own model of such a Unified field, which has made it possible to reveal the physical nature of gravitational forces, inertial forces, nuclear forces and energy, and to understand more deeply many mysterious astronomical phenomena. From the same position, we have proposed a deeper understanding of the laws of the propagation of light in space between stars over billions of years. This allowed us to show that Hubble's law should not be associated with Doppler's law and the idea of the expansion of the Universe, as well as with the Big Bang. We believe that it is the dark matter of the cosmos that is the Unified field that unites all of the above fundamental interactions.

We believe that the nature of electromagnetism is associated with the previously revealed laws of the interaction of dark matter with elementary particles of baryonic matter. Let's start with Coulomb's law.

8.1 Coulomb's law in the theory of dark matter.

Coulomb's law determines the modulus of the force of electrostatic interaction between point electrostatic charges (elementary charges) and is written as

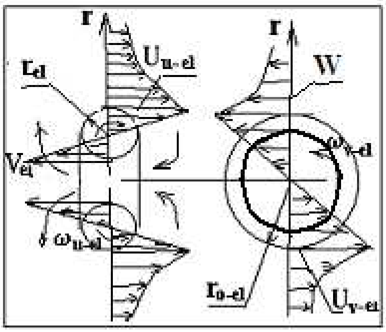
$$F=\frac{q_1 q_2}{4\pi\varepsilon\varepsilon_o r^2}=\frac{2{,}1\cdot 10^{-28}}{r^2}\ [H]\ . \qquad (8.1.1)$$

Here q is the value of the electrostatic charge. Like charges attract, and like charges repel. For vacuum ε=1. ε-relative dielectric constant. $\varepsilon_o=8{,}85\cdot 10^{-12}$

f / m - electrostatic constant. The charges have spherical symmetry. Force F is directed along a straight line connecting the centers of charges. During electrification, charges can transfer from one body to another. As a result, one of them takes a positive charge, and the other negative.

It is believed that some elementary particles of matter carry an electric charge. The electron has a negative charge, while the positron and proton are positive. These charges are the same in modulus and equal to the value $e=1,60219\cdot10^{-19}$ [C]. The forces of electrostatic interaction keep an electron in orbit around the nucleus of an atom in Rutherford's planetary model. (For reference, 1F/m=1C/N·m).

In the theory of dark matter in space, an electron is an annular vortex with a radius r_{o-el} (Fig. 8.1.1). The radius of the section of the vortex ring is taken



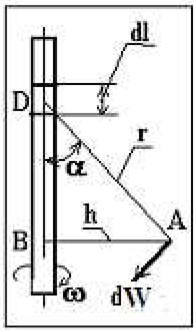


Fig. 8.1.1 Fig.8.1.2

$r_{el} = \dfrac{r_{o-el}}{200} = 0,005 \cdot r_{o-el}$. Inside the vortex ring, gaseous dark matter moves in circumferential and annular directions at speeds

$$U_{u-el}=\omega_{u-el}r, \tag{8.1.2}$$

where $0 \le r \le 0,005 \cdot r_{o-el}$.

$$U_{v-el}=\omega_{v-el}\, r\,, \tag{8.1.3}$$

where $0 \le r \le r_{o-el}$.

Like any vortex, a vortex-electron induces a velocity field around itself in a dark gas (in gaseous dark matter). The speed pattern is quite complex. To make it clearer, consider the velocity field around a rectilinear vortex described by the Bio-Savard law (Fig. 8.1.2)

$$dW=\frac{\Gamma \cdot Sin\alpha \cdot dl}{4\pi \cdot r^2} . \qquad (8.1.4)$$

Here Γ is the velocity circulation equal to the intensity of the rectilinear vortex. Let us imagine a vortex electron as an element of a rectilinear vortex of width dl. As applied to the vortex electron, we take the width (diameter) of the vortex ring $\Delta l = 2r_{el} = \frac{2r_{o-el}}{200} = 0{,}01 \cdot r_{o-el}$ as dl. Velocity dW will now be the velocity induced by the vortex electron $dW \to W$ at point A. It lies in the plane perpendicular to the axis of the vortex element dl and is directed towards the vortex rotation. r-distance between point A and the axis of the considered vortex element. α-angle between the axis of the vortex element dl and the radius r. The circulation Γ of the rectilinear vortex in the Bio-Savard formula will now be the circulation of the velocity calculated along the perimeter of the vortex-electron ring $\Gamma \to \Gamma_{el}$. In this case, the circumferential velocity around the symmetry axis of the vortex ring of an electron in the surrounding dark gas field in the plane of the vortex ring will be expressed by the formula

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$$W=\frac{0{,}01}{4\pi} \cdot \frac{\Gamma_{el} r_{o-el}}{r^2} = 0{,}0008 \cdot \frac{\Gamma_{el} r_{o-el}}{r^2} . \qquad (8.1.5)$$

Here Γ_{el} is the velocity circulation calculated along the perimeter of the electron vortex ring. It is written by the formula

$$\Gamma_{el}=2\pi r_{o-el}U_{v-el}=2\pi\omega_{v-el}r^2_{o-el} . \qquad (8.1.6)$$

The peripheral velocity U_{v-el} is the velocity at the outer edge of the vortex ring $U_{v-el} = \omega_{v-el} \cdot r_{o-el}$. Taking into account formulas (8.1.5) and (8.1.6), the velocity W takes the form

$$W=\frac{0{,}01}{4\pi}\cdot\frac{\Gamma_{el}\, r_{o-el}}{\cdot r^2}=0{,}005\cdot\frac{\omega_{v-el}\, r_{o-el}^3}{r^2} \quad . \qquad (8.1.7)$$

If another vortex-electron or vortex-positron enters the field of peripheral velocities near the vortex-electron, then the Magnus effect arises, according to which a transverse force arises, acting on the vortex in the flow of liquid or gas incident on it. Discovered by the German scientist G. G. Magnus (H. G. Magnus) in 1852. The transverse force is always directed from that side of the rotating vortex, on which the direction of rotation and the direction of the flow are opposite, to the side on which these directions coincide (Fig. 8.1.3).

According to Zhukovsky's normal force theorem, a repulsive force directed along the line connecting their centers will act on each vortex-electron. The modulus of this force is equal to the product of the density and velocity of the incoming flow (flow of gaseous dark matter) by the circulation of the velocity calculated along the perimeter of the streamlined body (along the outer perimeter of the electron vortex) and the span of the streamlined body (the width of the section of the vortex ring of the electron). If a positron with the opposite direction of rotation of jets of gaseous dark matter in the vortex ring appears in the place of the second electron, then the direction of the force will change to the opposite. Changing the direction of rotation in a positron as compared to an electron will not affect the velocity circulation module

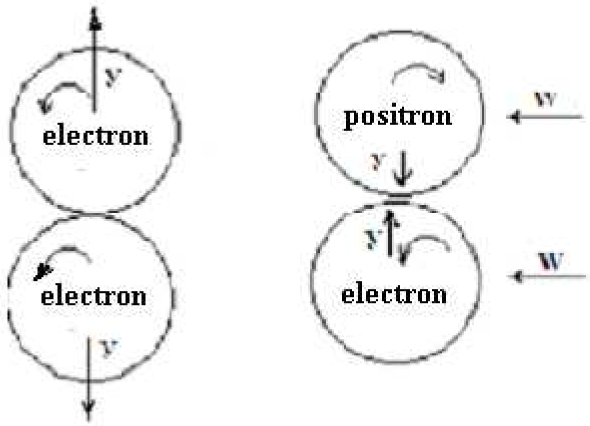

Fig. 8.1.3

$|\Gamma_{el}| = |\Gamma_{poz}|$, (8.1.8)

$$У = \rho_e \cdot W \cdot \Gamma_{el} \cdot \Delta l = \rho_{e.} \cdot \frac{10^{-4} \cdot \Gamma_{el} \cdot \Gamma_{el} \cdot r_{o-el}^2}{4\pi \cdot r^2} =$$

$$= \rho_e \cdot 0{,}005 \cdot \frac{\omega_{v-el} \cdot r_{o-el}^3}{r^2} \cdot 2\pi \cdot \omega_{v-el} \cdot r_{o-el}^2 \cdot 0{,}01 \cdot r_{o-el} \qquad (8.1.9)$$

$$= 0{,}373 \cdot 10^6 \cdot \frac{\omega_{v-el}^2 r_{o-el}^6}{r^2}$$

In view of the above, we apply Zhukovsky's theorem to determine the modulus of the force acting on each interacting elementary vortex particle. Each of these particles is blown by a flow induced by an adjacent vortex particle with a velocity In view of the above, we apply Zhukovsky's theorem to determine the modulus of the force acting on each interacting elementary vortex particle. Each of these particles is blown by a flow induced by an adjacent vortex particle with a velocityvelocity

