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A dark matter, the accretion and the star barsters

Introduction

In science, there is the recognition of the assumption that there are two kinds of matter in the universe. One of them is the ordinary baryonic matter, and the other, the so-called a dark matter, is the primary matter. Until now it was believed that these two matters do not interact with each other. In contrast to these views, we assume that a dark matter between stars, planets and other objects of the universe is in a gaseous state and actively interacts with baryonic matter. The atoms of baryonic matter continuously absorb dark matter, increasing their mass. As a result, near all baryonic bodies, including the star-busters, the radial currents are directed toward their centers. In addition, near the stars (including busters) and planets, there are vortices of dark matter.

This view of the nature of the interaction of star-barsters with dark matter made it possible to formulate a new condition for the existence of these stars. Now it is considered that the star busters are the neutron stars, which are in close connection with the ordinary star. The X-ray signals emitted by these stars with periodic bursts arise as a consequence of the accretion of matter from the surface of an ordinary nearby star. The accretion is due to the forces of attraction of the neutron star and the falling of matter torn from the surface of the star to the surface of a neutron star with the release of enormous energy. In the article is shown on the basis of the developed theory of gaseous dark matter, that the accretion mechanism has a different nature and the star busters can be the white-dwarf stars.

About accretion and barsters.

The concept of accretion appeared as an interpretation of observations of unusual stars called the barsters. The flashing X-ray stars were called by barsters. As noted in [1], by 2004, more than thirty barsters were known, eight of which belong to the star clusters of our Galaxy. A feature of these stars is that their radiation is almost completely concentrated in the x-ray range. The first of them was opened in 1962. There is the non-vanishing x-ray the radiation of the barster. Against this background, there are the sharp bursts of radiation. The sharp flashes of radiation bursts last the several seconds or minutes ((Δt=10s)). The spacing between the bursts does not go beyond a few hours or days ($t_в=10^4$c).

The accretion is the capture of matter by the gravitational field of a star. According to the idea of the Soviet astronomer IS Shklovsky (1966), the source of strong X-ray radiation is a member of the binary stellar system consisting of a conventional visible star and an invisible neutron star. The strong gravitational field of a neutron star, according to IS Shklovsky, can pluck a substance from the surface of a neighbor star. This substance, falling on a neutron star at a high speed, experiences the strong compression and the warming up. Because of this, it can emit X-rays. The so-called background luminosity of the barster L_o arises from the heating of the surface of a neutron star when a substance trapped from a nearby star falls onto it. If the mass of a substance J falls on the surface of a neutron star per unit time

$$J \cong 10^{14}\ \text{kg/s}, \qquad (1)$$

then the kinetic energy reported to the surface per unit time will be

$$Q=0{,}5\cdot JV^2 \cong 0{,}13\cdot J\cdot C^2=0{,}585\cdot 10^{30}\ \text{W}, \qquad (2)$$

The rate of incidence of matter in [1] 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 ($Q=L_o$)

.A problem for accretion theory is the low probability of forming a close binary system containing a neutron star. The fact is that a neutron star is formed during a supernova outburst and at the same time acquires a significant speed. Astrophysicists calculated that for the formation of a double pair of neutron and ordinary star, a simultaneous encounter of a neutron star with two stars should occur. One of these stars must take away the excess energy of the neutron star and fly away. And the second star must capture the neutron star by its gravitational field. This event has a very insignificant probability.

Now consider this problem from the point of view of the theory of dark matter [2,3,4]. Earlier [5,6], we already noted that this theory rejects the possibility of the existence of neutron stars with radii of the order r_o=(10-20) km. Our analysis in [5, 6] showed that stars with such dimensions are invisible and are suitable only for the role of star-black holes. The appearance of neutron stars was required by astrophysics to explain the very rapid rotation of the stars- pulsars. In [5, 6], we showed that stars-white dwarfs, whose dimensions are two orders of magnitude larger than the dimensions of neutron stars, are excellent in the role of pulsars. These stars are observed by astronomers. Their life cycle is well studied. The peculiarities of their internal structure and their behavior are known.

When considering the barsters, we will not deviate from the direction we adopted earlier and try to prove that this time also the stars-white dwarfs play the role of neutron stars-barsters. First, let's look at the luminosity background. Recall [2,3,4], that any star continuously absorbs gaseous dark matter from the surrounding space, which directly on the surface of a very dense white dwarf turns into a state of baryonic matter. The amount of material arriving at the surface of star is determined in accordance with [2,3,4] formula

$$\Delta M=M-M_o= M_o(e^{\frac{\alpha}{k}t}-1) \cong M_o\frac{\alpha}{k}t\,, \qquad (3)$$

where M and Mo are the masses of the star at the moment under consideration and at the time of the origin. We take Mo = $1{,}4\cdot M_C=2{,}8\cdot 10^{30}$kg. Mass of the Sun $M_C=2\cdot 10^{30}$kg; $k=3{,}36\cdot 10^{17}$ [2,3,4] . The flux of matter falling on the surface of the white dwarf per unit time will be

