The model of black hole and white hole based on virtual space-time physics theory

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Abstract: In my previous papers, I explored the idea that the Galactic Center may be a white hole. through specific calculations, it is shown that the assumption that the Galactic Center is a huge white hole can explain various phenomena in the Milky Way more effectively than the assumption of a huge black hole. However, the white hole theory in general relativity requires the assumption of time inversion, which contradicts the known laws of physics, such as the second law of thermodynamics. For this reason, this paper uses virtual space-time physics theory to analyze the structure of white and black holes. Using the concept of energy field, new models of white and black holes have been constructed. Of course, the assumption of huge white holes and existence of millions of solar-mass black holes in the center of the Milky Way is not contradictory. A large amount of mass ejected from white holes is still likely to form small and medium-sized black holes of a certain size.

Keywords: General relativity; Virtual space-time physics; White hole; Black hole

1 Introduction

The black hole theory of general relativity is based on the Schwarzschild black hole solution of Einstein's field equation. White hole solutions can also be obtained through general relativity, but it needs to be assumed that there is time inversion. The black hole solution can also be solved from Newton's gravitational formula. However, Newton's gravitational formula cannot obtain a white hole solution.

To solve these problems, virtual space-time physics can be used to build new models of black and white holes. Black and white hole solutions can be obtained through virtual space-time physics [1]. Of course, virtual space-time physics needs to assume the existence of virtual space-time.

As for related research on white holes and black holes, in addition to Schwarzschild ’s solution, more research on black holes has been focused on Hawking's series of work. However, due to the limitations of experimental observation technology, we now have little knowledge of black holes. White hole knowledge is scarce.

This article first introduces basic concepts such as energy and mass in virtual space-time physics, and then attempts to establish new white and black hole models and analyzes them.

2 Energy and mass

2.1 Mass-energy relationship

In the theory of relativity, energy and mass can be related through mass-energy relations. The total energy calculation formula is

$$E^2 = m^2c^4 + p^2c^2 = m^2c^4 + (hv)^{\ 2} \qquad (1)$$

We can express this as a plural form to see the relationship more clearly.

$$E = hv + imc^2 \qquad (2)$$

Where *i* represents the imaginary part. The energy *hv* part is special, it can only be measured in the form of momentum. If the rest mass is 0, this part corresponds to the total energy of the particle. If the static mass is not zero, the energy must be attached to a mass, and the kinetic energy is finally calculated. This energy is referred to herein as "virtual photon" energy. In other words, the virtual photon must always be attached to a non-zero mass to exist. Once the rest mass is zero, the virtual photon will be converted into a photon.

2.2 Energy field

In order to distinguish energy from mass, here the static mass is collectively referred to as "mass", and virtual photons and photons are collectively referred to as "energy fields". The energy *E* in formula (1) is called "total energy".

The energy field reflects an area of concentrated energy distribution formed by the collection of virtual photons and photons.

Energy field and mass belong to two objective existences of different dimensions. These two different dimensions can be represented in a two-dimensional coordinate system. If the total energy is constant, the trajectory of the total energy is a circle.

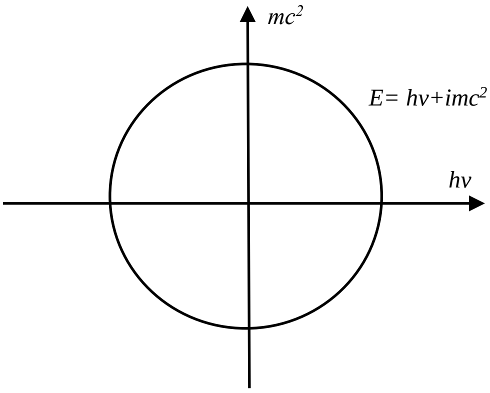

Figure 1. The two dimensional energy

It is also meaningful to have a negative mass in Figure 1, which represents the mass of antimatter. And *hv* is negative, it reflects that the virtual photon energy is negative. It can also be seen from the figure that matter and antimatter do not require exactly the same symmetry requirements. The ratio of matter to antimatter in the universe is directly related to the total mass and total mass distribution of the entire universe.