The density value of gaseous dark matter is ρ_e=1,19·10^9 kg / m^3. It was obtained from the analysis of the law of universal gravitation by I. Newton in relation to the white dwarf star Wolf-457 and the Moon. We believe that the force determined by the Zhukovsky theorem is equal to the force determined by the Coulomb law ($У = F$). Therefore, we can equate the right-hand sides of expressions (8.1.1) and (8.1.9)

$$0{,}37 \cdot 10^6 \cdot \frac{\omega_{v-el}^2 r_{o-el}^6}{r^2} = \frac{2{,}1 \cdot 10^{-28}}{r^2} . \qquad (8.1.10)$$

Expression (8.1.10) contains two unknown quantities ω_{v-el} - and r_{o-el} . To determine these quantities, let us turn to the concept of the electron spin. Let us recall that according to the theory of dark matter, an electron is a ring vortex, inside which a thin thread of liquid dark matter passes. It, like the nucleus of an atom, is surrounded by an annular vortex of gaseous dark matter and continuously absorbs this dark gas. This ring (vortex electron) is ejected from a hydrogen atom (and any other atom of baryonic matter) when the atom is strongly excited (for example, as a result of a strong collision with another elementary particle). Outside the atom, the electron retains its ring shape and high angular velocity ω_{v-el}.

We assume that each electron has a constant mechanical moment of momentum. The mechanical moment of an electron is called spin. (The concept of spin was introduced in 1925 by J. Uhlenbeck and S. Goudsmit, who, to interpret the experimental data on the splitting of a beam of silver atoms in a magnetic field, suggested that the electron can be considered as a top rotating around its axis with a projection on the direction of the field equal to $\pm\frac{1}{2}h$). According to [1,2], the spin of an electron or other elementary particle L_{eB} is called the angular momentum of an electron or other elementary particle M_{el}, due to its quantum nature. The projection of the spin on the direction of the induction "B" of the external magnetic field can take only two values - positive and negative. The spin module can be written as follows

$$L_{eB} = \frac{\hbar}{2} = \frac{h}{4\pi} = 0{,}525 \cdot 10^{-34} \text{ Дж·с}, \qquad (8.1.11)$$

where h=6,626·10^{-34} J·s=6,54·10^{-27} erg·s is Planck's constant; The angular momentum of the mass of a toroidal electron vortex will be

$$M_{el} = m_{el} U_{v-el} \cdot r_{o-el} = m_{el} \omega_{v-el} r_{o-el}^2, \qquad (8.1.12)$$

where the mass of the electron is $m_{el} = 9{,}11 \cdot 10^{-31}$kg, the circumferential velocity at the outer boundary of the vortex electron is $U_{v-el} = \omega_{v-el} \cdot r_{o-el}$.

Taking into account expressions (8.1.11) and (8.1.12), the electron spin is written

$$L_{eB} = \frac{h}{4\pi} = m_{el} \omega_{el} r_{o-el}^2 = 0{,}525 \cdot 10^{-34} \text{ [Дж·с]}, \qquad (8.1.13)$$

Let us equate the right-hand sides (8.1.12) and (8.1.13). Let's substitute the value of the electron mass. As a result, we get

$$0{,}525\cdot10^{-34} = 9{,}11\cdot10^{-31}\,\omega_{v-el}\,r_{o-el}^2 \,. \tag{8.1.14 }$$

Equations (8.1.10) and (8.1.14) constitute a system for determining the unknown quantities ω_{v-el} and. r_{o-el} From (8.1.14) we express the angular velocity of the vortex electron

$$\omega_{v-el} = \frac{0{,}525\cdot10^{-34}}{9{,}11\cdot10^{-31\cdot}\cdot r_{o-el}^2} = \frac{0{,}576\cdot10^{-4}}{r_{o-el}^2}\,. \tag{8.1.15}$$

We substitute expression (15) into (10) and resolve it with respect to r_{o-el}

$$r_{o-el} = 1{,}7\cdot10^{-12}\ \text{м}\,. \tag{8.1.16}$$

Substituting (16) into (15), we obtain the value ω_{v-el}

$$\omega_{v-el} = 0{,}2\cdot10^{20}\ \text{c}^{-1}\,. \tag{8.1.17}$$

The obtained parameters of the vortex-electron made it possible to calculate the average density of the vortex-electron ring. It is equal to $\rho = 0{,}927\cdot10^{8}$ kg/m^3. This value confirms our assumption that, according to the theory of dark matter, an electron is a ring vortex, inside which a thin thread of liquid dark matter with a neutron liquid density of 10^{18} kg/m^3 passes. The rest of the volume of the ring electron vortex is occupied by a gaseous vortex. Since the radius of the vortex-electron ring is much larger than the radius of the nucleus of the atom (hydrogen), being inside the atom, the vortex-electron ring surrounds the nucleus of the atom, occupying its entire orbit and rotating with angular velocity ω_{v-el}. Therefore, experimenters fail to detect the position of the electron in the orbit.

It is very important to note that we got the force of interaction between elementary particles the same as it is determined by Coulomb's law. But we didn't endow these particles with electric charges. The result is obtained without any additional assumptions. This force turned out as if by itself on the basis of the models of the atom and elementary particles adopted earlier in this theory and world constants such as the density of gaseous dark matter $\rho_e = 1,19 \cdot 10^9$ kg/m^3. Let me remind you that the density of gaseous dark matter was determined by analyzing the forces of attraction between the bodies of the Universe, that is, in a completely different area of physics. **<u>This speaks of the unified nature of the forces of universal gravitation, intra-atomic forces and electrical forces due to the internal structure of the atom and elementary particles.</u>**

The values r_{o-el} and ω_{v-el} allow calculating the peripheral velocity on the outer boundary of the vortex electron

$$U_{v-el} = r_{o-el} \cdot \omega_{v-el} = 0,34 \cdot 10^8 \text{ м/с}. \qquad (8.1.18)$$

The peripheral velocity on the outer boundary of the vortex electron is close to the speed of light in a vacuum, but does not exceed it and therefore does not contradict the theory of relativity. Therefore, it can be assumed that the vortex electron has its own mechanical moment of momentum. It is known that the postulates that the electron has its own mechanical and magnetic moments have proved to be very fruitful. At the same time, we can note the important role of the rotational motions of elementary particles in the phenomena of electrostatics and the properties of elementary particles.

Along the way, we note that the concept of spin as the angular momentum of a spherical electron with parameters: mass $m_o = 9,1 \cdot 10^{-31} \, кг$, radius $r_o = r_{el} = 10^{-15} \, м$ contradicts the theory of relativity, since the speeds with which a point on the diameter of an electron-ball should rotate around its axis exceeds the speed of light in vacuum $C = 3 \cdot 10^8$ m/s. Indeed, the angular momentum of a homogeneous ball is known. It is written by the formula $M_o = \frac{2}{5} \omega \cdot r_{el}^2 \cdot m_o = L_{eB} = \frac{h}{4\pi}$.

Whence $\omega=0{,}145\cdot10^{27}$ s^{-1}>>C, the peripheral speed of points on the surface of the electron turned out to be higher than the speed of light $U=r_o\cdot\omega=1{,}45\cdot10^{11}$ m / s □□C. In this regard, scientists (relativists) realized that "the rotation of an electron around an axis passing through the center of the sphere" cannot be understood literally. " As a result, they were forced to abandon the concept of the mechanical nature of the spin.