$$J=\Delta M/t= M_o\cdot \alpha/k=0{,}833\cdot 10^{13}\ \text{kg/s} \qquad (4)$$

The rate at which the substance crosses the surface of the star is determined in accordance with [2,3,4] by formula

$$V_{ro} = \frac{\alpha \cdot M_o}{4\pi \cdot \rho_e r_o^2} = 2{,}92 \cdot 10^8 \text{ m/s}, \qquad (5)$$

where the radius of the white dwarf is taken approximately the same as for the Wolf-457 star, equal to $r_o=8\cdot10^5$ m. The energy entering the surface of the star per unit time is equal to the kinetic energy of the flow of this mass

$$Q=0{,}5JV_{ro}^2=0{,}592\cdot10^{30}\text{ W} \qquad (6)$$

Comparing (2) and (6), we see that the energy input to the star together with the gaseous dark matter is equal to the accretion flux necessary to supply the background radiation of the stars-barsters. **Thus, there is no need to come up with an unlikely meeting with the distributed roles of three stars, including a hypothetical neutron star.**

Let us see further how the situation is with the bursts of energy of X-ray radiation. To do this, we perform a simple approximate calculation. We have already noted [2,3,4] that white dwarfs rotate rapidly. We assume that on the surface of a star with mass and radius, characteristic for white dwarf stars, there is an equilibrium of gravity and centrifugal force

$$\frac{mU_{б.к}^2}{r_o} = \frac{fmM_{б.к}}{r_o^2},$$

where m is the mass on the surface of the star; $U_{б.к}$-the circumferential velocity of points of the surface, which arises from the rotation of the star; the mass of the white dwarf $M_{б.к}=2{,}8\cdot10^{30}$kg; the radius of the white dwarf $r_o=8\cdot10^5$ m; $f=6{,}7\cdot10^{-11}$ $N\cdot m^2 / kg^2$. From this equation we have

$$U_{б.к}^* = \sqrt{\frac{fM_{б.к}}{r_o}} = 1{,}53 \cdot 10^8 \, m/s \qquad (7)$$

The 2 nd cosmic velocity for the white dwarf in question

$$V_к = \sqrt{\frac{2fM_{б.к}}{r_o}} = 2{,}16 \cdot 10^8 \, m/s \qquad (8)$$

Next, consider such situation.The cosmic vortex of gaseous dark matter [7,8] of a white dwarf increases the angular velocity of rotation of the star from a value corresponding to the equilibrium of gravity and centrifugal force

$$\omega_{б.к}^*=U_{б.к}^*/r_o=190 \text{ c}^{-1} \qquad (9)$$

In accordance with [7,8], the angular velocity of rotation of the white dwarf $\omega_{б.к}$ is related to the angular velocity of rotation of the vortex core of dark matter $\omega_в$ by the formula (9)

$$\omega_{б.к}=\frac{2}{3}\alpha\omega_в t+\omega_o \qquad (10)$$

If, as a result of the spinning of a white dwarf by an ether vortex, the angular velocity exceeds the critical value (9), the condition of equilibrium of forces on the surface of the star will be violated towards an increase in the centrifugal force. As a result, part of the mass of the star will detach from it, taking with it the moment of momentum. The star will reduce its angular rotation speed. The plasma detached from the surface of the white dwarf (protons, electrons, etc.) is picked up by an ethereal vortex and begins to move along spirals. In this case, charged particles begin to emit additional energy, which astronomers fix on the Earth in the form of flares.

There are two scenarios for the development of further events. If the plasma mass detachment occurred at the angular velocity of the white dwarf k exceeding the critical angular velocity , but less than the angular velocity corresponding to the 2nd cosmic velocity

$$\omega_к = V_к / r_o = 270\ c^{-1}, \qquad (11)$$

then after a while this mass will again fall on the star, causing an additional (irregular) surge by energy. If the detachment occurred 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 gaseous dark matter about a white dwarf according to the formula (10)

$$\omega_B = 3/2\ \frac{\omega_{б.к} - \omega_0}{t\alpha} \qquad (12)$$

We do not know the magnitude of the angular velocity ω_o after the detachment of a part of the mass from its surface. Probably, depending on the parameters of the star and the cosmic vortex of gaseous dark matter, these values may differ. Assume that $\omega_o=0$. As the time interval t between flares, we take the value $t=10^4$ s, characteristic for burgers [1]. As the time interval t between flares, we take the value $t=10^4$ s, characteristic for barsters [1]. The outbreaks, as already noted, are associated with the release of matter under the influence of increase in angular velocity.

$$\omega_B = 3\cdot190/2\cdot10^4 = 0{,}0285\ s^{-1} \qquad (13)$$

The period of rotation of the cosmic vortex of dark matter will be

$$T_в = 2\pi/\omega_B = 220\ s \qquad (14)$$

The circumferential velocity of the charged particles of the plasma ejection is approximately equal to the circumferential velocity of the surface of the star at the time of ejection

$$U^*_{б.к} \cong \omega^*_{б.к} \cdot r_o = 190\cdot(8\cdot10^5) = 1{,}52\cdot10^8\ m/s \qquad (15)$$

Charged particles of the plasma ejection, rotating inside the ether vortex with a near-light speed, must radiate energy.

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