PHYSICAL SCIENCES

SPACE DEFECT: INTERSPACE MATTER TRANSITIONS

Bashirov M.
Candidate of physical and mathematical sciences, associate professor,
Abbasov V.
student,
Baku State University
Baku, Republic of Azerbaijan.
https://doi.org/10.5281/zenodo.14499278

Abstract

The causes of gravitational phenomena between objects in the universe have always been an object of interest. Many such phenomena have led to the emergence of hypotheses about the existence of multidimensional spaces. This approach has not preserved its relevance until now in A. Einstein's time. In his presentation, defects in space and the events caused by them were discussed as a result of "astronomical disasters" in space. At the same time, an attempt was made to explain black holes, which are considered the most complex objects in the Universe, through this approach. Spatial defects have actually been shown to be the solution to many problems. The most important of these is how gravitational waves are generated. The information provided by gravitational waves proves the validity of many theorems. The importance of studying them in detail has been emphasized once again.

Keywords: gravitational field, 4-dimensional space, space defect, black holes, gravitational waves

İntroduction. The reasons for the phenomena of attraction in the universe have always been an object of interest. I. Newton could not fully clarify why objects attract each other. This issue was later clarified by A. Einstein. According to A. Einstein, space and time are complete and resemble a material. Any object with mass affects this material and bends it. The twisted material resembles a hole, and the greater the mass of the object, the wider the resulting hole. Since the hole formed by low-mass objects is smaller than the hole formed by large-mass objects, they orbit large objects [1].

We cannot observe this resulting hole. A. Einstein explained the reason for this by suggesting the fact that this hole exists in 4-dimensional space. In fact, it can be noted that the bending of this material does not depend on the properties of the objects, but only on their masses. Celestial bodies are distributed in space in a certain regular manner depending on their mass and distance between them. Because, although the objects in the Universe have different properties in different places, they are parts of a single whole. This fact specifically requires that celestial bodies have a certain regularity for their mass distribution. We noted that this distribution for celestial bodies depends on mass and distance. The quantity that links these two concepts is the potential of the gravitational field. In order for celestial bodies to be in balance, their potential should not differ in terms of energy. That is, the distance, which we call the radius of the circle of attraction, should have such a value that their potentials are the same.

$$M_1/R_1 = M_2/R_2 = ... = M_n/R_n \quad (1)$$

M-the mass of the celestial body, R-the radius of the gravitation circle(1). Based on the statement , let's try to prove this fact for the Sun and the Earth. Let's use the values of these quantities for the Sun and the Earth. $M_G = 1{,}9888 \cdot 10^{30}$ kg, $R_G = 1{,}455 \cdot 10^{12}$ m, $M_Y = 5{,}97237 \cdot 10^{24}$ kg və $R_Y = 3{,}844 \cdot 10^{8}$m because it is.

$M_G/R_G = 1{,}9888 \cdot 10^{30}/1{,}455 \cdot 10^{12} \sim 1{,}015 \cdot 10^{18}$ kg/m;

$M_Y/R_Y = 5{,}97237 \cdot 10^{26}/3{,}844 \cdot 10^{8} \sim 1{,}015 \cdot 10^{18}$ kg/m

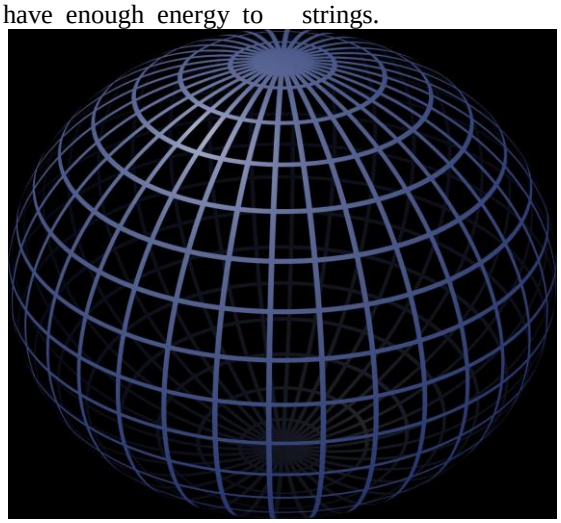
relationships pay off.From the calculations, we see that the condition $M_g/R_g = M_y/R_y$ is satisfied. Therefore, the expression $M = X \cdot R$ (2) is satisfied for celestial bodies. The reason for the approximation of the value of the X-constant is obvious. Because other celestial bodies affect the observed celestial body [2].