We could stop at this. We found out that Coulomb's law, obtained experimentally for electrostatic forces, is actually due to the action of pressure forces in gaseous dark matter on elementary particles of matter when they approach. The particles have a vortex structure. **The direction of rotation of jets of gaseous dark matter inside the vortex rings of elementary particles determines whether these forces will repel or attract particles, that is, in conventional terminology, they carry a positive or negative electric charge.**

However, questions remain. Indeed, none of the considered vortex gas models of elementary particles meets the condition of spherical symmetry. In this case, we have doubts about the validity of the statement that the electron has a spherical shape and therefore meets the condition of spherical symmetry. The electron is so small that it is impossible to see it and unconditionally verify its spherical shape. If the vortex-electron has the shape of a torus, then it is possible that it always moves perpendicular to its axis of symmetry. When approaching another vortex-electron or other elementary particle, the interaction of the surrounding vortices rotates the vortex-electrons in such a way that their symmetry axes become parallel and their vortex rings are in the same plane. In this case, our analysis of the forces between like and opposite charges turns out to be real.

The gaseous dark matter inside each of the vortex rings that make up the elementary spherical charges rotates around the axes of symmetry of their rings. Let us assume that counterclockwise rotation corresponds to a negative charge, and clockwise rotation to a positive charge, if we look at the charge from the outside. This is a conditional division. The opposite rule could be accepted. Nevertheless, it is clear that two spherical charges of the same direction of rotation in rings will repel, and two charges with opposite directions of rotation will attract.

Thus, if we electrify two identical light balls suspended on thin threads with the same name, then the force acting on each of them, in this case, will be equal to the sum of the elementary forces acting on each elementary vortex ring on their surface. These equally electrified balls will repel. The more electrified the balls are, the further apart they are. It is known that in practice, to determine the degree of electrification, special devices are used - electroscopes. For example, Fig. 8.1.4 shows an electroscope in which two thin sheets of aluminum are attached to a wire B with a ball A at the upper end.

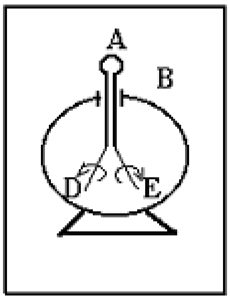

Рис.8.1.4

When the wire "B" is imparted an electric charge, the elementary vortex rings of gaseous dark matter inside the aluminum sheets unfold in such a way that their axes of symmetry are directed along the petals and the axial rotation of gaseous dark matter in the vortex rings is the same. As a result, as noted earlier, repulsive forces arise. By the divergence of the petals, one can judge the degree of electrification reported by them.

In this case, it can be assumed that in uncharged bodies there are always charges of opposite signs or, which is the same, elementary rings of gaseous dark matter with the opposite direction of rotation of jets of dark matter along the vortex rings. Their number is such that their action completely compensates for each other. In the process of electrification, the rotation of gaseous dark matter in elementary rings of any one sign begins to prevail. This determines the sign and degree of electrification of bodies.

Comparing the expressions of the Coulomb law for elementary charges obtained in electrostatics (8.1.1) and in the theory of dark matter (8.1.9), we find **the relationship between the elementary charge q_{el}=e and the spatial circulation of the vortex electron**

$$\Gamma_{el}^{*} = \Gamma_{el} \cdot \Delta l = 0{,}01 \cdot \Gamma_{el} \cdot r_{o-el},$$

$$e = q_{el} = \sqrt{\varepsilon_o \varepsilon \cdot \rho_e} \cdot \Gamma_{el}^{*}. \qquad (8.1.19)$$

The logic of further reasoning can be the same as in electrostatics [1.2.3]. Since the flow of gaseous dark matter outside the vortex rings of an electron, positron, and proton is potential, the resulting voltage around various electrically charged bodies can be found using the superposition method. That is, to find the resulting solution as the sum of stresses created by point charges.

It would be possible to repeat all the conclusions of electrostatics, using instead of charges q their expressions through the spatial circulation of velocity and obtain formulas for the strengths of electric fields around charged planes, cylindrical and spherical surfaces and a number of others. Obviously, this is not necessary, since the meaning of our research is different.

We want to reveal and substantiate the nature of electrostatic phenomena based on the interaction of local vortex structures of gaseous dark matter with the surrounding field of gaseous dark matter. We would like to show the unity of such seemingly heterogeneous phenomena as universal gravity, inertia, nuclear energy, dualism of corpuscular and wave properties of elementary particles, electromagnetic phenomena and the propagation of light. All these phenomena, in our opinion, are different facets of the properties and flows of gaseous dark matter. In the same row there are many mysterious cosmic phenomena discovered by astronomy, but which today have no reasonable explanation.

8.2 Electric current

By definition [1,2], the current strength J is equal to the number n of electric charges e transferred at a speed per $\bar{V}$ unit time through the cross-sectional area S of the conductor

J=en$V$ S , (8.2.1)

where n is the number of electric charges (vortices of conduction electrons) per unit volume. For copper wire n=8.5·10^28 m^-3. The speed of movement of charges inside the conductor is of the order of V =8·10^-4 m / s.

But the electric charge e=q_{el}=$\sqrt{\varepsilon_o\varepsilon\cdot\rho_e}\cdot\Gamma^*_{el}$ according to (8.1.19) is proportional to the spatial circulation of the velocity Γ^*_{el} calculated over the surface of the vortex ring of the dark gas of the electron, which forms an electric charge. Therefore, expression (8.2.1) can be rewritten to the form

$$J=\sqrt{\varepsilon_o\varepsilon\rho_e}\cdot\Gamma^*_{el}nVS\ . \qquad (8.2.2)$$

Recall that the spatial circulation of velocity Γ^*_{el}, calculated over the surface of one electron vortex ring is related to the velocity circulation along the electron vortex ring contour Γ_{el} by the dependence

$$\Gamma^*_{el}=\Gamma_{el}\cdot\Delta l=0{,}01\cdot\Gamma_{el}\cdot r_{o-el}\ , \qquad (8.2.3)$$

Let us take into account that inside the vortex ring of an electron, dark matter rotates not only along the ring with an angular velocity $\omega_{V-el}=0{,}2\cdot10^{20}$ s^{-1}, but also rotates around the ring body with an angular velocity $\omega_{U-el}=3\cdot10^{18}$ s^{-1}. Based on the Stokes theorem, the velocity circulation calculated along the contour of the cross-section of the vortex ring of one electron is equal to the voltage of the electron vortex

$$\Gamma_{U-el}=2\pi\omega_{U-el}r^2_{el}=I_{el}\ , \qquad (8.2.4)$$

where

$$r_{el}=0{,}02r_{o-el}=3{,}4\cdot10^{-14}\text{ м}\ , \qquad (8.2.5)$$

$$\omega_{U-el} = 3 \cdot 10^{18}\ \mathrm{c}^{-1} . \qquad (8.2.6)$$

When an electric current passes along a metal conductor, the vortex rings of electrons (charges) form vortex filaments with voltages I_{V-el} equal to the circulations of the speed of the dark gas calculated along the outer contour of the vortex ring of the electron Γ_{V-el}. All vortex lines inside the conductor form a vortex bundle with total voltage $I_{V-\Sigma}$ and total circulation Γ_{V-el} equal to it.