2.3 Antimatter ratio in the universe

Consider here that the total energy in the universe is E

The proportion of mass in it is expressed as:

$$\mu = \frac{mc^2}{E} \times 100\% \qquad (3)$$

If the total energy of the universe is converted into mass, the corresponding mass will reach:

$$M = \frac{E}{c^2} \qquad (4)$$

So, the distribution of the mass of the entire universe will be [-*M, M*]

Assuming such a mass distribution meets the requirements of a normal distribution, then:

$$f(m) = \frac{1}{\sqrt{2\pi}\sigma} e^{-\frac{(m-m_0)^2}{2\sigma^2}} \qquad (5)$$

Where m_0 is the average mass of all matter in the universe. Figure 2 shows a graph of this normal distribution. From this distribution, the probabilities of various masses in the universe can be found. However, two of these parameters are difficult to determine. One is the existing average mass m_0 in the universe. Or at least μ can be obtained. This should be roughly determined by the ratio of mass and energy in the solar system. Another parameter is the standard deviation σ, which is the dispersion of the current mass distribution in the universe. However, we don't know how much mass falls outside the average mass distribution. This may require new theories for calculations.

Figure 2 shows a graph of the mass distribution. Masses falling in the m <0 range are antimatter. It can be seen from the figure that according to the current distribution of the mass of the universe, the probability that the entire universe is antimatter is very small. Then convert this probability into the proportion of different particle masses in the universe, then we can see that the antimatter proportion in the universe should be very small. This is basically consistent with the current observations.

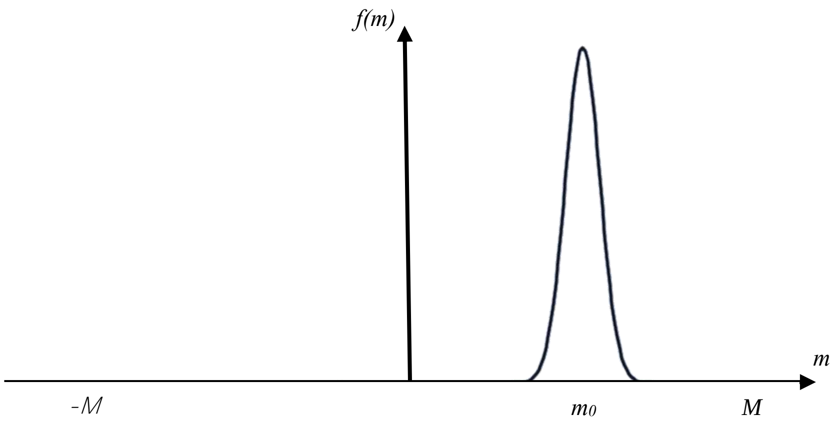

Figure 2. The distribution of cosmic mass

2.4 Symmetry of mass and energy

In turn, we can also regard the *hv* as mass in formula (2), which corresponds to virtual photons. Treating the *hv* term as a mass does not affect the calculation result mathematically.

Therefore, we can assume that there are two completely symmetrical space-time structures. In a space-time R, mc^2 is the mass and *hv* is the virtual photon energy. In another space-time V, *hv* is mass and mc^2 is virtual photon energy.

Mass and virtual photon energy are just two concepts. They are used to indicate that a frame of reference contains two concepts of a series of physical properties. They are independent of the frame of reference. Therefore, we can completely regard the mass in R space-time as the virtual photon energy in V space-time. vice versa.

2.5 Mass energy and space-time

Now we introduce the concept of space-time. Assuming space-time is an elastic medium, the energy field can spread in space-time, occupying all space-time as much as possible

So, if there is some kind of hole in space-time, the energy field will be able to put pressure on the hole.

As shown in Figure 3. The surrounding energy field will exert pressure on the hole, including the sum of the energy of free photons, virtual photons carried by various masses, etc.

