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Gravity, dark matter and dark energy balance

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In the article it is assumed that the Universe is filled with a moving dark matter. Objects of usual baryon matter (such as elementary particles, solids, liquids, gases, planets, stars and galaxies) exist in the ocean of dark matter and represent special moving forms of dark matter. All baryons permanently absorb dark matter. At the surface of elementary particles takes place the phase transformation of gaseous dark matter to the liquid and the solid. It leads to the permanent increase of the mass of the baryon matter. From these assumptions follows the law of universal gravity. All major parameters of the gaseous dark matter, namely, density, pressure, velocity, etc. are determined by using the laws of continuum mechanics and the available observation data. It is shown that the stock of dark energy of the Universe (energy of dark matter) is very huge and the dark energy plays the important role in the energy balance of all objects of baryon matter including the galaxies, stars and planets.

Keywords: dark matter, baryon matter, dark energy, Heat Death of the Universe, universal gravitation law, nature of Universe, the growing Earth, Secular Acceleration of Moon.

1. Interaction of baryonic and dark matter

In this paper 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 within baryonic matter is converted from a gas to a liquid state, and then the solid state. This phase transition is discussed in more detail in [1-3]. 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

$$q = \frac{dm_e}{dt}$$

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 is

$$q = -\ 4\pi r^2 \rho_e V_{re} \tag{1}$$

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 $C_{a0} = C = 3\times10^8 [m/s]$). From Eq. (1) follows the expression for radial velocity of gaseous dark matter

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

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

$$q = \frac{dm_e}{dt} = \alpha m \tag{3}$$

where $\alpha\ [1/s]$ is the coefficient of mass flow rate of gaseous dark matter. This is constant. It value does not depend on the chemical composition and physical state of the baryon body. We will define it later.

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

$$\frac{dm_e}{dt} = k\frac{dm}{dt}$$

Here k is the coefficient of mass formation rate. From (3) and (4) follows

$$\frac{dm}{dt} = \frac{\alpha}{k} m \tag{4}$$

After integration we have the law of baryon mass growth in time due to the absorption of dark matter. This law is governs all baryons of universe from elementary particles to the stars and planets, including Earth and Sun

$$m = m_0 e^{\frac{\alpha t}{k}} \tag{5}$$

Here the value m_0 represents the mass of baryon at initial instant $t = 0$. Coefficients α and k are defined later. Taking into account Eq. (2) and (3) the radial velocity can be calculated

$$V_{re} = \alpha m \ / \ 4\pi\rho_e r^2 \tag{6}$$

The minus sign on the right side dropped.

2. **Gravity**

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. 1). Let r is the distance between bodies.

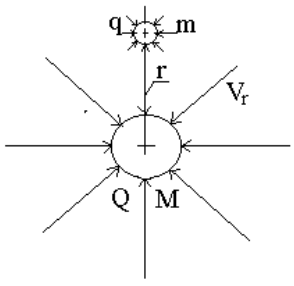

Fig.1

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 towards the large body is

$$V_{re1} = Q / 4\pi\rho_e r^2 \tag{7}$$

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

$$F = \frac{Qq}{4\pi\rho_e r^2} \tag{8}$$

From Eq. (3) we get

$$q = \alpha m, \ Q = \alpha M$$

Hence

$$F = \frac{\alpha^2}{4\pi\rho_e}\frac{Mm}{r^2} \tag{9}$$

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

Thus, equation (9) 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

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

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

$$f = \alpha^2/4\pi\rho_e \tag{10}$$

From formulas (7), (8) and (9) it follows, that gravity force acceleration is

$$g = \alpha V_{re} = \frac{\alpha^2}{4\pi\rho_e}\frac{M}{r^2} = f\frac{M}{r^2} \tag{11}$$

Taking into account (11) for gravity force we may write

$$F_g = mg = m\alpha V_{re}$$

The density of dark matter in gaseous state ρ_e we find from (10)

$$\rho_e = \alpha^2/4\pi f \tag{12}$$

Therefore, we write the expression (7) for the radial velocity on the surface of any star. Star absorbs gas of dark matter. Therefore, the photons of light, emitted by the star, have to overcome the incoming flow of dark gas in all radial directions. This is reminiscent of sailing in the river against the current. If the speed of the swimmer does not greater than the velocity of the water, he can be swimming as long as desired, but does not move forward against flow. In view of these considerations we conclude that a star is invisible when the radial velocity of the gas of dark matter on its surface becomes equal to the speed of light. Such a star turns into “a black hole” and disappears from sight. This condition can be written as

$$V_{re0} = fm/\alpha r_0^2 = C \tag{13}$$

Here $f = \alpha/4\pi\rho_e = 6.7\times10^{-11}[Nm^2/kg^2]$ is the gravity constant. This formula is used to calculate the coefficient $\alpha\ [1/s]$ that is the coefficient of mass flow rate of gaseous dark matter through surface of baryons.

From formula (13) we see that for a very dense star the largest radial velocity of gaseous dark matter on the stellar surface V_{re0} can be expected in case of large mass and small radius. Stars "white dwarfs" fit for the purpose. Among them the densest star Wolf-457 has mass $m = 1.01\times10^{30}[kg]$ and radius $r_0 = 0.7\times10^6[m]$ [4]. This star is about of the same size as Earth. But

its mass is a million times greater than the mass of Earth but only two times less than the mass of the Sun.

From equation (13) it follows that for the star Wolf-457 the coefficient $\alpha = 0.46\ [s^{-1}]$. This is threshold of invisibility. But since this star is visible, it is clear that α is a few more. It is possible that in the Universe there are more dense visible stars which are currently not found yet. If we imagine the star in the same volume of the "white dwarf" Wolf-457 with the radius $r_o = 0{,}7\times10^6[m]$ and with a mass twice greater than the mass of the star Wolf-457, namely, $m_0 = 2{,}02\times10^{30}\left[kg\right]$, then the flow rate coefficient of the gaseous stream of dark matter in accordance with the formula (13) takes the value $\alpha = 0{,}92\ [s^{-1}]$. This value is close to unity. Therefore we accept that the coefficient of mass flow rate of the gaseous flow of dark matter through the surface of all baryons in the Universe has the following magnitude

$$\alpha = 1\ [s^{-1}] \tag{14}$$

If $\alpha = 1\ [s^{-1}]$ then at the surface of the star Wolf-457 the velocity of a gas dark matter is $V_{re0} = fm/\alpha r_0^2 = 1{,}36\times10^8[m/s]$. It is approximately equal to half of the speed of light. Today more dense stars astronomers do not detect. Apparently, they have become a "black holes" and be invisible.