A large number of elementary vortex lines with a vortex-electron cross-sectional area $S_{el}=\pi(0,02r_{o-el})^2$ pass through the conductor cross section S. We assume that the number of elementary vortex lines with a cross-sectional area $S_{el} = \pi \cdot r_{o-el}^2$, proportional to $\frac{S_a}{S_{el}}$, can theoretically pass through an area of interatomic space equal to the area of an atom $S_a = \pi \cdot r_a^2$. However, we do not know their number in advance. Therefore, we introduce a correction factor ς. In addition, the number of vortex lines inside the conductor should depend on the relative cross-sectional area S / S_1. Let us take the value $S_1 = 1м^2$ as the characteristic area. Finally, the number of elementary vortex lines will be equal to

$$i = \varsigma \cdot (S / S_1) \cdot \frac{S_a}{S_{el}} . \qquad (8.2.7)$$

Multiplying the voltage (circulation) of the elementary vortex line $I_{V-\Sigma} = \Gamma_{V-el}$ by the number of these lines, we obtain the total voltage of the entire vortex bundle inside the conductor

$$I_{V-\Sigma} = \Gamma_{V-\Sigma} = \Gamma_{V-el} \cdot \varsigma \cdot (S / S_1) \cdot \frac{S_a}{S_{el}} . \qquad (8.2.8)$$

Next, we return to the expression for the current strength (8.2.2). Let us rewrite it for the vortex bundle, having previously multiplied and divided the right-hand side by a factor $i = \varsigma \cdot (S / S_1) \cdot \frac{S_a}{S_{el}}$ and replaced the surface circulation of the electron Γ^*_{el} with expression (8.2.3). Also consider that $\Gamma^*_{el} = \Gamma_{el} \cdot \Delta l = 0{,}01 \cdot \Gamma_{el} \cdot r_{o-el}$. As a result, we get

$$J = \sqrt{\varepsilon_o \varepsilon \rho_e} \cdot nVS \cdot \Gamma^*_{el} \cdot \frac{\varsigma \cdot (S/S_1) \cdot \dfrac{S_a}{S_{el}}}{\varsigma \cdot (S/S_1) \cdot \dfrac{S_a}{S_{el}}} =$$

$$= \sqrt{\varepsilon_o \varepsilon \rho_e} \cdot nVS \cdot 0{,}01 \cdot \Gamma_{V-el} r_{o-el} \frac{\varsigma \cdot (S/S_1) \cdot \dfrac{S_a}{S_{el}}}{\varsigma \cdot (S/S_1) \cdot \dfrac{S_a}{S}} = \qquad (8.2.9)$$

$$= 0{,}01 \cdot \sqrt{\varepsilon_o \varepsilon \rho_e} \cdot \frac{0{,}01 \cdot r_{0-el} \cdot nVS_1}{\varsigma \cdot \dfrac{S_a}{S_{el}}} \cdot I_{V-\Sigma}.$$

Whence the voltage of the vortex bundle of dark matter inside the metal conductor I_Σ can be expressed through the current in this conductor

$$I_\Sigma = \Gamma_\Sigma = \frac{\varsigma \cdot S_a / S_{el}}{0{,}01 \cdot r_{o-el} \cdot \sqrt{\varepsilon_o \varepsilon \rho_e} \cdot nVS_1} \cdot J\,. \qquad (8.2..10)$$

This is a useful addiction. The speed of movement of charges inside the conductor is of the order of $V = 8 \cdot 10^{-4}$м/с m / s.

In gas dynamics [8,9,11], there is a solution to the problem of determining the velocity field near a system of vortex rings in an infinite liquid field, distributed uniformly along the length of the cylinder in planes perpendicular to its generatrix. Only the circumferential rotation of a liquid (a dark gas without taking into account the compressibility with constant density) in vortex rings with an angular velocity is considered ω_U. There is no flow along the rings (not considered). According to this study, we define the velocity field induced by a system of annular vortices distributed uniformly along the length of the cylinder with a section of arbitrary shape and distributed in planes perpendicular to the generatrix of the cylinder (the cylinder is elongated along the y-axis from --∝ to +∝). Let's turn to Fig. 8.2.1.

Let be $\gamma = d\Gamma / d\eta$ the linear intensity of the vortex layer on the surface of the cylinder (the intensity of an elementary vortex ring of width dη). M(ξ, η, ζ) is a point on the cylinder. A (x, y, z) is an arbitrary point in space where speed is sought. Using the Biot-Savard law, the formula for the velocity induced by one vortex ring from the entire vortex layer on the cylinder at point A, we will have

$$\bar{V} = \frac{1}{4\pi} \int_{-\infty}^{+\infty} d\eta \int_{L} \frac{\gamma \cdot [d\bar{S}, \bar{r}]}{r^3} \ . \tag{8.2.11}$$

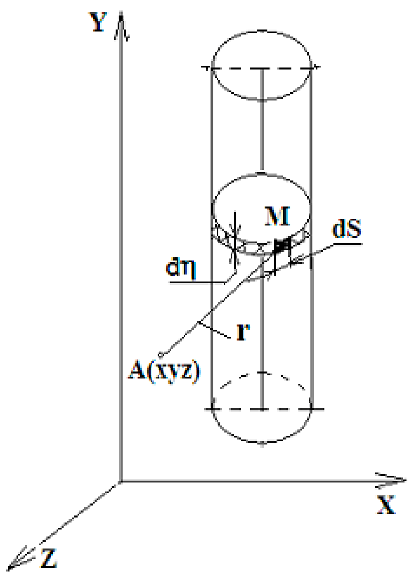

Fig.8.2.1

Let's expand the vector product [$dS, \bar{r}$]. A-priory

$$[dS,\bar{r}] = \begin{vmatrix} i & j & k \\ d\xi & d\eta & d\zeta \\ x-\xi & y-\eta & z-\zeta \end{vmatrix} = \mathrm{i}\cdot[(z-\zeta)d\eta-(y-\eta)d\zeta]+$$

$$+\,j\cdot[(x-\xi)d\zeta-(z-\zeta)d\xi]+\mathrm{k}\cdot[(y-\eta)d\xi-(x-\xi)d\eta]$$

Projecting $\overline{V}$ on the coordinate axis, we will have

$$V_x = -\frac{1}{4\pi}\int_{-\infty}^{+\infty} d\eta \int_L \frac{\gamma\cdot(y-\eta)\cdot d\zeta}{[(x-\xi)^2+(y-\eta)^2+(z-\zeta)^2]^{3/2}}$$

$$V_y = -\frac{1}{4\pi}\int_{-\infty}^{+\infty} d\eta \int_L \frac{\gamma\cdot(x-\xi)\cdot d\zeta-(z-\zeta)\cdot d\xi}{[(x-\xi)^2+(y-\eta)^2+(z-\zeta)^2]^{3/2}}$$

.

$$V_z = -\frac{1}{4\pi}\int_{-\infty}^{+\infty} d\eta \int_L \frac{\gamma\cdot(y-\eta)\cdot d\xi}{[(x-\xi)^2+(y-\eta)^2+(z-\zeta)^2]^{3/2}}$$

as $r^2=(x-\xi)^2+(y-\eta)^2+(z-\zeta)^2$

Consider the integral entering into the expression for the velocity component V_x. We assume $\gamma = const$. Since the expression under the integral sign $\int_L$ contains ($y-\eta$) in the numerator, it is convenient to change the order of integration. Then we will have

$$\int_{-\infty}^{+\infty} d\eta \int_L \frac{(y-\eta)\cdot d\eta}{[(x-\xi)^2+(y-\eta)^2+(z-\zeta)^2]^{3/2}} =$$

$$= \int_L d\xi \int_{-\infty}^{+\infty} \frac{(y-\eta)\cdot d\eta}{[(x-\xi)^2 + (y-\eta)^2 + (z-\zeta)^2]^{3/2}}$$

When integrating over y, the following values x, z, ξ, η, ζ should be considered constant. Considering the expression under the integral sign $\int\limits_{-\infty}^{+\infty}$, one can see that

$$\frac{d}{d\eta}\left[\frac{1}{\sqrt{(x-\xi)^2 + (y-\eta)^2 + (z-\zeta)^2}}\right] =$$

$$= -\frac{1}{2}\frac{-2(y-\eta)\cdot d\eta}{\left[(x-\xi)^2 + (y-\eta)^2 + (z-\zeta)^2\right]^{3/2}}.$$

Therefore

$$\int_{-\infty}^{+\infty} \frac{(y-\eta)\cdot d\eta}{\left[(x-\xi)^2 + (y-\eta)^2 + (z-\zeta)^2\right]^{3/2}} =$$

$$= \int_{-\infty}^{+\infty} d\left[\frac{1}{\sqrt{(x-\xi)^2 + (y-\eta)^2 + (z-\zeta)^2}}\right]_{-\infty}^{+\infty} =$$

$$= \frac{1}{\sqrt{(x-\xi)^2 + (y-\eta)^2 + (z-\zeta)^2}}\Bigg|_{-\infty}^{+\infty} = \frac{1}{r}\Bigg|_{-\infty}^{+\infty} = 0.$$