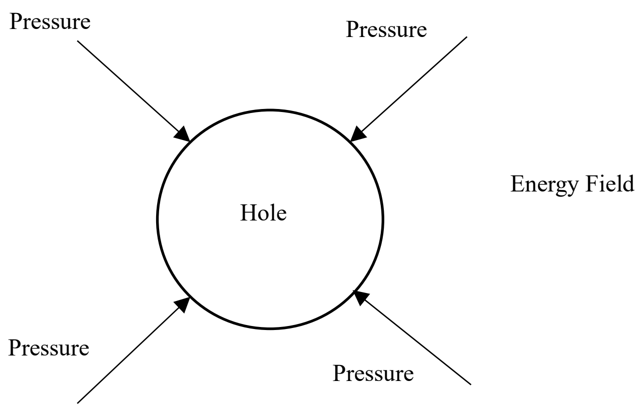

Figure 3. The pressures produced by energy field

The pressure exerted on the hole by the energy field shown in Figure 3 can exist either in real space-time or in virtual spacetime.

Since the energy field and mass of the virtual real space-time will be converted to each other, the energy field of the virtual space time will show the static mass in real space-time.

From the theory of virtual space-time physics, the spatial relationship between virtual space-time and real space-time is a reciprocal relationship. Therefore, the inward pressure generated by the energy in virtual space-time is manifested as the outward pressure generated by mass in the real space-time.

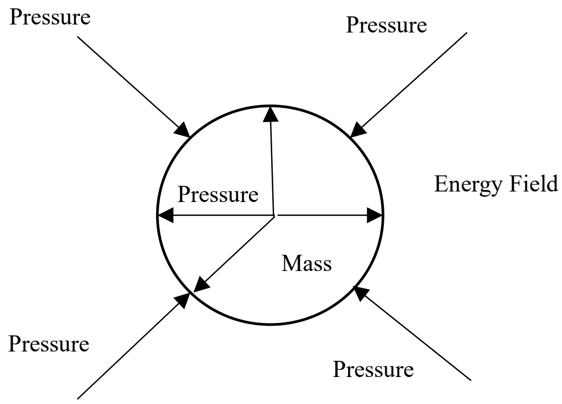

Figure 4. The pressures produced by mass

It can be seen from Fig. 4 that the energy field of the virtual space-time shows mass in real space-time, and it is shown within the circle in the figure. The pressure generated by the energy field in the virtual space-time appears as internal pressure in the real space-time, which is opposite to the pressure formed by the energy field in the real space-time.

Of course, both mass and energy fields will exert pressure on space-time and distort the structure of space-time.

3 Black hole structure

If the energy field of the virtual space-time continues to increase, the corresponding real space-time mass will continue to increase, and the real space-time will be continuously squeezed, causing the real space-time to bend. In turn, gravity is created.

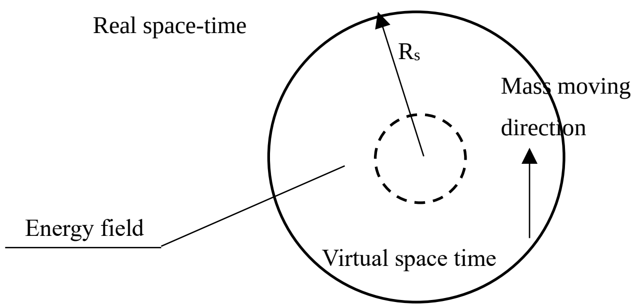

Figure 5. The Black hole

Figure 5 shows the structure of a black hole. The radius of the solid circle in the figure is equal to the Schwarzschild radius. The outer part of the Great Circle is real space-time, and the inner part is the interior of the black hole, which is virtual space-time. The dashed small circle inside the virtual spacetime is the energy field boundary inside the black hole. The energy field inside the black hole lies between the Schwarzschild radius and the small circle in the figure. This is because any mass inside the black hole cannot escape, so the energy field will be concentrated inside the black hole. Once a mass enters a black hole, it usually enters the interior of the black hole in a fast rotating manner. Therefore, an important feature of black holes is that the energy field lies within the Schwarzschild radius.

According to the prediction of virtual space-time physics, once the mass enters the virtual space-time, it will move at a speed exceeding the speed of light. Of course, this super light speed is expressed according to the real space-time reference system. If virtual space-time is used as the reference system, the speed of these masses is still fast as soon as possible, but its speed cannot exceed the speed of light.

Although mass and energy fields have different effects on space-time. Mass causes squeezing of space-time and produces space-time bending. The energy field has the opposite effect. But the total effects of mass and energy field on space-time can be solved by Einstein's field equation.

$$R_{\mu v} - \frac{1}{2} g_{\mu v} R = \frac{8\pi G}{c^4} T_{\mu v} \qquad (6)$$

If $T_{\mu v} = 0$, we can get the Schwarzschild black hole solution. There have been many studies on the properties of black holes in the past, so I won't repeat them here.