The magnitude $\alpha = 1\ [s^{-1}]$ and the formula (3) $q = dm_e/dt = \alpha m$ lead us to a completely unexpected understanding of the baryon mass of bodies. From these formulas it follows that the flow of the gas dark matter through the surface of the baryon is equal to the mass of baryon. Although we call the baryon masses and masses of dark matter by using the same term, but in fact they represent the different concepts though related to each other. It becomes clear that all the baryon masses grow with time. This increase can not be understood as a purely mechanical adding of the mass of absorbed dark matter into the mass of the absorbing body.

Still uncertain is physical process by which large mass of gas dark matter is absorbed and gives a small amount of baryonic mass, thereby increasing ability of baryons to absorb gas of dark matter from the surrounding space. Thus, it is necessary to further examine the relationship between rates of the consumption of dark gas dm_e/dt and the formation of new baryon mass dm/dt. Let us consider this relationship in more detail.

This value $\alpha = 1\ [s^{-1}]$ allows calculate the density of gaseous dark matter with the help of (10)

$$\rho_e = \alpha^2/4\pi f = 1.19\times10^9[kg/m^3] \tag{15}$$

Remark that the formulas (10) and (15) describe the physical nature of Newton's gravitational constant. This constant is inversely proportional to the density of gas dark matter, i.e. uniquely related to the properties of dark matter.

To complete the picture let us estimate pressure p_e of gas dark matter. The gas of dark matter is an ideal monoatomic gas. It is characterized by density ρ_e and has the velocity of propagation of weak perturbations $C_{a0} = 3\times10^8[m/s]$ (it is equal to the speed of light in vacuum). Then according to gas dynamics laws [4-5] for pressure we get

$$p_e = \frac{\rho_e \cdot C_{a0}^2}{\chi} = 6.426\cdot10^{25}[N/m^2]$$

here $\chi = \frac{i+2}{i} = \frac{5}{3} = 1.67$ is the adiabatic index, $i = 3$ is the number of degrees of freedom for a gas dark matter atom.

In the observational astronomy it is convincingly shown [6-7] that dark matter interacts with the molecules of the interstellar gas (the cyanogen CN) and causes the phenomenon of cosmic background radiation with the temperature

$$T_e = 2.75\ [^o K]$$

We take this temperature as the temperature of the gas dark matter. Thus, we have now approximate values of the basic parameters of gas dark matter: density, pressure, and temperature.

To determine the coefficient of mass formation rate k let us turn to the phenomenon of secular acceleration of the Moon. It is known [8], that among the many celestial movements that fully conform to celestial mechanics, there are several cases of discrepancy of the observed and calculated motion of the heavenly bodies. One of these unexplained phenomena is the so-called phenomenon Secular Acceleration of Moon. A comparison of the ancient observations of eclipses of the Sun with new observations showed that at present time the Moon moves a little faster than before. Each 100 years Moon goes ahead against the calculated position on 10" or at the distance of approximately 18.6 km. Only part of this acceleration, about 6", explained by the theory of gravitation, and the remaining 4" (ΔS_{100}) are present due unknown cause [8]

$$\Delta S_{100} = 7.45\ [km] = \ 0.745 \times 10^4 [m] \tag{16}$$

The Moon is accelerated due to the increase in mass of the Earth in time. Let us show it. Assuming that the orbit of the Moon has a circular shape, we write the equality of forces acting onto the Moon (gravity force and centrifugal force)

$$mV^2 / r_{opbit} = fmM / r_{opbit}^2$$

where m and M are the masses of the Moon and the Earth, r_{opbit} is the radius of the orbit of the Moon, f is the gravitation constant. From this equation we find the orbital velocity of the Moon $V = \sqrt{fM / r_{opbit}}$. Taking into account the growth of the mass of the Earth (Eq. (5)) we get the law of the Moon acceleration

$$V = \sqrt{\frac{fM_0}{r_{opbit}}} e^{\frac{\alpha t}{2k}} \approx \sqrt{\frac{fM_0}{r_{opbit}}} \left(1 + \frac{\alpha}{2k} t\right) \tag{17}$$

where M_0 is the mass of the Earth at the initial instant $t = 0$. This dependence implies that over time the orbital velocity V should be growing to hold the Moon on its orbit. From (17) the additional increment of the Moon path due to its orbital acceleration can be written as

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

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

$$\Delta S_{100} = 2.52 \times 10^{21} \alpha / k\ [m] \tag{18}$$

Because of the proximity of the Moon to the Earth in its motion such deviations can be visible. But such deviations cannot be detected in the observations of more distant celestial objects. Given the reliability of data about the Moon motion we use equations (16) and (18) in order to determine the ratio α / k and the coefficient of formation rate of mass k

$$\alpha / k \ = \ 2.97 \times 10^{-18} \ [1/s] \tag{19}$$

$$k \ = \ 3.36 \times 10^{17} \tag{20}$$

The value $\alpha / k \ = \ 2.97 \times 10^{-18} \ [1/s]$ and the law (5) allow find out how the masses of baryons in the Universe grow in time. This dependence is shown in Table 1, where m_0 is a mass of baryon at instant $t = 0$.

Table 1 Growth of the mass of baryons in time due to absorption of gas dark matter.

Time (billion years)	0.0	1.0	2.0	3.0	5.0	10	15
$m/m_0=e^{\alpha \cdot t/k}$	1.00	1.10	1.21	1.33	1.61	2.59	4.17

We note in passing that the value $\alpha / k \ = \ 2.97 \times 10^{-18} \ [1/s]$ equal of the Hubble constant. Perhaps the red shift in the spectra of distant galaxies takes place not due to the recession of galaxies or due to the expansion of the Universe but because of the increase of mass and size of photons of light from galaxies on the way to Earth [3]. The details are discussed farther.

