The Galactic Center may be a White Hole

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Abstract: It has long been assumed that the Galactic Center is a huge black hole. However, from some existing data, if the Galactic Center is a black hole, the surrounding mass will move around the Galactic Center. This will cause the outer mass of the Milky Way to move faster than the mass of the inner Milky Way. But this is not consistent with observations over the years. Although it can be explained by the existence of dark matter, direct evidence for the existence of dark matter is still lacking. If there is dark matter around the earth that has a serious effect on gravitation, there should be many experimental results that violate the law of conservation of energy. However, various experiments conducted on the earth for more than 100 years have shown that energy is conserved. However, if the Galactic Center is a white hole, the white hole continuously ejects masses, and at the same time the white hole is still rotating at a high speed, the distribution of the surrounding mass is like a spiral firework, and it has a spiral shape. Combined with my previous works, I concluded that the scope of gravitation is limited at the cosmic scale. Therefore, the motion of the galaxy's peripheral mass around the Galactic Center can be simplified to a linear fluid motion, and its velocity is equal everywhere . This can be used to explain the observations of galactic rotation curves.

Keywords: Universe model; Galactic Center; Milky Way; Solar system

1 Introduction

At present, the subject that the giant black hole may exist in the Galactic Center becomes a hot spot after LIGO detects the gravitational wave. However, if the Galactic Center is indeed a black hole, there will be many phenomena that are difficult to explain. Including the flat shape of the Milky Way, galactic rotation curve and other issues. To explain these problems, dark matter is needed for calculations. This article assumes that the Galactic Center is a white hole, and many problems can be easier to explain. Because the white hole is constantly ejecting masses and it is still rotating at a high speed, the distribution of the external mass is like a rotating fireworks effect, showing a spiral shape. Combining my previous works [1 ~ 4], we can conclude that the scope of universal gravitation is limited at the cosmic scale, so the motion of the galaxy's peripheral mass around the Galactic Center can be simplified as a fluid linear motion, and its speeds everywhere are all equal. This can be used to explain the observations of galactic rotation curves.

Of course, the assumption that the Galactic Center is a white hole still has difficulties in theoretical and practical observational data supports. In theory, although general theory of relativity supports the existence of white holes. But the problem of time inversion is still very different from our daily experience. This is like a person who can return to young age. It is a nightmare. From the actual observation data, it seems that there is no obvious data to support the existence of white holes, and it is also not known how to detect white holes.

Of course, if it is based on the theory of virtual space-time physics, the existence of white holes is exactly the same as the existence of black holes. That is, as long as the existence of black holes is confirmed, there will be white holes without any theoretical obstacles.

2 Two possibilities for the Galactic Center

2.1 Formation of the solar system

The formation of the solar system has many hypotheses. The more representative hypothesis is that the sun formed due to gravitational collapse in the cosmic gas after the supernova burst. The rotation of the sun and the fusion reaction eject masses forming large and small planets in the solar system. Therefore, from the formation and development of the sun to our current solar system, there is a process of continuously decreasing temperature. This cooling process can also be confirmed by Earth's paleontological evidence.

However, this explanation of the formation of the solar system is static. No consideration is given to the movement of the solar system around the Galactic Center. After all, the movement of the solar system relative to the Galactic Center will cause the distance between the solar system and the Galactic Center to change. The closer to the Galactic Center, the greater the change in energy radiated from the Galactic Center to the solar system, and the more unstable the solar system is. The further away from the Galactic Center, the more stable the solar system's orbit, and the more stable the geological structure and climate change of the planets in the solar system. Therefore, when studying the evolution process of the earth, how the solar system moves relative to the Galactic Center will definitely affect the overall geological structure and climate change. It is unclear whether the solar system is constantly moving away from the Galactic Center or is approaching the Galactic Center. The impact of these two modes of motion on the earth is also very different. Therefore, here we first analyze according to two situations.

2.2 The Galactic Center is a black hole

At the same time that the cosmic gas was affected by gravitational collapse and formed the center of the massive mass of the Milky Way, the solar system was gradually formed in the periphery. As the mass of the Galactic Center gets larger, the solar system on the periphery of the Milky Way is constantly attracted by the mass of the Galactic Center. This produces a spiral motion around the Galactic Center.