Hence $V_x = 0$. Likewise $V_z = 0$. Next, consider the expression for speed V_y. We rewrite it as

$$V_y = \frac{\gamma}{4\pi}\int_{-\infty}^{+\infty} d\eta \int_L \frac{[(x-\xi)d\zeta - (z-\zeta)d\xi]}{[(x-\xi)^2 + (y-\eta)^2 + (z-\zeta)^2]^{3/2}} =$$

$$= \frac{\gamma}{4\pi}\int_L (x-\xi)d\zeta \int_{-\infty}^{+\infty} \frac{d\eta}{[(x-\xi)^2 + (y-\eta)^2 + (z-\zeta)^2]^{3/2}} =$$

$$= \frac{\gamma}{4\pi}\int_L (z-\zeta)d\xi \int_{-\infty}^{+\infty} \frac{d\eta}{[(x-\xi)^2 + (y-\eta)^2 + (z-\zeta)^2]^{3/2}} .$$

Because when integrating with respect to magnitude η, $(x-\xi)$ and $(z-\zeta)$ are constants. Next, we introduce a change of variables. We put

$$(y-\eta) = \sqrt{(x-\xi)^2 + (z-\zeta)^2} \cdot shU ,$$

(shU-hyperbolic cosine). Then

$$d\eta = -\sqrt{(x-\xi)^2 + (z-\zeta)^2} \cdot chU \cdot dU$$

(chU-hyperbolic cosine). therefore

$$\int_{-\infty}^{+\infty} \frac{d\eta}{[(x-\xi)^2 + (y-\eta)^2 + (z-\zeta)^2]^{3/2}} =$$

$$-\frac{\sqrt{(x-\xi)^2 + (z-\zeta)^2}}{[(x-\xi)^2 + (z-\zeta)^2]^{3/2}} \cdot \int_{-\infty}^{+\infty} \frac{chU \cdot dU}{[1 + sh^2 U]^{3/2}} =$$

$$-\frac{1}{[(x-\xi)^2 + (z-\zeta)^2]} \cdot \int_{-\infty}^{+\infty} \frac{dU}{ch^2 U} =$$

$$-\frac{1}{[(x-\xi)^2 + (z-\zeta)^2]} \cdot thU \Big|_{-\infty}^{+\infty} = -\frac{2}{(x-\xi)^2 + (z-\zeta)^2} .$$

(thU-hyperbolic tangent). Hence

$$V_y = -\frac{\gamma}{2\pi}\int_L \frac{(x-\xi)\cdot d\zeta - (z-\zeta)\cdot d\xi}{(x-\xi)^2 + (z-\zeta)^2}$$

Let's turn to Fig.8.2.2 with a cylinder on which vortices are distributed

Project points M and A onto the xoz plane. Then they will be mapped to points M' and A'. Let's introduce new variables ρ : and ψ , where $\rho = M'A'$, $\psi -$ the angle between the z-axis and the radius.

Considering the above, we get

$$x - \xi = \rho \cdot \sin\psi$$

$$z - \zeta = \rho \cdot \cos\psi$$

$$d\xi = -[d\rho \cdot \sin\psi + \rho \cdot \cos\psi \cdot d\psi]$$

$$d\zeta = -[d\rho \cdot \cos\psi - \rho \cdot \sin\psi \cdot d\psi]$$

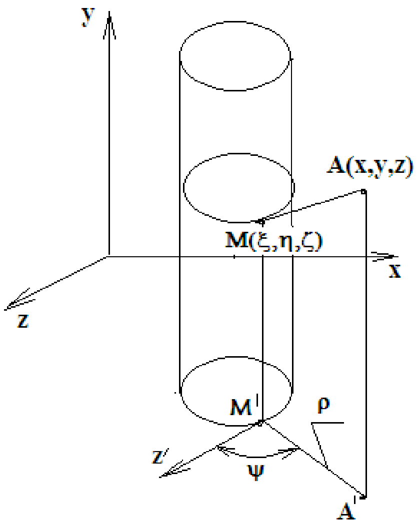

Fig.8.2.2

$$d\zeta = -[d\rho \cdot \cos\psi - \rho \cdot \sin\psi \cdot d\psi]$$

Hence

$$(x-\xi)\cdot d\zeta - (z-\zeta)\cdot d\xi = -\rho \cdot \sin\psi[d\rho \cdot \cos\psi - \rho \cdot \sin\psi \cdot d\psi] +$$

$$+\rho \cdot \cos\psi[d\rho \cdot \sin\psi + \rho \cdot \cos\psi \cdot d\psi] = \rho^2(\sin^2\psi + \cos^2\psi)\cdot d\psi =$$
$$\rho^2 \cdot d\psi ,$$

where $(x-\xi)^2 + (z-\zeta)^2 = \rho^2(\sin^2\psi + \cos^2\psi) = \rho^2$.

Therefore

$$V_y = -\frac{\gamma}{2\pi}\int_L \frac{(x-\xi)\cdot d\zeta - (z-\zeta)\cdot d\xi}{(x-\xi)^2 + (z-\zeta)^2} = -\frac{\gamma}{2\pi}\int_L d\psi$$

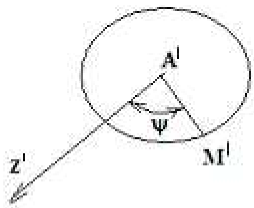

Fig.8.2.3

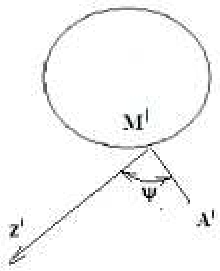

Fig.8 .2.4

A full revolution when traversing the contour gives $\psi = 2\pi$. If point A is inside the vortex cylinder (Fig. 7), then by going around the contour L we get

$$V_y = -\frac{\gamma}{2\pi}\int_{-\infty}^{+\infty} d\psi = \gamma$$

If point A is outside the vortex cylinder (Fig. 8.2.4), then

$$V_y = -\frac{\gamma}{2\pi}\oint d\psi = 0$$

If point A is located on the vortex cylinder itself, then by the mean value theorem

$$V_y = \frac{\gamma}{2}$$

It turned out that the vortex does not induce velocities outside the cylinder. An axial flow is induced inside the cylinder with a velocity varying from $V_y=\Upsilon$ on the cylinder axis to $V_y=\Upsilon/2$ on its walls. Here Υ is the linear intensity of the vortex layer on the cylinder surface. If we assume that the electrons move close to each other, then it can be estimated as the ratio of the circulation of the circular flow on the surface of the vortex ring (vortex electron) to its width

$$\Upsilon=\frac{\Gamma_{el}}{2r_{o-el}}=\pi\cdot\omega_{u-el}\cdot r_{el}=0{,}32\cdot10^{6}\ \text{м/с}. \qquad (8.2.12)$$

Previously, the parameters of the electron vortex ring were obtained:

$$r_{o-el}=1{,}7\cdot10^{-12}\,[\text{м}],\ \ \omega_{V-el}=0{,}2\cdot10^{20}\,[\text{с}^{-1}],$$
$$r_{el}=0{,}02\cdot r_{o-el}=3{,}4\cdot10^{-14}\,[\text{м}],\ \ \omega_{U-el}=3\cdot10^{18}\,[\text{с}^{-1}]$$

It follows from the analysis that inside the conductor, in addition to motion with a low speed of vortex electrons ($\bar{V}\cong6\cdot10^{-4}$ m/s), there is an axial jet of gaseous dark matter with a speed

$$V_e=0{,}32\cdot10^{6}\text{м/с}. \qquad (8.2.13)$$

Thus, the logic of our research led us to the idea **that an electric current is a combination of two flows: the first consists of vortex electrons, i.e. vortex rings of gaseous dark matter flowing at a low speed ($V\cong6\cdot10^{-4}$ m/s) along vortex lines forming a vortex cord inside a metal conductor. It is accompanied in the same direction by a second high-speed flow of gaseous dark matter ($V_e\cong0{,}32\cdot10^{6}$ m / s). It is initiated by the first thread. The vortex cord voltage in the conductor is related to the current strength by the formula (8.2.10). It is this high-speed flow of gaseous dark matter that is associated in our minds with the concept of "an electric shock".**

When a conductor closes with a grounded body, this flow rushes into the latter and, interacting with the molecules and atoms of this body, leads them to an excited state, causes heating. Careless handling of live electrical wires can lead to tragic consequences.