In solving this problem the great variety of stars and the processes occurring in them should be taken into account. It is known [6-7] that, along with an increase in mass due to the absorption of gas dark matter, stars also emit large masses.

So through the corpuscular radiation the Sun loses $7 \times 10^{14} [kg / year]$ while the mass loss due to electromagnetic radiation is $1.5 \times 10^{17} [kg / year]$.

The corpuscular radiation and electromagnetic radiation are characteristic properties of all stars. Apparently, the intensity of the corpuscular radiation is proportional to the intensity of the light radiation, i.e. luminosity of the star. Therefore, mass loss, as well as its accumulation, roughly proportional to each other. For the most massive stars the mass loss rate can be very high.

For example, bright supergiant star Wolf-Rayet emits $2 \times 10^{25} [kg / year]$, i.e. 10 orders of magnitude larger than the Sun, and gets (see (5)) $1.8765 \times 10^{21} [kg / year]$. That is, this star currently emits 10000 times greater mass than the received [6-7, 9-10].

Recall that baryonic bodies absorb gas of dark matter from the surrounding space according to equation (4)

$$dm_e / dt = k dm / dt$$

From this equation it follows that the rate of absorption of the mass of gas dark matter m_e is many times greater than the rate of formation of baryonic mass m. Over time the great mass of gas dark matter creates a completely negligible quantity of baryonic mass. The relation between these masses we get integrating Eq. (4) and putting the constant of integration equal to zero

$$m = \frac{m_e}{k} \tag{21}$$

According to this formula, the density of gas dark matter can be determined in conventional units adopted for the density of baryonic matter. To do this, we need to reduce the density of gas dark matter ρ in k times

$$\rho_e^* = \rho_e / k = 3.54 \times 10^{-12}[g / sm^3] = 3.54 \times 10^{-9}[kg / m^3] \tag{22}$$

This is the average density of the gaseous dark matter in the Universe, written using measure unit of the density of baryonic matter.

We have identified the physical properties of gaseous dark matter. This allows us to draw some conclusions. On the one hand dark gas is consists of very small atomic with radii $r_o = 10^{-25}[m]$. On the other hand, this medium was very dense ($\rho_e = 1{,}19 \times 10^9[kg / m^3]$). So the question is arises,does not interfere with the high density of the gaseous dark matter on motion of the planets and other celestial bodies in their orbits. Why a countercurrent flow of gaseous dark matter is not sweeps us from the surface, when the Earth is the motion on orbit around the Sun with great speed $30[km / s]$?

To understand this, we is consider a hypothetical spatial fishing net with large cells. Its will average density, and not the density of the filaments is small as compared to the density of water. If you will be increase the size of the cells, then this average density can be made arbitrarily small. But the network will pass easily through the water. It will be the easier than will be larger the cell width. This device a fishing net simulates atomic structure of most minerals that make up the Earth and other planets.

In liquids and gases the interatomic distances have of the order $10^{-10}[m]$ and more. At the same time, the size of the atomic nuclei of these liquids and gases is make up only $10^{-15}[m]$. Distance between the nuclei of baryons will become unthinkable huge if their values to measured by size of atom of dark gas $r_o = 10^{-25}[m]$. I.e compared to the size of atoms gaseous dark matter a baryon body, including human body, are very rarefied environment. Therefore, only the nuclei of atoms are streamlined, due to a huge density $10^{18}[kg / m^3]$. Themselves bodies (people, planet, star) is riddled by dark gas flows through.

In gas dynamics [4] showed that a inviscid flow around the body, provides resistance only a bodies, moving with acceleration or slow. The motion of bodies with a constant rate through continuum are not creates a resistance.

According a paradox Dalambera-Eylera body resistance vanishes if a body have a constant speed and the absence of viscosity. Consequently, the nuclei of the atoms that make up molecules, planets and stars are not an insurmountable obstacle to the movement of bodies through the dark gas and dark gas passes through these organs. Thus, the planets move in their orbits around the sun without experiencing resistance to its motion, and does not slow down over billions of years.

However, if the gas jets have a own speed, then they have a margin of amount of motion. This amount of motion can not vanish into thin air, being absorbed by the body. Therefore, regardless of the speed of the body, it is passed into the a body, exerting a force is applied in the direction of the jets of air. This force can be written as

$$\overline{F} = \alpha \cdot m \cdot \overline{V}_e . \tag{23}$$

The presence of radial flow of of dark gas to the centers of baryon bodies, as we have seen, is leading to gravity.

3. **Dark matter**

Above the dark matter was considered as a gas. This gas of dark matter is composed of atoms that are in permanent motion. Because of significant volume concentration of these atoms the dark matter is seen as a continuum. Such medium is described in traditional representation by using usual values of density, pressure, temperature and speed. Through this medium the usual baryonic bodies interact with each other.

Nevertheless, particular interest is the internal structure of dark matter. To study this, we turn to the equation of state of an ideal gas [5]. For gas dark matter the equation of state can be written as

$$\frac{p_e}{\rho_e} = \frac{b}{m^*_{e-A}} T_e \qquad (24)$$

where $b = 1.38 \times 10^{-23} \left[J / K \right]$ is Boltzmann constant, p_e, ρ_e and T_e are the pressure, the density and the temperature of gas dark matter. From (24) we find the mass of one atom of dark matter m^*_{e-A}

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

According to formula (21) the mass of one atom of dark gas provided in ordinary masses baryon bodies m^*_A, we can express through the mass of one atom of dark gas, recorded in units of mass of dark matter m^*_{e-A}

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

The number of atoms of dark matter per one cubic meter of space ($W = 1m^3$) is very huge

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

Assuming the density of atom of dark matter is equal to the density of the nucleus of the hydrogen atom, we can determine the radius of the atom of dark matter

$$r^*_{0e} = \sqrt[3]{\frac{3m^*_A}{4\pi\rho_0}} = 0.62 \times 10^{-25} [m]$$

where $\rho_0 = 10^{18}$ $[kg / m^3]$ is the density of the hydrogen atom nucleus [11]. For comparison remind that the radius of this nucleus $r_{0-nu} = 10^{-15}$ $[m]$.