If the Galactic Center and stars such as the Solar System are formed in this way, considering the requirements of the isotropy of the cosmic gas, the mass distribution in the Milky Way should be a spherical structure instead of the flat shape we see now.

Of course, it may also be that after gravitational collapse, a huge black hole is formed, which will

cause a more intense fusion reaction, form a material ejection, and form the solar system. This analysis is similar to the explanation of white holes.

The reason for the formation of a flat disk may also be related to the rotation direction of the cosmic gas that originally formed the Milky Way. If it rotates in one direction and a huge black hole mass is formed in the center, the stars and planets formed by the surrounding mass will eventually orbit the Galactic Center in a plane.

2.3 The Galactic Center is a white hole

If the Galactic Center is a white hole, it means that there will be constant mass ejected from the Galactic Center. If the white hole itself is rotating rapidly, the ejected material will orbit the white hole. There is a gravitational effect between the ejected masses, which produces a viscous fluid-like movement and forms a spiral galaxy structure.

Since the rotation of the galaxy's center usually has only one direction, the ejected masses can usually only be maintained on one plane. This can reasonably explain why our Milky Way is a plane structure.

Another evidence is that the disk direction of spiral galaxies in the universe we have observed is random. This should be related to the random rotation of the center of the spiral galaxy. Figure 1 shows that different spiral galaxy disk orientations exist randomly.

Therefore, in a comprehensive view, the Galactic Center is more likely to be a white hole.

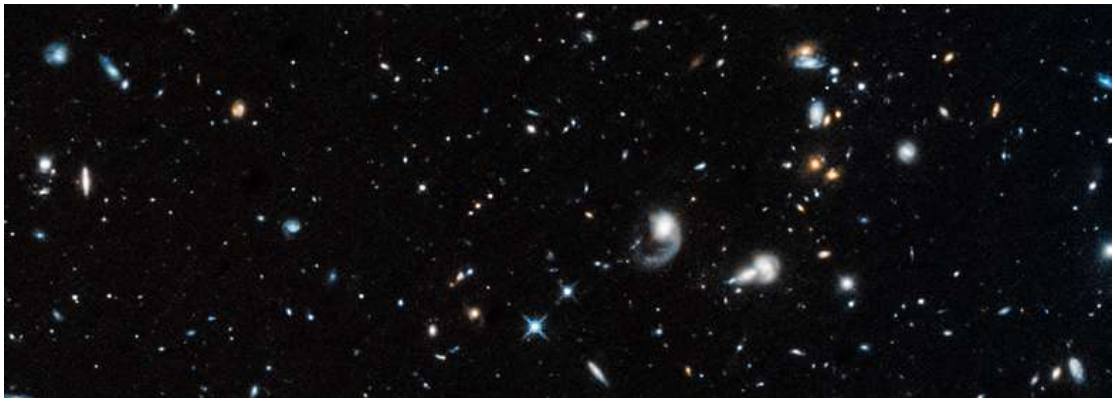
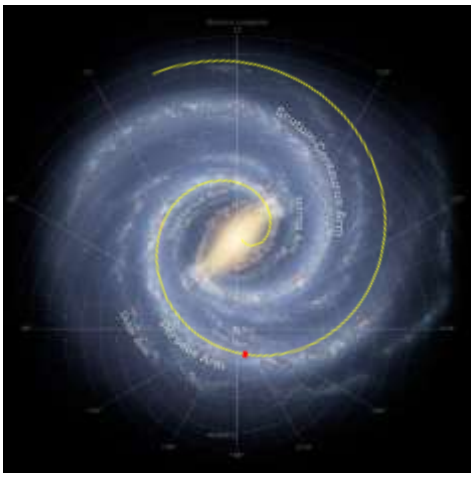


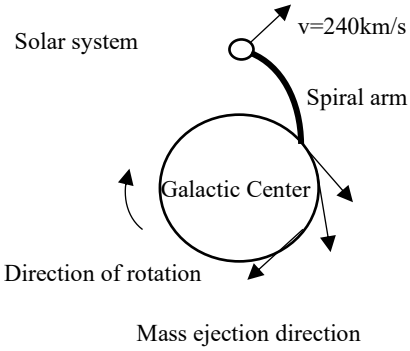
Figure 1 Various galaxies in the universe photographed by the Hubble Telescope