In 1905, A. Einstein combined space and time with the theory of special relativity and showed that movement in space affects the passage of time. In the 3-dimensional space we exist in, everything is actually energy. The existing unit of energy forms 3-dimensional space. 3-dimensional space is located within multi-dimensional spaces. Space and time are one whole. Hence, events occurring in high-dimensional spaces cause corresponding motion in 3-dimensional space, space, and time. In fact, all objects that exist in

the Universe have motion. Movement, in turn, affects the flow of time. We can write what we said mathematically as follows:

$$\text{Time} = \text{Space}/\text{Motion} \quad (3)$$

We conclude that these concepts are related to each other. The speed of light is considered the fastest speed for elementary particles in 3-dimensional space. Elementary particles do not have enough energy to reach a value greater than this speed. The expansion rate of the universe is considered to be greater than the speed of light. This fact, in turn, leads to the fact that the speed of energy propagation in wires is greater than the speed of light. Strings are generally shapers of 3-dimensional space[3]. That is, it would be most correct to describe 3-dimensional space as a spatial grid of strings.



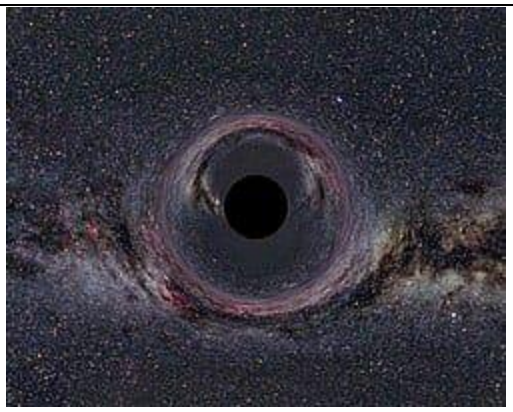
Problem: If the energy of any object is greater than the energy of the net of these strings, that object can cross the 3-dimensional phase. In doing so, that body will move into 4-dimensional space. At this time, there will be a defect in the space network of the wires. Based on the dependence between energy and speed, it is possible to explain the occurrence of this phenomenon by the fact that the speed of objects can exceed the speed of light. $E=mc^2$ (4) it would be more correct to write the expression for strings in this form:$E=mv^2$. As we can see, compared to strings, their mass is very small ($\sim 1{,}4 \cdot 10^{-84}$ kg [3]) since if objects with a certain mass have a speed greater than the speed of light, they can easily move into 4-dimensional space. At this time, a certain defect will appear in the space. Note that there are various objects in the Universe that can be explained by this approach. Let us clarify what we are saying. Rotational motion is characteristic of any celestial body. For rotating celestial bodies, the intensity of the gravitational field takes a certain value. For celestial bodies, the cosmic velocity I is directly related to the intensity of the gravitational field as follows.

$$V_I=\sqrt{g \bullet R} \quad (5)$$

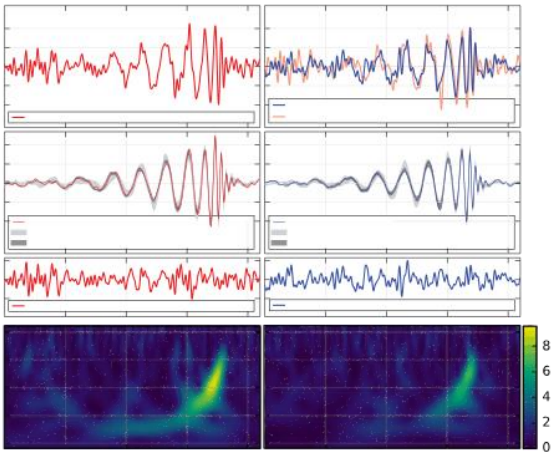
where v_I is the cosmic velocity I for the celestial body, g is the gravitational field intensity for the celestial body, and R is the radius of the celestial body

At the same time, there must be a certain relationship between the cosmic speed I and its rotation speed for celestial bodies. Combining these facts, we can explain the properties of black holes, the most complex objects in the Universe. The gravitational field of black holes is so strong that even light cannot escape [4].