Number of atoms of dark matter which are placed adjacent to one another inside the nucleus of a hydrogen atom, is equal to the ratio of the masses of the proton $m_{0\text{-}nu}$ and atom of dark matter m^*_A

$$N_{0z} = m_{0-nu} / m^*_A = \frac{1.67 \times 10^{-27}}{2.09 \times 10^{-57}} = 0.8 \times 10^{30}$$

The nucleus of an atom of hydrogen permanently adsorbs the atoms of dark matter during 15 billion years (4.71×10^{17} $[s]$) with a rate about 0.17×10^{13} atoms of dark matter per second. Stable elementary particles permanently absorb the dark matter for billions of years. Absorbed dark gaseous matter with low density $\rho_e^* = 3{,}54\cdot10^{-9}$ [kg/m3] becomes a liquid with a density $\rho_0=10^{18}$ [kg/m3]. In the transition from the gaseous to the liquid state of matter the volume is decreased.

From this we can conclude that the elementary particle is something like a liquid drop of dark matter. Its shape is maintained due to high external pressure and/or, possibly, according to Gamow hypothesis [6-7], due to surface tension.

Obviously the conversion of the gas of dark matter into particle of baryonic matter is accompanied by the change the type of its interaction with gas of dark matter in free space.

4. **Dark energy**

According to the kinetic theory of gases we know that the gas of dark matter has internal energy, which is defined as the kinetic energy of the random motion of its atoms. Atoms of gaseous dark matter are moving randomly without resistance between successive collisions with each other. Collision of such atoms occurs without loss of energy as collision of elastic balls. The internal energy per unit mass of an ideal gas is expressed by the formula [5]

$$\bar{U}_0 = \frac{U_0}{m} = C_V T_0 = \frac{ia^2}{2\chi}$$

Here C_V is a specific heat capacity at constant volume, T_0 is a stagnation temperature of gas (for $V_e = 0$), i is number of degrees of freedom of the gas molecules, a is a sound velocity in the gas, $\chi = (i+2)/i$ is adiabatic index. For monoatomic gas of dark matter $i = 3$.) From the previous equation we have

$$\bar{U}_{0e} = \frac{U_{0e}}{m} = \frac{iC_{a0}^2}{2\chi} = 0.9\times C_{a0}^2 \qquad (25)$$

where according to our assumption the role of sound velocity plays the speed of light in vacuum $C_{a0} = 3\times10^8$ $[m/s]$. For monoatomic gas we have $i = 3$ and $\chi = (i+2)/i = 5/3$. According to formula (25) the internal energy of one cubic meter of gas dark matter in dormant state (volume is $W = 1$ $[m^3] = 10^6$ $[sm^3]$) has a very large value

$$E_{1e} = 0.9\times Cr_e W = 9.64\times10^{32}[erg] = 9.64\times10^{25}[J]$$

Energy of space filled with gas of dark matter is really huge. This energy supports radial flows of gas dark matter towards the centers of baryonic particles over the whole Universe. We, the ordinary people, are dealing permanently with the flow of gas dark matter towards the center of the Earth and we feel it as the force of gravity.

The internal energy per unit mass of the gas U_{0e} relates to the flow velocity V_e according to energy equation for isentropic flows, known from gas dynamics [4]

$$\chi U_{0e} + \frac{V_e^2}{2} = \frac{V_{\max}}{2} = const \qquad (26)$$

Here $V_{\max}$ is the maximum of velocity of gas flow. From this equation it can be seen that with increasing velocity of gas dark matter the internal energy is decreasing and converts to the kinetic energy of the orderly flow and vice versa. Let us substitute the expression (25) into equation (26) instead of U_{0e}. In result we get the connection of the velocity of propagation of weak disturbances C_a and the velocity of gas dark matter V_e

$$C_a = \sqrt{\frac{\chi - 1}{2}(V_{\max}^2 - V_e^2)} \tag{27}$$

Value $V_{\max}$ is defined from condition that for gas dark matter in dormant state $V_e = 0$ and the velocity C_{a0} is equal to the velocity of weak disturbances propagation $C_{a0} = 300000\ [km/s]$

$$V_{max} = \sqrt{i} C_{a0} = 519615\ [km/s] = 5.19615 \times 10^8 [m/s]$$

From formula (27) we conclude that at $V_e = V_{\max}$ the velocity of weak disturbances propagation becomes equal to zero and random motion of atoms is stopped.

5. Accumulation of energy in stars due to absorption of gas dark matter

During absorption the radial velocity of gas dark matter on spherical surface of stars is defined by formula (6)

$$V_e = V_{\max} = \alpha m_0 \ / \ 4\pi\rho_e r_0^2$$

Here r_0 is the star radius and m_0 is the star mass.

The energy of star permanently grows due to kinetic energy of absorbed dark matter. The rate of the energy growth can be written as

$$N_{absorption} = qV_{r0}^2 / 2 = a^3 m_0^3 / 32\pi^2 \rho_e^2 r_0^4 \tag{28}$$

Here $N_{absorption}$ is gravitational capacity of absorption. The energy of gas dark matter is absorbed along with this gas by any baryonic body. Some part of this energy is spent on to creation of new mass because it is known that energy and mass are equivalent and satisfy the relation

$$E = mC^2 \tag{29}$$

The part of the gravitational capacity for creation of mass Δm during time t

$$N_{creation} = \Delta m C^2 / t \tag{30}$$

Increase of mass during time t may be found from expression (5)

$$\Delta m = m - m_0 = m_0 (m/m_0 - 1) \approx m_0 \alpha t / k \tag{31}$$

Substituting (31) into (30) we get the part of capacity for creation of new mass

$$N_{creation} = m_0 \alpha C^2 / k$$

Furthermore, stars emit energy into space in the form of corpuscular and electromagnetic radiation. Many planets also emit energy into space because many of them have a molten core. Jupiter is known to radiate two times more heat than gets from the Sun [6-7].