Here is the Schwarzschild radius of the black hole:

$$R_s = \frac{GM}{c^2} \qquad (7)$$

Because the interior of the black hole is virtual space-time, R_s also becomes the boundary between virtual space-time and real space-time.

4 Structure of white hole

If a black hole appears in the virtual spacetime, the black hole will have a very large virtual spacetime mass, and the virtual spacetime energy contained in the black hole is relatively small compared to the virtual spacetime mass. According to the requirements of virtual space-time physics, the mass of virtual space-time corresponds to the real space-time energy field, and the energy field of virtual space-time corresponds to the mass of real space-time.

It can be seen that in real space-time, there will be a very concentrated area of energy field, which also contains a relatively small amount of mass.

From formula (7), the Schwarzschild radius is relatively small due to its small mass. And the energy field is very powerful, which means that the energy field of the virtual space-time black hole in real space-time will continue to expand, which will drive high-energy photon radiation and mass ejection.

Assuming the total energy of the white hole is E_w, then:

$$E_w = -\frac{Gm}{r} + E_k$$

Where m is the mass of the white hole. E_k represents the energy of the energy field, which includes both free photons and the virtual photon energy carried by the mass ejected from the white hole.

Note that the energy of the energy field will gradually decrease as the white hole continuously ejects matter, which is usually achieved through the fusion nuclear reaction process. During the nuclear reaction, the energy field will continue to "cool" and form the static mass. Therefore, as a whole, the mass of the entire white hole system including the ejected material is constantly increasing.

However, there is a problem here. The increase in the total mass of the white hole system does not mean that the mass of the center of the white hole increases. If the mass formed by the white hole's ejected energy field has cooled down and the mass is sufficiently dispersed, and the distribution range exceeds the Schwarzschild radius, the black hole of real space-time will not be re-formed. Of course, if the ejected masses are concentrated in a relatively small range, some small and medium-sized black holes may be formed.

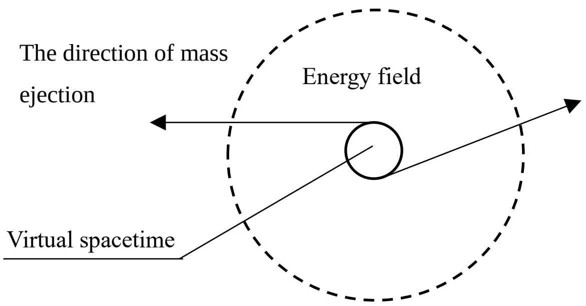

Figure 6. The white hole

Figure 6 shows the structure of the white hole. The center of the white hole is the virtual space-time of Schwarzschild's radius, which is the small circle in the figure. It is considered that the energy field of the black hole in the space-time is inside the Schwarzschild radius. Therefore, when converted to real space-time, the energy field will fall outside the Schwarzschild radius, that is, outside the virtual spacetime. Therefore, an important feature of white holes is that the energy field lies outside the Schwarzschild radius.

Therefore, there is a very powerful energy field around the white hole, which can accelerate the mass contained in the white hole and project it out of the center of the white hole. At the same time, in the process of continuous cooling of the energy field, through fusion nuclear reactions, new masses can be formed. After these masses absorb the energy (photons, virtual photons) of the energy field around the white hole, they will also be ejected from the white hole.

Considering that there are high-speed spins in the mass of the black hole, there are also high-speed spins in the white hole energy field. Therefore, after various masses are ejected from the white hole, an elliptical motion is performed around the center of the white hole. If these masses can be continuously accelerated by the energy field, it can be known from calculations [2] that these masses will make an elliptical spiral motion with an increasing axis diameter.

5 Summary

A few days ago, I thought about the question of the Galactic Center. At the beginning I also thought that the Galactic Center might be a huge black hole. However, by searching the relevant data of the Milky Way, I found that a lot of data does not seem to support the theory that the center of the Milky Way is a huge black hole, because if it is a black hole, even if Hawking radiation is generated due to the falling mass of the black hole, it is unlikely to form what we observe So strong light to the center of the Milky Way. In addition, new galaxies that are constantly being generated in the center of the Milky Way are also contrary to the assumption of black holes. Of course, there is a lot of other evidences.