Without the idea of a high-speed flow of gaseous dark matter, it would not be entirely clear how a flow of electrons moving at a meager speed of less than one millimeter per second can kill people and animals whose reaction to pain, shock, and other sensations is much faster.

Electric lightning is also a discharge of electric current, consisting of the same two streams. During a thunderstorm, the air is oversaturated with water vapor and free electrons. Due to the turbulence of the atmosphere and the mixing of layers in the air, extended air vortices arise, involving free electrons in their motion. As a result, electron vortices are formed. If these vortices turn out to be elongated between the ground and a cloud in which many excess electrons have accumulated, the latter begin to slowly move from the cloud to the ground, lining up in chains with gaseous dark matter blowing forward from the central holes of the vortex rings. These vortex lines (more precisely vortex tubes) begin to play the role of electrical wires.

Now, inside the vortex electron tubes, high-speed flows of gaseous dark matter (V_e=0,32·10^6 m/s) appear. A current discharge occurs with all the ensuing consequences. Interacting with atoms and molecules of air, high-speed streams of dark matter heat the air to the state of incandescent plasma, the glow of which we see in the blaze of lightning and hear in belated rumbles of thunder. It is known that lightning also occurs between two clouds, one of which has an excess and the other lacks electrons.

At present, experimental data are known on measuring the velocities of the "leader" (the tip of a lightning bolt) $V \cong 10^6$ m/s. Of course, in the experiment, not the flow of dark matter is recorded, but the movement of the front of contact of the flow of dark matter with air. Air atoms and molecules acquire the speed of the front of contact with the flow of dark matter. As a result, the air is heated and converted into plasma. This makes the lightning visible. Recall that we theoretically obtained the speed of movement of dark matter inside the vortex cord of dark matter V_e=0,32·10^6 m/s. This value practically coincided with the lightning observations.

8.3 Ampere's Law

Ampere's Law is the law of interaction of electric currents. It was first installed by André Marie Ampere in 1820 for direct current. It follows from Ampere's law that parallel conductors with electric currents flowing in one direction attract, and in opposite directions they repel. Ampere's law is also called the law that determines the force with which a magnetic field acts on a small segment of a conductor with a current

d F = J·B·dl·sin α,

where B is the magnetic induction. After integration, we have a force (attraction-repulsion) referred to a conductor segment with a length l

$$\frac{F}{l} = J \cdot B \cdot \sin\alpha \,, \qquad (8.3.1)$$

where J is the current in the conductor, $B = \mu_0 \mu \frac{J}{2\pi r}$ is the magnetic induction, r is the distance measured along the normal from the axis of the conductor, α is the angle between the vector of magnetic induction and the direction along which the current flows. $l -$ the length of the current conductor .

In the concepts of the theory of dark matter, electric current is a phenomenon associated with the slow movement of vortex electrons along elementary vortex filaments inside a conductor at a speed of $\bar{V}$ =8·10^{-4} m/s, accompanied by a high-speed flow of dark matter with a speed of V=0,32·10^{6} m/s from. Elementary vortex filaments inside a conductor with current make up a vortex bundle. The total voltage of the vortex bundle is equal to the total velocity circulation and can be expressed in terms of the current strength by the formula

$$I_{V\text{-}\Sigma} = \Gamma_{V\text{-}\Sigma} = \frac{\varsigma \cdot S_a / S_{el}}{0,01 \cdot r_{o-el} \cdot \sqrt{\varepsilon_o \varepsilon \rho_e} \cdot nVS_1} \cdot J \,. \qquad (8.3.2)$$

The walls of the conductor are not an obstacle for dark matter. Therefore, the vortex bundle located inside the conductor induces around itself and, therefore around the conductor, a circular flow of gaseous dark matter with a speed

$$U_v=\frac{\Gamma_{V-\Sigma}}{2\pi\cdot r}=\frac{I_{V-\Sigma}}{2\pi\cdot r}\ . \qquad (8.3.3)$$

The neighboring conductor is in this stream. Due to the fact that its vortex bundle also passes inside it, the circulation of velocity along its perimeter is not zero. As a result, the force of Magnus will act on him in the direction of the first conductor. The same force will act on the first conductor. The force (attraction-repulsion) acting on each conductor and referred to a segment of a conductor of length l was found using Zhukovsky's theorem on the normal force arising on bodies in a flow of a liquid or gaseous medium at a non-zero value of the velocity circulation calculated along the outer contour of this body

$$\frac{F}{l}=\rho_e U_{V2}\Gamma_{\Sigma 1}=\rho_e\frac{I_{V-\Sigma 1}I_{V-\Sigma 2}}{2\pi\cdot r}=\frac{(\varsigma\frac{S_a}{S_{el}})^2}{(0{,}01\cdot r_{o-el})^2\cdot\varepsilon_o\varepsilon\cdot(nVS_1)^2}\cdot\frac{J_1J_2}{2\pi\cdot r}$$

(8.3.4)

In this formula

$$\mu_o\mu=\frac{(\varsigma\frac{S_a}{S_{el}})^2}{(0{,}01\cdot r_{o-el})^2\cdot\varepsilon_o\varepsilon\cdot(nVS_1)^2}\ . \qquad (8.3.5)$$

This formula connected the magnetic constants μ_o and μ with the electrostatic constants ε_o and ε, as well as with the parameters of the ring vortex electron of dark matter $r_{el}=0{,}01\cdot r_{o-el}$ and the speed of movement of the vortex electrons of the electric current in the conductor $\bar{V}$ =8·10^{-4} m/s. The same formula includes the cross-sectional areas of an atom S_a and an electron vortex S_{el}. Such a combination of such dissimilar quantities was only possible due to the concept of the field of dark matter. Substitution of the values of the quantities included in it into expression (8.3.4) made it possible to determine the number of vortex filaments by the formula $i = \varsigma \cdot (S / S_1) \cdot \frac{S_a}{S_{el}}$. The number of vortex lines in a copper conductor with a cross-sectional radius $R = 3мм = 3 \cdot 10^{-3} m$ $(\vec{S} = \frac{S}{S_1} = 0{,}28 \cdot 10^{-4} m^2)$ turned out to be $i = 4{,}2 \cdot 10^2$ =420. The calculated value μ_o is the same as the experimental value. Here: n is the number of electric charges (vortex of conduction electrons) per unit volume.

For copper wire n=8.5·10^{28} m^{-3}, $\bar{V}$ =8·10^{-4} m/s, μ=1, ε=1 (for vacuum), ε_o=8,854·10^{-12} F/m, $S_1 = 1$ m , $S_a = 3{,}14 \cdot 10^{-20}$ m^2, $S_{el} = 3{,}14 \cdot (1{,}7 \cdot 10^{-12})^2 = 9{,}075$ m^2, $r_{o-el} = 1{,}7 \cdot 10^{-12}$ m, $\mu = 1$, μ_o=4π·10^{-7} Gn/m=1,26·10^{-6} Gn/m, a correction factor that specifies the number of elementary vortex filaments in a vortex bundle ς=0,43·10^4

If the conductors with current are at an angle α (Fig. 8.3.1), then the velocity U induced in the field of dark gaseous matter by an infinite horizontal conductor with a current J_1, should be decomposed taking into account (8.3.2) and (8.3.3)) into the direction normal to inclined conductor

$$U_{n1} = U_{v1} \cdot \sin\alpha = \frac{I_{V-\Sigma 1}}{2\pi \cdot r}\sin\alpha = \frac{\varsigma \cdot S_a / S_{el}}{0{,}01 \cdot r_{0-el} \cdot \sqrt{\varepsilon_o \varepsilon \rho_e} \cdot nVS_1} \cdot \frac{J_1 \cdot \sin\alpha}{2\pi \cdot r} \tag{8.3.6}$$

and on the direction parallel to this conductor $U_\tau = U_{v1}\cos\alpha$. It is clear that the movement of the flow of dark matter along the inclined conductor is not reflected in the pressure distribution diagram in the cross section of this conductor.