The luminosity of stars, that is, the power radiated into space, depends on the mass and radius of the star. From known diagrams mass-luminosity and radius-luminosity in [7] and [10] it is noted that for big stars with a mass to three and more times greater than the mass of the Sun the luminosity is proportional to the cube of the mass. According to formula (28) absorption capacity is also proportional to the cube of the mass. Hence it can be expected that the luminosity is proportional to the absorption capacity. For such stars the nuclear fuel is not sufficient for life support during a few billion years. Nuclear fuel probably is only an intermediary in the transmission and conversion of absorbed energy into radiant energy, and is resumed in the process of increasing the mass of star.

For better understanding of these issues let us estimate numerically the magnitudes of capacities for gravitational absorption, creation of a new mass and radiation for our star – the Sun. According to (28) the capacity of gravitational absorption for Sun is $N_{absorption} = \alpha^3 m_0^3 / 32\pi^2 \rho_e^2 r_0^4 = 7.47\times10^{34}$ [watts/s]. Capacity of light radiation [9] is $\mathrm{N}_{\mathrm{radiation}} = 3.8\times10^{26}\ [watts/s]$. In accordance with the formula (30) the capacity for creation of mass is $\mathrm{N}_{\mathrm{creation}} = \mathrm{m}_0 \alpha C^2 / k = 5.35\times10^{29}\ [watts/s]$. Comparison of these values shows that the increase in energy due to the absorption of dark matter greatly exceeds the energy loss due to the creation of new mass and radiation

$$\mathrm{N}_{\mathrm{adsorption}} >> \mathrm{N}_{\mathrm{radiation}} + \mathrm{N}_{\mathrm{creation}}$$

However, there are stars whose capacity of absorption is equal to the radiation power. For instance, the star SS433 [9] of the dual system has the mass about 20 masses of Sun $m_0 = 4\times10^{31}\ [kg]$. Radius of this star is estimated as $\mathrm{r}_0 = 2\times10^{10}\ [m]$. The total luminosity, i.e. energy spent for radiation per unit time is $N_{radiation} = 10^{32} \div 10^{33} [watts/s]$. It is a million times greater than the solar luminosity. From formula (28) it follows that the capacity of absorption for this star is equal to luminosity

$$N_{absorption} = \frac{(4\times10^{31})^3}{32\pi^2 (1.19\times10^9)^2 (2\times10^{10})^4} = 8.95\times10^{32}\ \text{[watts/s]}$$

Thus energy exchange between the star and dark matter depends not only on the mass and radius of the star, but also on the characteristics of its inner structure, density and processes.

So the energy is continuously builds up inside the baryons in the process of absorption of the gaseous dark matter. Modern astrophysics does not account for this fact. As a result, it can not explain the enormous explosions in galaxies [6-7], which are observed by astronomers. Thanks to these explosions the enormous energy of order of $10^{51}\ [J]$ is freed. This is equivalent to simultaneous outbreak of 10^7 supernovae (energy of the explosion in the galaxy M82). The energy of explosions that occur in radio galaxies is much more and estimated at $10^{57}\ [J]$.

Formula of Einstein's theory $E = m\times C^2$ can not help to explain the sources of this monstrous energy, because the energy of baryonic mass (29) is not sufficient. Recall that in thermonuclear energy processes only part of the mass goes into energy (the so-called mass defect), which is equal to 1/130 part of the whole mass. The conversion of hydrogen into helium for entire galaxy ($\mathrm{m}_{\mathrm{galaxy}} = 10^{40} \div 10^{41}$ [kg], $\mathrm{E}_{galaxy} = \mathrm{m}_{\mathrm{galaxy}} \times C^2 = 10^{57} \div 10^{58}\ [J]$) gives only $\Delta\mathrm{E} \approx 10^{56}\ [J]$. But such a

transformation can not happen instantaneously and simultaneously, this transition would have to be carried out during billions of years because the propagation velocity of perturbations in the Universe should not exceed the speed of light.

If we assume that the Sun exists in its present state about 15 billion years ($4.71\times10^{17}s$), then during this time the following gravitational energy has been accumulated

$$E_{absorption} = N_{absorption}\, 4.71\times10^{17} = 3.5\times10^{52}\ [J]$$

This value is comparable with the energy of the explosion in the galaxy M82, which was mentioned earlier. Each one billion years in white dwarfs of Van Maanen and Wolf-457 the following amount of energy is accumulated due to absorption of dark matter

$E_{absorption} = 5.37\times10^{57}\ [J]$ for Van Maanen star, and

$E_{absorption} = 5.90\times10^{62}\ [J]$ for Wolf-457 star.

This energy is sufficient to explain the energy of superexplosions occurring in radio galaxies and in other mysterious objects in the Universe. That is, the presented above analysis indicates, that for explanation of the explosions with tremendous energy we have no need to blow up the galaxy. It is enough to blow up superdense white dwarf, Wolf-457 or Van Maanen. Such stars are present in each galaxy. Thanks to our explanation the explosions of tremendous energy may lose their aura of mystery.

By the way the astronauts who are in space should not be afraid the overheating due to the gravitational energy defined by (28). For the human body the capacity of absorption the gas of dark matter can be determined by the formula $N=0.5qV_{r0}^2$. Let us take the equivalent radius $r_0 = 0.5$ [m] and mass100 $[kg]$. Then for absorption capacity we get

$$N_{absorption} = \alpha^3 m^3 / 32\cdot\pi^2\rho_e^2 r_0^4 = 3\times10^{-14}\ [watts/s]$$

This absorption capacity is not able to lead to overheating of human even in a long time interplanetary flight.

Formula (28) allows calculate the heat flux due to energy of the gas of dark matter absorbed by the Earth. Due to absorption of gas of dark matter the internal energy of the Earth and hence the interior temperature of the Earth is permanently increasing. This conclusion contradicts to the opinion of modern science that the Earth permanently looses heat.

With growth of internal temperature at a certain stage of development in the bowels of the Earth the chemical reactions started and various terrestrial rocks, water, gases, etc. substances were created due to chemical reactions. This process is accompanied by the increase of mass and size of the Earth. The movement of lithospheric plates started and instead of a single continent "Pangaea" the modern continents were formed [12]. Raising the temperature of mineral resources can not be equated with usual hypotheses of change in climate and weather on Earth surface. But the general trend is that there is a warming of the Earth. It certainly leaves its mark on the climate and its warming.