So, I think about it the other way, thinking that the Galactic Center is more likely to be a white hole. For this reason, I specifically analyzed the dynamic mechanism of the galaxy spiral structure if the Galactic Center is a white hole. The analysis results show that the theoretical calculations are in good agreement with the actual spiral structure of the galaxy [2]. This also prompted me to further theoretically explore the formation mechanism and structure of black and white holes. Although the theory of general relativity has good theory and calculations on the structure of black holes, the calculation of white holes requires time inversion such an unacceptable assumption. This is why this article discusses the analysis of black and white hole structures from the perspective of virtual space-time physics.

I believe that from the perspective of virtual space-time physics, black holes and white holes have the same opportunity to exist. If you consider virtual space-time and real space-time as two inseparable parts of the universe, the number of black and white holes in the universe must be exactly equal. This is because a black hole in real space-time must correspond to a white hole in virtual space-time.

In addition, this article divides the total energy in the universe into two parts: mass and energy field. Therefore, a black hole can be considered to be generated by an energy field smaller than the Schwarzschild radius. The corresponding white hole is just the opposite. It is formed by the energy field exceeding the Schwarzschild radius.

Because the energy field around the white hole is very powerful, the mass in the white hole will absorb a large amount of energy and be continuously ejected. The energy field itself also has a cooling process. During the cooling process, the energy field will continue to form new masses and be ejected along with other masses.

Of course, the analysis in this article does not mean that there will not be black holes in the Galactic Center. On the contrary, the analysis of this article also pointed out that, while the mass of white holes is projected intensively, some masses may be gathered together. If the mass distribution range is smaller than the Schwarzschild radius, small and medium-sized black holes may indeed form. For example, millions of solar-mass black holes. But such black holes are basically insignificant compared to the huge mass and energy of the entire Galactic Center.

References

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基于虚时空物理学的白洞和黑洞模型

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摘要：在我的前几篇论文中，我探讨了银河系中心可能是白洞的观点。通过具体的计算表明，银河系中心为巨大白洞的假设比巨大黑洞的假设更能有效地解释银河系中出现的各种现象。然而广义相对论中的白洞理论需要存在时间反演的假设，这与我们已知的物理学规律，比如热力学第二定律相矛盾。为此，本文用虚时空物理学理论来对白洞和黑洞的结构进行分析。运用能量场的概念，构建出了新的白洞和黑洞的模型。当然巨大的白洞与银河系中心存在几百万个太阳质量的黑洞假设并不互相矛盾。白洞抛射出来的大量质量还是有可能形成一定规模的中小型黑洞的。

关键词: 广义相对论；虚时空物理学；白洞；黑洞

Аннотация: В моих предыдущих работах я исследовал идею о том, что Галактический Центр может быть белой дырой. с помощью конкретных расчетов показано, что предположение о том, что Галактический Центр представляет собой огромную белую дыру, может объяснить различные явления в Млечном Пути более эффективно, чем предположение об огромной черной дыре. Однако теория белой дыры в общей теории относительности требует предположения об инверсии времени, что противоречит известным законам физики, таким как второй закон термодинамики. По этой причине в данной статье используется теория физики виртуального пространства-времени для анализа структуры белых и черных дыр. Используя концепцию энергетического поля, были построены новые модели белых и черных дыр. Конечно, предположение об огромных белых дырах и существовании миллионов черных дыр в солнечной массе в центре Млечного пути не противоречит. Большое количество массы, выбрасываемой из белых дыр, все еще может образовывать маленькие и средние черные дыры определенного размера.