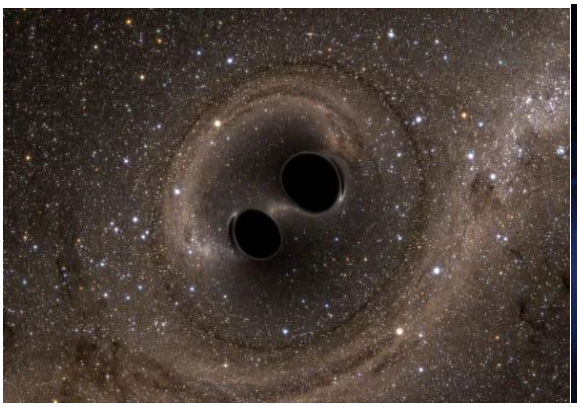
So, for black holes, the cosmic velocity I is greater than the speed of light. Based on the above facts, we can say that the rotation speed of black holes is equal to or greater than the speed of light. It can be seen from expression (4) that since the masses of black holes are very large, their energies will be much larger. However, it is not correct to explain the value of this energy exactly with the masses of black holes. Because they exist in planet-sized black holes. So, the main issue here depends on the speed. As a result of such great velocities, the energy of black holes is extremely large. Such a large energy is enough to create a defect in space. As a result of this defect, black holes seriously bend space. At the same time, time flows more slowly near black holes [4].

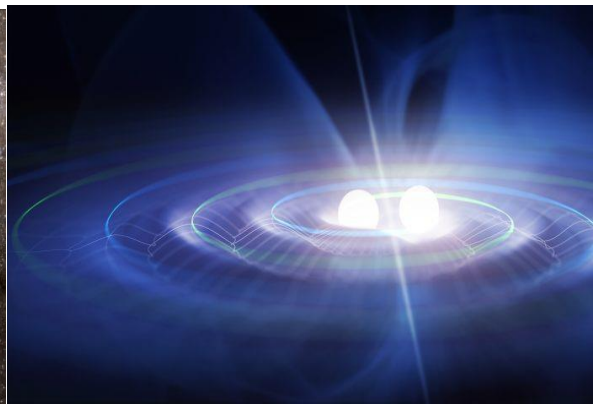


Problem solving. These facts are easily explained by expression (3). By the way, we can say that black holes differ from each other according to their properties. These differences are related to the variety of defects created in space. Since black holes are defects, they can be considered interstellar transitions. That is, matter flows from 3-dimensional space to 4-dimensional space or vice versa. Of course, this mentioned flow of matter will occur according to the characteristics of spaces. The fact that makes the study of 4-dimensional space relevant is that it exists in 4-dimensional space in the gravitational field [2]. We can define this field only by its effect on objects. Just as there are electromagnetic waves related to the electromagnetic field, there must also be gravitational waves related to the gravitational field (in 4-dimensional space). A. Einstein stated this fact 100 years ago. Since then, some physicists have been searching for those waves. In the end, the search paid off. Gravitational waves do exist. On September 14, 2015, the Interferometric Gravitational Wave Laser Observatory detected gravitational waves.