There is another problem with an increase in baryonic mass and thus with increasing luminosity of stars. Some scientific studies claim that significant increase in the luminosity of the Sun may destroy all life on Earth. Although the warming observed on Earth, we know that during the last billion years no evidences of sweeping changes in the Earth's climate were found. Consequently, the amount of heat energy received from the Sun, is not changed, although it is

proved that every billion years the Sun gets hotter by 10% and that during the life time of the Sun (3.5 billions years) its radiation has increased by 30%.

When analyzing the growth solar irradiance one should consider not only the increase in the mass of the Sun according to the formula (5), but also the simultaneous increase of its volume. Assuming that the average density of the Sun remains unchanged, with the help of (5) we can find an expression for the change of its radius in time, depending on the mass change

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

where r_0 and m_0 are radius and mass of the Sun for $t = 0$. According to the diagram of "radius-luminosity" the capacity of light radiation of the Sun is inversely proportional to the fourth power of its radius. Therefore the luminosity of the Sun is increasing in time

$$N / N_0 = (m / m_0)^3 / (r / r_0)^4 = e^{\frac{5}{3}\frac{\alpha}{k} \cdot t}$$

According to Table 1 during the last billion of years the mass of the Sun is increased by 1.098 times. During this time, its radius is increased by 1.0317 times. Hence the radiation luminosity of the Sun is increased by 1.1687 times. This estimation is in concord with with astronomical observation data.

It is known that the energy of solar radiation that is absorbed by distant objects, including the Earth, is inversely proportional to the square of the distance. During the last billion of years the amount of energy which the Earth got from the Sun has not changed. It can be argued that with the growth of the mass and luminosity of the Sun the distance between the Sun and Earth is also been increasing simultaneously. From astronomical observations is known, for example, that the distance from Earth to the Moon is increasing by 1.5 meters every 100 years. Why can not the same happen with the Earth and other planets? Let us calculate the increase of the distance between Earth and the Sun, which is needed to compensate the increase in the luminosity of the Sun. Obviously, the ratio of the radii of the Earth orbit at the end and beginning of the considered interval of time should be as follows

$$r_{orbit} / r_{0\ orbit} = \sqrt{E / E_0} = 1.08 \qquad (32)$$

At present, the radius of the Earth orbit is $r_{orbit} = 1.495 \times 10^{11}\ [m]$. Taking into account (32), the radius of the orbit one billion years ago $(3{,}15 \times 10^{16}[s])$ was $r_{orbit} = 1.380 \times 10^{11}\ [m]$. Increase of the distance during this time is $\Delta r_{orbit} = 0.115 \times 10^{11}\ [m]$. Average increase of the Earth orbit radius for a hundred years $(3{,}15 \times 10^{9}[s])$ is equal to

$$\Delta r_{orbit} = 0.115 \times 10^{4}\ [m] = 1.15\ [km]$$

The relative increase of the orbit radii for 100 years is equal to $\Delta r_{orbit} / r_{0\ orbit} = 3.91 \times 10^{-9}$ for Moon and $\Delta r_{orbit} / r_{0\ orbit} = 7.70 \times 10^{-9}$ for Earth. As one can see, the relative increase in the distance between the Sun and Earth, which is necessary to compensate for the increase in the luminosity of the Sun, only by 1.97 times higher than the observed relative increase in the distance between the Earth and the Moon. However, the growth rate of solar luminosity is likely overestimated. Therefore, the actual increase of Earth orbit radius can be less.

6. Should we expect a Heat Death of the Universe?

The account of energy accumulation inside baryonic matter due to absorption of the dark matter may change representation about the "Heat Death" of the Universe. The ideas about the "Heat Death" were first grounded by W. Thomson in the work "On a Universal Tendency in Nature to the Dissipation of Mechanical Energy" (Proceedings of the Royal Society of Edinburgh for April 19, 1852). The idea of heat death stems from the second law of thermodynamics, which states that entropy tends to increase in an isolated system because of the dissipation of mechanical energy, which is converted to heat. Energy recovery is impossible because the dissipation is an irreversible process. As a result of strong compression by force of gravity in any star at some instant the nuclear reactions begin to act and then nuclear processes permanently take place for billions of years. When the nuclear fuel ends stars fade, turning into a lifeless mass. The energy is permanently radiated during the lifetime of stars and irreversibly dissipates in the surrounding space. So a "Heat Death" of the Universe permanently comes close (hypothesis of Clausius).

Such a pessimistic view of the nature of the Universe arises if we consider only one type of matter i.e. the usual (baryonic) matter ignoring different form of matter - dark matter and interaction between these two kinds of matter. In nature there is a continuum of dark matter that surrounds the baryons and there are pressure forces, generated by radial flows of gas dark matter towards the centers of barions, replenishing within them the amount of mass and energy. This permanent creation process is not taken into account in the analysis of the processes taking place in the stars, planets and other baryons of the Universe. This leads to a distorted picture of the world and to conception of the "Heat Death." In reality, the baryonic bodies from the smallest to the biggest are in permanent change, absorbing the dark matter and energy from the continuum of dark matter.

This view of the nature of things is confirmed by observational astronomy and by the new data of geophysics. To date, in astronomy accumulated a lot of facts that contradict the concepts of the aging and degradation of the Universe. Observations of Ambartsumian and a number of other astronomers indicate that in the centers of galaxies is observed the formation of a new substance. This material then is observed in the form of jets of hot inert gas. Research [7] reported the appearance of the heavenly bodies of superdense matter (remind that gaseous dark matter has a density $\rho_e = 1.19 \times 10^9 \ [kg / m^3]$).

Currently, there are data [9] about the invisible matter in the coronas of galaxies, this invisible matter by the mass far exceeds the total mass of the substance of stars of these galaxies, which suggests that all this non-luminous matter, probably planets, asteroids, gas are formed and increase their masses everywhere in the Universe and not only in the centers of galaxies. That is, the birth and development of the usual material bodies, not aging and fading, but creation and development are observed everywhere in the Universe. At the same time, astronomers have seen an explosion of stars, accompanied by a scattering of matter and energy. That is, the cycle of matter and energy from one state to another is permanently observed. Observations revealed that some of the small moons of Jupiter and Saturn are tectonically active and even have the active volcanos. This indicates that after 3.5 billion years after the formation of the solar system (some sources point on 6 billion years) on these dwarf planets are observed evidencies of warming, not cooling of interior. This may occur only if in the bodies along with its dissipation there is the energy growth. Moreover, the energy income should be greater than its outcome. It is also proved that large planets, Jupiter and Saturn, emit more energy than they receive from the Sun.