Source: https://hubblesite.org/contents/media/images/2018/61/4276-Image.html?page=8&filterUUID=4c394bbb-b21e-43ab-a160-2a4521d70243

3 Calculation of Milky Way Spiral Arm Shape and Length Using White Hole Mechanism

Considering that the speed of the solar system is 240km/s, the right side of Figure 2 shows the direction of the Galactic Center rotation and the direction of the white hole ejection mass. Force analysis has not been considered in the figure. Assuming that the white hole is rotating clockwise, all the ejected materials are ejected according to the tangential direction of the Galactic Center circle cross section. Due to the different time of ejecting the masses, a spiral mass ejection curve is finally formed on the periphery.





The yellow spiral is the result of the calculation, and the length of the spiral is 8 billion years. The red dot is where the solar system is located. (Source: NASA/JPL-Caltech/R. Hurt. https://solarsystem.nasa.gov/resources/285/the-milky-way-galaxy/)

Figure 2. Schematic diagram of Galactic Center's ejection masses and the calculation results (For comparison, the Milky Way picture and the calculated spiral are rotated and scaled respectively)

For convenience, polar coordinates are used for this purpose, as shown in Figure 3.

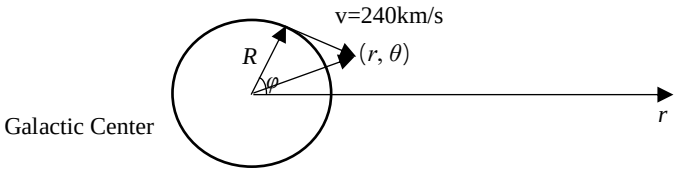


Figure 3 Polar coordinates

Where

$$r = \sqrt{R^2 + (vt)^2} \qquad (1)$$

$$\theta = -[\varphi - arc\cos\left(\frac{R}{r}\right)] \qquad (2)$$

The negative sign in formula (2) indicates that the moving direction is clockwise. In this way, the mass distribution projected by Galactic Center can be calculated. The yellow spiral on the left of Figure 2 is the result of calculation simulation.

The calculated parameters in Figure 2 and Figure 3 are 8 billion years, and the rotational angular velocity of Galactic Center is 4×10^{-17} rad/s.

Actually, there is no accurate data on the rotation speed of Galactic Center. However, we can perform calculations based on some established data to obtain the corresponding spiral curve of the masses distribution that ejected by Galactic Center. By trying with different data, we can change the spiral orbital shape shown in Figure 2 until it conforms to the Milky Way spiral shape in Figure 2.

Some of the data that has been determined mainly include the speed at which the solar system is moving:

$$\mathrm{v} = 2.4 \times 10^5 m/s$$

Galactic Center has a radius of about 10 light years

$$\mathrm{R} = 10 l.y. = 10^{17} m$$

Then the distance between the ejected mass and the Galactic Center can be calculated by formula (1). According to formula (2), the angle corresponding to the polar coordinates in Figure 3 can be calculated. Where $\varphi = \omega t$

The calculated spiral trajectory is superimposed on the spiral shape pattern of the Milky Way in Figure 2. It can be seen that the calculated spiral trajectory is in good agreement with the shape of the actual spiral arm of the Milky Way. Since the galaxy's spiral shape pattern is taken from

NASA/JPL-Caltech/R. Hurt, it is quite accurate. The yellow spiral superimposed on the galaxy spiral shape pattern on the left in Figure 2 is the result of the calculation. The time span is approximately 8 billion years. It is basically consistent with the lower limit of the current estimated Milky Way's life of 8-20 billion years. From the superimposed pattern in Figure 2, considering that the Perseus Arm is actually composed of two mass-projecting spirals, the external Perseus Arm and the internal Sagittarius Arm, respectively, the calculated spiral and the Perseus Arm's average positions of the masses distribution and the length are basically the same. This also shows to a certain extent that at least the ejection masses of the Milky Way has lasted 8 billion years. If we consider that the Galactic Center has not yet ejected the mass, it may have existed for billions of years, so the entire Milky Way is about 10 billion years old.

As for the other Scutum-Centaurus Arm of the Milky Way, it is actually composed of two spiral arms, the Scutum-Centaurus Arm and the Outer Arm, which are basically the same length as the Perseus Arm, indicating that the formation time of the two spiral arms is basically the same.