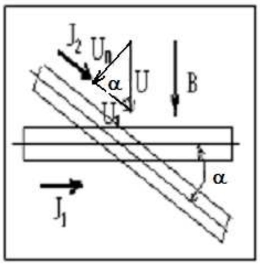

Fig.8.3.1

The pressure distribution depends only on the Un1 speed U_{n1}. Therefore, the formula for determining the modulus of the Zhukovsky lateral force should be rewritten taking into account formulas (8.3.2), (8.3.5) and (8.3.6) to the form

$$\frac{F}{l} = \rho_e U_n \Gamma_{\Sigma 2} = \mu_o \mu \frac{J_1 J_2}{2\pi \cdot r} Sin\,\alpha = J_2 \cdot B \cdot Sin\,\alpha\,. \qquad (8.3.7)$$

Recall that the modulus of force, determined by the Zhukovsky theorem, is equal to the product of the density ρ_e and the speed of the incoming flow U_{n1} by the circulation of the speed $\Gamma_{\Sigma 2}$, which is equal to the voltage of the vortex bundle $I_{\Sigma 2}$ inside the inclined conductor. Let us take into account that the speed U_{n1} is induced by the vortex bundle inside the horizontal wire. The direction of the speed U_{n1} coincides with the direction of the magnetic induction vector induced by the horizontal conductor with current J_1. Therefore, the angle α turns out to be the angle between the magnetic induction vector B and the section of the inclined conductor l_2 with current J_2. Thus, formula (8.3.7) is the well-known Ampere's law, which determines the force with which a magnetic field with induction B acts on a segment of an inclined conductor l with a current J_2. placed in it.

8.4 Lorentz force

The Lorentz force is the force with which the electromagnetic field, according to classical (non-quantum) electrodynamics, acts on a point charged particle. Sometimes the Lorentz force is called the force acting on a charge q moving with speed only from the side of the magnetic field.

$F=q \cdot V \cdot B \cdot Sin\alpha$

Often, the full force acting from the electromagnetic field, in other words, from the electric E and magnetic B fields. In the International System of Units (SI), it is expressed as:

$F = q (E + [v \times B])$

This force is named after the Dutch physicist Hendrik Lorenz, who derived the expression for this force in 1892. Three years before Lorenz, the correct expression was found by O. Heaviside.

.We will consider the case of the force effect of a magnetic field on a charge q moving with a speed V. In the concepts of the theory of dark matter, an elementary electric charge (negative or positive) is either an electron or a positron $q = e$. The magnetic field is the velocity field of gaseous dark matter, induced by a conductor with an electric current [1 ...4].

If an elementary electric charge q = e moves in a magnetic field (the field of velocities of gaseous dark matter) at an angle α to the vector of magnetic induction B at a velocity V, then its motion can be considered as an elementary electric current with a current strength $J_2=q/1s$ in a conventional conductor length $l_2=V \cdot 1s$. Substitute these values into Ampere's formula (1). We get the Lorentz force

$$F = \rho_e U_n \Gamma_{\Sigma 2} l_2 = \mu_o \mu \frac{J_1 J_2}{2\pi \cdot R} l_2 \cdot Sin\,\alpha = J_2 \cdot B \cdot l_2 \cdot Sin\,\alpha$$

$=q \cdot V \cdot B \cdot Sin\alpha$ (8.4.8)

Fig. 8.4.2 and Fig. 8.4.3 show the diagrams of the velocities U and U_e induced in gaseous dark matter by a conductor with a current (a vortex bundle of dark matter passing inside the conductor and moving at a speed V by an elementary charge q. The same figures show diagrams of forces obtained in accordance with Zhukovsky's theorem, acting on electric positive and negative charges flying along a conductor with a current flowing in our direction. The direction of the Lorentz forces acting on the positive and negative charges can be determined by the left hand rule.

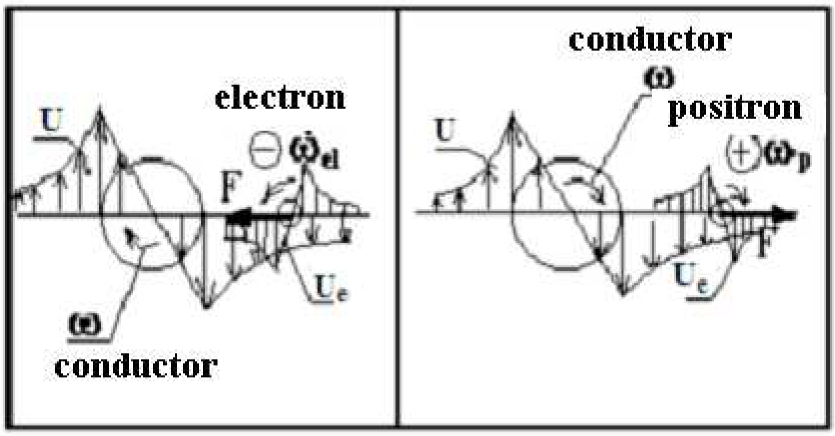

Fig.8.4.2 Fig.8.4.3

8.5 Frame with current in a magnetic field of straight conductor with current

Figure 8.5.1 shows a frame that is a closed flat loop with current J_2. The axis of the frame is parallel to the infinite rectilinear conductor with current J_1. We already know that this is equivalent to the fact that a vortex cord of gaseous dark matter with voltage I1 passes inside the conductor. The strength of the current and the voltage of the vortex cord are related to each other by the formula (8.3.2). A straight-line vortex induces a peripheral velocity field around itself. The frame is small compared to the distance between the frame and the straight vortex. Therefore, we will assume that it is streamlined by a uniform flow of gaseous dark matter with the same circumferential speed $U=I_1/2\pi\cdot R$ entirely. Here R is the distance between the infinite conductor and the axis of the frame. The length of the sides of the frame, parallel to the axis, is Δl_2 and of the perpendicular sides -h. The area inside the frame outline is $S_p=\Delta l_2 h$.

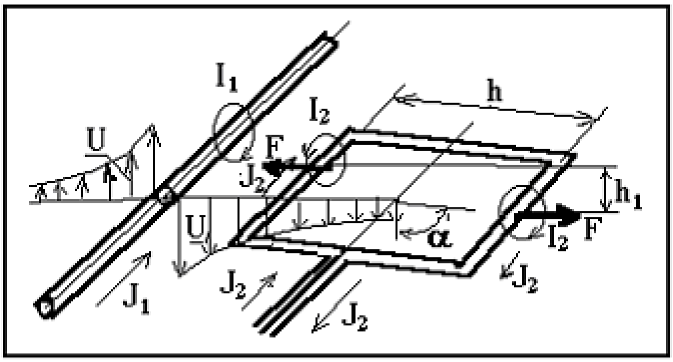

Fig.8.5.1

When the flow of gaseous dark matter flows around the frame, induced by the vortex cord of an infinite conductor, normal forces appear on the sides of the frame parallel to its axis, which are determined by the Zhukovsky theorem. This is because an electric current flows in the conductor forming the frame and passes its own vortex cord of gaseous dark matter with voltage I_2. This voltage is related to the current strength J_2 by the formula (8.3.2).

In accordance with the first Helmholtz vortex theorem, the stress I_2 is constant along the entire length of the frame, despite its complex shape. In this case, the direction of rotation of the vortex bundle in the parallel conductors of the frame turns out to be opposite. The Zhukovsky forces arising on these conductors will be parallel to each other, but directed in different directions. Zhukovsky's forces are perpendicular to the axis of the rectilinear vortex and the incident flow velocity.