The permanent cycle of matter and energy in the Universe is explained by the fact that all the barions exist not in the empty space, but in the continuum of gaseous dark matter that regulates this cycle. The continuum of dark matter takes back the mass and energy of dead stars. At the same time the comtinuum of dark matter serves as a source of new barionic matter and energy. The dark

matter continuum, as previously noted, contains a huge energy. Each cubic meter of it contains energy E_e=9.64×10^{25} [J].

7. Red shift in the spectra of distant galaxies

The most exciting challenge of modern physics and astronomy, without a doubt, is the mystery of the red shift in the spectra of distant galaxies. Essence of the phenomenon of red shift in the spectra of distant galaxies lies in the fact that almost all the spectral lines of distant galaxies are shifted towards the red part of spectra compared to the spectrum of nearby galaxies. The shift of spectral lines grows with increase of the distance to galaxy. In 1930 E.Habbl has derived from observations of the relation between redshift and distance for galaxies [6-7]:

$$\Delta\lambda / \lambda = H \times t = H^* \times L \tag{33}$$

Here $H \approx 3\times10^{-18}[1/s]$ is the Hubble constant, $H^* = H / C \approx 10^{-26}[m^{-1}]$, $L[m]$ is the distance from the galaxy to the Earth, $t[s]$ is the time for travel of light from the galaxy to the Earth.

The light wave consists of a chain of photons. Photons like all baryons in the Universe absorb gaseous dark matter. As a result their masses grow according to the law (5). This leads to the increase of the wave length. In accordance with the law (5) it can be concluded that

$$\Delta\lambda / \lambda = (m - m_o) / m_o = m / m_o - 1 = e^{\alpha t/k} - 1 \tag{34}$$

Here λ and $\Delta\lambda$ are the light wave length and its increment, m_0 and $m - m_0$ photon mass and its increment. If $e^{\alpha t/k}$ is expanded in a series we obtain

$$\Delta\lambda / \lambda = \frac{\alpha}{k} t = \frac{1}{C} \times \frac{\alpha}{k} \times L \tag{35}$$

Comparing (33) and (35) in view of (19) we find the Hubble constant

$$H = \frac{\alpha}{k} = 2{,}97\times10^{-18}[1/s]$$

$$H^* = \frac{1}{C} \times \frac{\alpha}{k} = 10^{-26}[m] \tag{36}$$

The magnitude of H in (36) is equal to the magnitude of the Hubble constant, obtained from observations of modern astronomy [6-7].

It should be noted that the Hubble law is formulated for very long distances. Therefore, there is no need for the expansion of equation (34) in series and a formula $\Delta\lambda / \lambda$ for can be written as

$$\Delta\lambda / \lambda = e^{\alpha t/k} - 1 = e^{Ht} - 1 = e^{HL/C} - 1 \tag{37}$$

We also note that our explanation of the nature of the red shift in the spectra of distant galaxies makes unnecessary the use of the Doppler effect and of the theory of "Big Bang" for understanding of this phenomenon.

Explosions of massive stars are observed everywhere in the Universe and represent one of the most essential events in the cycle of matter in the Universe. They do not occur simultaneously, but are the result of the accumulation of excess mass due to the absorption of dark matter. Apparently, these explosions take place due to phase transition of baryonic matter and dark matter between each other with great energy output.

Hubble formula (33) is used in astronomy to determine the distances to galaxies and radio stars, which appear due to the huge distance stars. The magnitude $\Delta\lambda / \lambda$ is determined by the Balmer lines in the spectra of these objects.

In the Universe already found objects [10] for which the magnitude $\Delta\lambda / \lambda$ tends to 5 and the recession velocity is close to the speed of light. The recession velocity calculation according to formulas (33) and (37) gives bad results. The Hubble formula without any tweaks contradicts to modern estimates of the size of explored part of the Universe that is approximately equal to 15 billion light-years ($15Gyr$). For example, for $\Delta\lambda / \lambda = 3$ from the Hubble formula obtain

$$L_{habbl} = \frac{\Delta\lambda / \lambda}{H^*} = \frac{3}{10^{-26}} = 3\times10^{26}[m] = 32[Gyr]$$

The formula of the theory of dark matter (37) gives a correct result

$$L = \frac{\ln\left(\frac{\Delta\lambda}{\lambda}+1\right)}{H^*} = \frac{1.38}{10^{-26}} = 1.38\times10^{26}[m] = 14.6\ [Gyr]$$

The performed study showed that the value $\alpha / k = 2.97\times10^{-18}\ [1/s]$ equals to the Hubble constant. Perhaps the red shift in the spectra of distant galaxies takes place not due to the recession of galaxies and the expansion of the Universe, but because of the increase in mass and size of a photon of light from galaxies on the way to Earth [3].

8. Alternative idea of "Big Bang"

Astrophysics asserts that our universe was formed as a result of a "Big Bang ." This is confirmed by the detected CMB and by gravitational waves , which have survived the explosion. According to Gamow's theory about 15 billion years ago the superdense elementary particle was exploded . Products explosion created our universe. Since then, she is constantly expanding. It remains an open question on the form in which the energy is inside this superdense elementary particle ? Considered improper to ask what was around before the particles explosion and where the universe is expanding ?

In my case it does not reject the idea of "Big Bang." Nevertheless, this article has a different perspective on this phenomenon of nature. It is based on the idea that the baryonic body is constantly absorb dark matter from the surrounding space. Radial flow to the centers baryon bodies are unstable and therefore a vortices was formed around the bodies. These vortices is forced atomic nuclei to rotate with high angular speed.