4 Analysis

From the calculation results in Section 3, the calculated mass distribution spiral struction is in good agreement with the mass distribution and length of the actual spiral arms of the Milky Way. At least to some extent, it has been proved that the spiral arm of the Milky Way has a dynamic mechanism of outward ejection mass. Of course, Section 3 only calculates one of the spiral arms. The structure and length of the two spiral arms of the Milky Way are the same, so you only need to calculate twice to obtain the complete spiral structure of the Milky Way galaxy.

In addition, the calculated helix is still a spiral structure near the Galactic Center. The actual Galactic Center has a high-brightness rod-like structure. This should be related to the strong gravitational interaction of the Galactic Center. In the calculation of this paper, the influence of gravitation on the mass ejected is not considered. Therefore, the gravitational force generated by the huge mass in Galactic Center will inevitably attract the mass ejected, thereby destroying this spiral structure. But far from the Galactic Center, the gravitational effect from the Galactic Center is very weak, and may even exceed the range of the gravitational effect produced by the Galactic Center mass, so the calculation results are in good agreement with the actual observations. This also proves to a limited extent the scope of gravity.

If the analysis above is correct, some of our previous views on the Milky Way need to change.

First, the Galactic Center should be a white hole that continuously ejects masses. Although the theory of white holes can be obtained from general relativity. However, the number of related studies is small. Perhaps this will be an important direction for future general relativity research. Of course, from the perspective of virtual space-time physics, the existence of a white hole is inevitable. Since the mass of the real space time can enter the virtual space-time through the black hole and be converted into the energy of the real space time, the mass of the virtual space-time can also enter the real space time to form a white hole.

Second, if we look at the galactic rotation curve in the Milky Way from the mechanism of continuous mass ejection, it can be found that the gravity generated by the Galactic Center has become very weak in the galaxy orbit outside the Galactic Center. The resulting gravitation does not have a very significant effect on the motion of the galaxies. The galaxies motion we observe now is actually determined by the speed at which these galaxies are ejected from the beginning. Because the velocity of the ejection is basically equal, the speed of movement of all galaxies we now observe, including the solar system, is basically equal. If there are differences, it may be due to relatively small changes caused by the gravitational interaction of the limited range of interaction between galaxies. If this theory is correct, in fact our current solar system does not do elliptical movements around the Galactic Center, but a process of movement away from the Galactic Center. As time goes by, the density of the Milky Way galaxy will inevitably become lower and lower, and the final outcome needs further study.

Third, the analysis in this paper does not require the assumption of dark matter. Although this article does not deny the existence of dark matter, it may be easier to understand if it does not need to be explained with the help of dark matter when explaining galaxies motion.

References

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Appendix: Spiral Orbit Simulation Program (Excel VBA)

Corresponding parameter

v	2.40E+05	m/s
R	1.00E+17	m
M		kg
F		N
Dt	1.00E+15	s
Omiga	4.00E-17	Rad/s

The program

```
Sub Draw()
Dim R, v, rr, Dt, Thita, Phi, Omiga
Dim beginY, endX, endY, ZeroY
Set shp = Worksheets(3)

v = Sheet1.Cells(1, 2)
R = Sheet1.Cells(2, 2)
Dt = Sheet1.Cells(5, 2) '
Omiga = Sheet1.Cells(6, 2)
For i = 1 To 240 Step 1
    t = i * Dt
    Phi = -Omiga * t
    rr = Sqr(R ^ 2 + (v * t) ^ 2)
    Thita = Phi + Application.WorksheetFunction.Acos(R / rr)
    x = Int(rr * Cos(Thita) / 1E+19) + 20000
    y = Int(rr * Sin(Thita) / 1E+19) + 20000
    If i = 1 Then
        beginX = x / 10
        beginY = y / 10
    End If

    endX = x / 10
    endY = y / 10
    With shp.Shapes.AddLine(beginX, beginY, endX, endY).Line
        .Weight = 4
        .DashStyle = msoLineSolid
        .ForeColor.RGB = RGB(255, 255, 0)
        If i = 150 Then 'Solar system location
            .Weight = 20
            .ForeColor.RGB = RGB(255, 0, 0)
        End If
    End With

    beginX = endX
    beginY = endY


Next

End Sub
```