Just as in the analysis of the force interaction of two infinite rectilinear conductors with current, the forces bring together the conductors of finite length if the directions of the currents coincide and repel if the currents flow in different directions. The magnitudes of these forces acting on each side are determined by the formula

$$F = \rho_e U_1 \cdot \Gamma_{\Sigma 1} \Delta l_2 = \rho_e \frac{I_1 I_2 \cdot \Delta l}{2\pi \cdot R} . \qquad (8.5.1)$$

The moment of a pair of forces located at a distance h_1 from each other will be

$$P_m = Fh_1 = \rho_e \frac{I_1 I_2 \Delta l_2}{2\pi R} h_1 . \qquad (8.5.2)$$

If the voltages I_1 and I_2 of vortex bundles of gaseous dark matter are replaced with the help of (8.3.2) through the currents J_1 and J_2 and take into account the expression (8.3.5) for the coefficients $\mu_o\mu$ and the expression for the induction $B = \mu_0 \mu \frac{J}{2\pi r}$, then we obtain the following formula

$$P_m = BJ_2 \Delta l_2 h_1 . \qquad (8.5.3)$$

From Fig. (8.5.4) it can be seen that the arm of forces h_1 is related to the distance between the sides of the frame h through Cosα

$$h_1 = h\mathrm{Cos}\alpha . \qquad (8.5.4)$$

Let's substitute this value in the formula (8.5.4). We finally get

$$P_m = BJ_2 l_2 h\mathrm{Cos}\alpha = BJ_2 S_p \mathrm{Cos}\alpha . \qquad (8.5.5)$$

Here α is the angle between the direction of the velocity U in the center of the frame (induction vector) and the plane of the frame. The resulting formula is fully consistent with the experimental data. The biggest moment acting on the frame will be when $Cos\alpha=1$

When the frame is located in a plane passing through an infinite conductor, $Cos\alpha=0$ and the moment P_m turns to zero. In this case, the forces applied to the opposite sides of the frame also lie in the same plane and, although they are still directed in different directions, the shoulder $h_1=0$ and therefore the moment $P_m=0$.

The orientation of the frame depends on the direction of the current in the frame. When the direction of the current in the frame changes, the sign of the voltage (circulation) of the vortex of gaseous dark matter changes. As a result, the forces and moment from them also change their directions and the frame rotates 180^o. The closer the frame is to the wire through which the current flows, the greater is the moment from the forces acting on the frame. The quantity $\Delta\Phi$ [1,2], which is an integral part of the formula (8.5.5), is called the flux of magnetic induction (magnetic flux)

$$\Delta\Phi=B\cdot S\cdot Cos\alpha \qquad (8.5.6)$$

Положительный знак магнитного потока соответствует острому углу α.

Conclusion: An Eternal and Infinite Universe

In the theory of gaseous dark matter, the possibility of complete transformation of baryonic matter into energy is natural, since baryonic matter itself is considered as a form of motion of dark matter, and energy is interpreted as the internal energy of the chaotic movement of atoms of gaseous dark matter, as the stored kinetic energy of rotation of the nuclei of atoms (protons and neutrons) as the energy of weak and strong waves propagating in the field of a dark gas, or as the kinetic energy of flows (jets) of a dark gas.

According to the theory of gaseous dark matter in the entire Universe, a new mass (new baryonic matter) is constantly being formed in the process of absorption of dark gas by atomic nuclei from the surrounding space. The space-filling dark gas has tremendous internal energy. Naturally, an exchange of energy and mass takes place between the field of dark gas and material bodies, including stars. Therefore, energy on the scale of the Universe does not disappear and does not appear out of nothing, but only passes from one type to another. So there is no mysticism in such a transformation.

Although dark gas is invisible, has no smell or taste, we perceive it through gravity, inertial force, and electromagnetic influences. The sea of □□dark gas that fills the entire Universe is raging and boiling, and inside this raging sea of □□dark gas, instead of realizing that everything in nature is material, we entertain ourselves with fairy tales about disembodied gravitational fields and magnetic fields, about incomprehensible forces of inertia, which exist as if by themselves without a material carrier. We come up with horror stories about “black holes” eternally absorbing matter, which falls into a “singularity” and goes into other dimensions, ie. to nowhere, about the corridors of time through which “aliens” come to us, about the “heat death” awaiting the Universe, about the “big bang” that allegedly gave birth to the Universe, about the “expanding Universe” (it is not clear only where it is expanding, as if there is something other than the universe) and other absurdities.

In conclusion, I note that the theory of gaseous dark matter had explained and reconcile with each other the phenomenon of stellar aberration, Michelson's experiment, Sagnac's experiment, Doppler's phenomenon, Fizeau's phenomenon, observations of double stars, etc. These experiments are associated with the concept of presence in space material gaseous medium (gaseous dark matter). Related to this is the question of whether the Earth in its movement around the Sun at a speed of 30 km / s carries dark matter or passes through it, i.e. blown by the oncoming flow of dark gas?

A. Einstein's theory of relativity connects the propagation of light with the movement of light waves. It is known that any wave propagates in a continuous medium (air, water) at a constant speed, which does not depend on the speed of the source and the reflecting surface. Transferring this property of the motion of waves in air or water to the propagation of light, the theory of relativity states that the speed of light is also constant. This is its main postulate (it has no experimental confirmation), on which it is built and stands firmly, rejecting any objections to this.

With this property of the speed of light, Michelson's experiment showed that the entire continuous gaseous interstellar medium is carried away by the Earth as it moves along its orbit. The phenomenon of stellar aberration, on the contrary, shows that the Earth. moving in orbit, it does not carry this environment with it at all. The theory of relativity could not explain this contradiction and abandoned the concept of a gaseous interstellar medium (ether), forcing light waves and electromagnetic oscillations to propagate and vibrate in emptiness. Thus, she left unanswered what is the nature of gravity, inertia, electromagnetic fields and many other mysterious phenomena occurring in the Universe. At the same time, the concept of a void between cosmic bodies, which the theory of relativity endowed the Universe with, only now physicists (relativists), feeling the lack of support under their theoretical constructions, are modestly quietly trying to replace it with by a physical vacuum, etc.

The contradiction between the interpretation of Michelson's experiment and the phenomenon of stellar aberration exists only as long as physics believes that the speed of light, according to the theory of relativity, does not obey the laws of addition of speeds known from human practice. If the propagation of light is associated with the movement of a photon as a material particle, then the speed of the photon must add up with the speed of the radiation source and the speed of the reflecting surface. In this case, the contradiction between the considered experiments naturally disappears and gaseous dark matter gets the right to exist. Any researcher himself, rejecting Einstein's postulate of the constancy of the speed of light, can repeat their reasoning after Michelson and Sagnac and make sure that the contradictions of these experiments between themselves and the phenomenon of stellar aberration disappear.

The existing misconception lies in the misunderstanding that the particles of dark matter are very small. Due to the fact that their own dimensions are many orders of magnitude smaller than the dimensions of any material bodies, smaller than the Earth, fewer atoms of which it consists and fewer nuclei of these atoms, they easily move inside material bodies, inside the Earth. (as meteorites fly inside the solar system between the planets). Streams of dark gas flow around only the dense nuclei of atoms, and not the entire Earth. In this sense, the Earth is does not carry away the dark gas, and the experience of aberration is explained in the same way as when the Earth and light move in emptiness. There is nothing to add here.

In Michelson's experiment, the displacement of the interference fringes should not occur, no matter how high the speed of the Earth relative to the ether (during the lifetime of A. Einstein, it was believed that a rarefied medium by called ether filled the space between the stars and planets). Michelson's experience cannot reveal this. In fact, the phenomenon of Bradley's stellar aberration and Michelson's experiment do not contradict each other.

It must be remembered that all material (baryonic) bodies are composed of atoms. The atoms of most minerals, metals, liquids and gases themselves have densities of the order of several units, measured in kg/m^3, and only the nuclei of atoms (protons) have enormous densities of the order of 10^{18} kg/m^3 and very small sizes with radii of the order of 10^{-15} m. The radii of atoms of material bodies are of the order of 10^{-10}m. As a result, most baryonic bodies are like to a sieve or to sieve through which gaseous dark matter flows freely. (according to our estimates [5,18], the mass of one dark matter atom is $m_A^* = 2{,}09 \cdot 10^{-57}$ kg, the radius of one dark matter atom is $r_{0e}^* = 0{,}62 \cdot 10^{-25}$ m, the number of dark matter atoms inside the nucleus of a hydrogen atom located close to each other $n_{0z} = 0{,}8 \cdot 10^{30}$).

In this case, a situation arises that is paradoxical for scientists who are not specialists in fluid dynamics. Material (baryonic) bodies of low density, moving in the dark gas of outer space, pass streams of dark gas between the nuclei of atoms through themselves and therefore do not create a field of disturbed flow around them. Only very small nuclei of atoms inside the bodies are flown around in comparison with the size of the body itself.

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