The nuclei of atoms baryonic matter is rotated very quickly, because dark gas is supplied to them with great peripheral speed. Apparently, transition a dark gas from gaseous to liquid state (solid) state occurs at the outer boundary of the atoms ($r_0 = 10^{-10}[m]$). Here dark gas jet velocity reaches the speed of light (in a vacuum). Angular velocity of rotation is $\omega = \frac{C}{r_0} = \frac{3\cdot10^8}{10^{-10}} = 3\cdot10^{18}[рад/с]$. The same angular velocity there is the nuclei of atoms

A hydrogen atom has an axis of rotation and has poles respectively. Select the segment core atom wide Δr near the equator, as shown in Figure 2. The mass of this segment

$dm = \rho_o r_o^2 \Delta r \cdot d\theta / 2$. This segment has angular velocity. He has a centrifugal force. (mass center located at a distance $r_m = \frac{2}{3} r_o$ from the axis of rotation)

$$dF_z = \frac{3u_o^2 dm}{2r_o} = \frac{3}{4}\omega^2 r_o^3 \rho_o \Delta r \cdot d\theta \qquad (38)$$

This force is balanced by the external pressure. It is acting upon the surface segments

$$dF_p = p_e r_o \Delta r \cdot d\theta, \qquad (39)$$

where $p_e = p_{eo}(1 - \frac{C_o^2}{V_{\max}^2})^{\frac{\kappa}{\kappa-1}} = 2{,}64 \times 10^{25}[\Pi a]$, $u_o = C = 3 \cdot 10^8 [m/s]$. Density of the substance nucleus atom can express as the ratio of mass to volume $\rho_o = 3m / 4\pi \cdot r_o^3 \approx 10^{18}[] kg/m^3$

Segment nucleus of an atom will be broken by centrifugal force when it exceeds the pressure force

$$dF_z / dF_p \geq 1 \qquad (40)$$

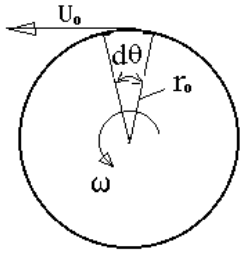

Fig.2 the nuclei of atom

Substitute (38) and (39) into (40). We was obtained the condition of destruction of atomic nucleus by centrifugal forces

$$\frac{dF_z}{dF_p} = \frac{9\omega^2 m}{16\pi \cdot r_o p_{to} (1 - \frac{C^2}{V_{\max}^2})^{\frac{\kappa}{\kappa-1}}} \geq 1 \qquad (41)$$

Hydrogen atom (nucleon) and the pressure in the dark gas is characterized by the following parameters: $m = 1{,}673 \times 10^{-27}[kg]$, $\omega = 3 \times 10^{18}[s^{-1}]$, $r_o = 10^{-15}[m]$, $p_{eo} = 6{,}426 \times 10^{-25}[H/m^2]$. For a nucleus of a hydrogen atom we have $dF_{ц.б} / dF_p = 0{,}0187 < 1$. Consequently, the nucleus of an atom can not be broken by centrifugal forces.

The transition process gaseous dark matter into the liquid phase at the boundary of the atomic nuclei increases their weight and dimensions. Next we estimate how long it took to fill the nucleus of atom by liquid dark matter to its present size. From expression (4) the growth rate is determined $\frac{dm}{dt} = \frac{\alpha}{k} m$. Atomic mass in accordance with the law (5) increases in time is not uniform. As the average value of this increase will take the value of $(\frac{dm}{dt})_{mdl} = 0{,}7 \frac{\alpha}{k} m$.

Mass atom considering this value will be increased in the time interval in accordance with the expression $m = (\frac{dm}{dt})_{mdl} \Delta t$. The present value of the mass of an atom of hydrogen $m = 1{,}67 \cdot 10^{-27}[kg]$. This mass accumulates over time $\Delta t = \frac{m}{(\frac{dm}{dt})_{mdl}} = 0{,}48 \cdot 10^{18}[s] = 15{,}3[Gyr]$. This time is of the order of the universe of life, from birth to the present day

The process of filling nuclei of atoms by a liquid of dark matter will be increased its weight and volume to the limit value . This is brings us to the hypothesis of the "Big Bang. We are believe that

"the act of creation of baryonic matter from dark gas" is simultaneously throughout the universe. Liquid dark matter is fills the nuclei of atoms in a long time. For all matter in the universe annihilation of matter can also to occur at the same time (in astronomical terms). It is likely that this will be accompanied by a simultaneous explosion. It will be a "Big Bang ." Of course, one does not need a blast "superdense elementary particle" whose structure could not imagine even the scientists with the most violent imagination. In this case, the "Big Bang" will be everywhere, as if by clockwork alarm was installed in every atom. Matter as a result of this explosion will be disintegrate into free atoms dark gas/

All dark matter field will be enflame gas explosion and immediately the vortex formation will begin, ie a conversion of gas dark matter into a baryonic matter will begin. 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". To do this, use the condition disrupt the nucleus of an atom (41).

At the same time, we is note that with an increasing time the mass of the nucleus of an atom will be increase in accordance with the law $\frac{m}{m_o} = e^{\frac{\alpha}{k}t}$. With increasing of a mass will be increase the radius of the nucleus in accordance with the expression $r = \sqrt[3]{\frac{3m_o e^{\frac{\alpha}{k}t}}{4\pi \cdot \rho_o}}$. Angular velocity is not changed, as it has been defined for the circumferential speed at the far edge of the atom, but not to its nucleus. With these remarks, the destruction of the state of the nucleus of an atom (hydrogen) takes the form

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

where $\kappa = 5/3$, $p_{eo} = 6{,}426\times10^{25}[Па]$, $u_o = C = 3\times10^8[m/s]$, $m_o = 1{,}673\times10^{-27}[kg]$, $\omega = 3\cdot10^{18}[s^{-1}]$, $\alpha/k = 2{,}97\cdot10^{-18}[s^{-1}]$.

Calculations was been shown that this condition is satisfied when the size of the nucleus of the atom was increased 2.02 times. By that time has passed $t = 32[Gyr]$.

Thus from the previous "Big Bang" was passed $15{,}3[Gyr]$. The next "Big Bang" you have to wait more $32[Gyr]$. Thus it is necessary to reckon with the fact that we had not a exact calculation, but we have a estimate. The values obtained can be refined.

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