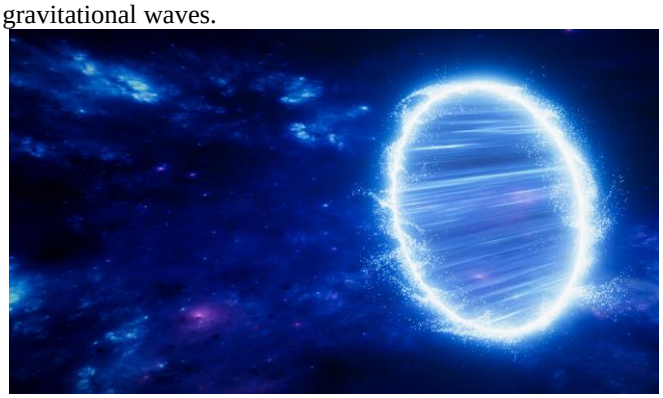
At the heart of the station is a laser and a semiconductor mirror. The laser beam is split into two parts by this mirror, and after traveling the same distance, it returns back through the all-conducting mirror, and the difference between the light waves is measured by a very sensitive sensor [5]. Note that since the distance and speed of light are the same, there should be no difference between the waves, but this was not the case and Einstein was proven right. The reason was the ripples of the Universe, caused by the collision of black holes 1.3 billion light years away.





So, if we don't feel it, when these waves pass through the interior of the Earth, they change its shape even if it is a little bit, that's where this difference comes from. Note also that the masses of the colliding black holes were 36 and 29 times that of the Sun, and the newly created black hole should have been 65 times that of the Sun, but a black hole with a mass of about 62 times was formed [6]. But what happened to the remaining 3 solar masses? Let's remember the formula $E=mc^2$. Mass is needed for energy to exist. That is, the remaining 3 solar masses are spent on energy. This energy is directly related to gravitational waves.

Result. From what we said, we can conclude that black holes are defects created in space. Interspatial matter flows through them. In 3-dimensional space, each object has a certain mass, shape, etc. has such qualities. That is, every object moving into 3-dimensional space has a certain shape, mass, etc. acquires such characteristics. We noted that the gravitational field exists in 4-dimensional space, as well as its own gravitational waves. Therefore, gravitational waves flow into 3-dimensional space through black holes.



As these substances move into 3-dimensional space, they acquire the property of mass. Since these waves reach us from very long distances, it is very difficult to observe them. It is clear that the larger the defect created in the space, the larger will be the flow of matter into the 3-dimensional space. The cause of the observed gravitational waves was the enormous energy generated during the collision of two massive black holes. As a result, it was possible to determine gravitational waves. At the same time, in addition to black holes, gravitational waves are observed due to the explosion of stars, and in general, due to the defect caused by the release of large energy during the "astronomical catastrophe".

The discovery of gravitational waves confirms an important aspect of the theory of relativity. This discovery opens a new page in the study of space. So, from now on, electromagnetic radiation will no longer be the only method of studying the Universe. As Scott Hughes, an astrophysicist at the Massachusetts Institute of Technology, said, scientists will be able to study still-mysterious space objects with the help of gravitational waves[7]. Gravitational waves contain enormous amounts of information. As a result of the forms of vibrations that occur in space and time, it is possible to learn the dimensions and other characteristics of cosmic objects that cause those vibrations. In other words, from now on, scientists can learn not only the facts about the baryonic mass, which makes up 5% of the Universe, but also the remaining 95%.

References:

1. Abbasov V., Sarmasli V. "M THEORY". NJD-128. 2024.

2. Bashirov M., Abbasov V. "A new approximation to Dark matter". NJD-132. 2024.

3. Bashirov M., Abbasov V. "String theory: another approach to phenomena" NJD-141. 2024.

4. Davies,P.C.W. "Thermodynamics of Black Holes". Reports on Progress Physics.1978

5. Naeye, Robert. " Gravitation al Wave Detection Heralds New Era of Science" 2016.

6. "Einstein's gravitational waves 'seen' from black holes" BBC News. 2016.

7. "Asymptotic gravitational-wave fluxes from a spinning test body on generic orbits around a Kerr black hole"- Viktor Skoupy, Georgios Lukes-Gerakopoulos, Lisa V. Drummond, Scott A. Hughes. 2023.