1 导言

广义相对论的黑洞理论，依据的是爱因斯坦场方程的史瓦西黑洞解。通过广义相对论也可以获得白洞解，但需要假设存在时间反演。黑洞解也可以从牛顿引力公式求解出来。但牛顿引力公式无法获得白洞解。

为了解决这些问题，可以采用虚时空物理学来构建新的黑洞和白洞的模型。通过虚时空物理学[1]可以获得黑洞和白洞解。当然虚时空物理学需要假设存在虚时空。

至于有关白洞和黑洞的相关研究，除了史瓦西解之外，对黑洞研究比较多的结果主要集中在霍金的系列工作中。不过由于实验观察技术的限制，我们现在拥有的黑洞知识很少。白洞知识则几乎没有。

本文先介绍虚时空物理学中的能量和质量等基本概念，然后尝试建立新的白洞和黑洞模型，并对这个模型进行分析。

2 能量和质量

2.1 质能关系

相对论中，能量和质量可以通过质能关系联系起来。总能量计算公式为

$$E^2 = m^2c^4 + p^2c^2 = m^2c^4 + (h\nu)^2 \qquad (1)$$

我们将其表示为复数形式就可以更清楚地看出其中的关系。

$$E = h\nu + imc^2 \qquad (2)$$

其中的 i 表示虚数部分。能量 $h\nu$ 部分比较特殊，它只能够以动量的形式被测量出来。如果静止质量为 0，则该部分对应了粒子的总能量。如果静止质量不为零，该能量必须依附于某个质量，最后综合计算出动能。这里将该能量称作“虚光子”能量。也就是说虚光子必须始终依附于一个不为零的质量才能够存在。而一旦静止质量为零，则虚光子将转变为光子。

2.2 能量场

为了区分能量和质量，这里将静止质量统一称之为“质量”，将虚光子、光子统一称之为“能量场”。将公式（1）中的能量 E 称之为“总能量”。

能量场反映出虚光子和光子的集合所形成的一种能量集中分布区域。

能量场和质量属于不同维度的两个客观存在。这两个不同的维度可以在一个二维的坐标系中表示出来。如果总能量恒定，则总能量的轨迹就是一个圆形。

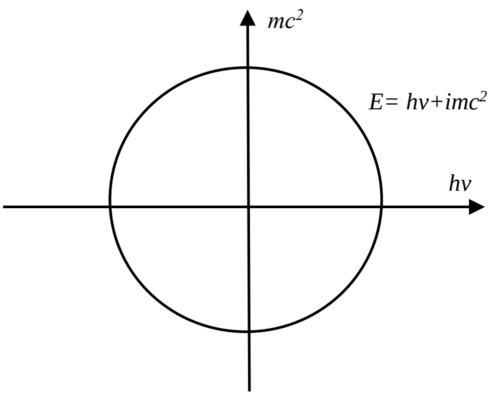

Figure 1. The two dimensional energy

图 1 中质量为负也是有意义的，它表示了反物质的质量。而 $h\nu$ 为负数，则反映出虚光子能

量为负值。从图中也可以看出，物质和反物质并没有需要完全相等的对称性要求。宇宙中的物质与反物质比例跟整个宇宙的总质量和总质量分布有直接的联系。

2.3 宇宙中反物质比例

这里考虑宇宙中的总能量为 E

质量在其中所占的比例表示为：

$$\mu = \frac{mc^2}{E} \times 100\% \qquad (3)$$

如果宇宙总能量全部转换成质量，则对应的质量将达到：

$$M = \frac{E}{c^2} \qquad (4)$$

因此整个宇宙的质量的分布范围将是[-*M*, *M*]

假设这样的质量分布符合正态分布要求，则：

$$f(m) = \frac{1}{\sqrt{2\pi}\sigma} e^{-\frac{(m-m_0)^2}{2\sigma^2}} \qquad (5)$$

其中 m_0 为现在宇宙中所有物质的平均质量。图 2 显示了该正态分布的图形。由这个分布可以求出各种不同的质量在宇宙中存在的概率。不过其中有两个参数比较难确定。一个就是宇宙中现有的宇宙平均质量 m_0. 或者至少能够获得μ. 这应该是可以通过太阳系中质量和能量的比例情况来大致进行确定。另一个参数就是标准差σ，即目前宇宙中质量分布的离散情况。有多少质量是落在平均质量分布之外的。这可能需要新的理论来进行计算。

图 2 显示了质量分布的图形，落在 m<0 范围的质量就是属于反物质的。从图中可以看出，按照现在的宇宙质量分布情况来看，整个宇宙质量为反物质的几率是非常小的。然后将这个几率转换成不同粒子质量在宇宙中所占的比例，则可以看出目前宇宙中的反物质比例应该很小。这与目前的观察结果基本一致。

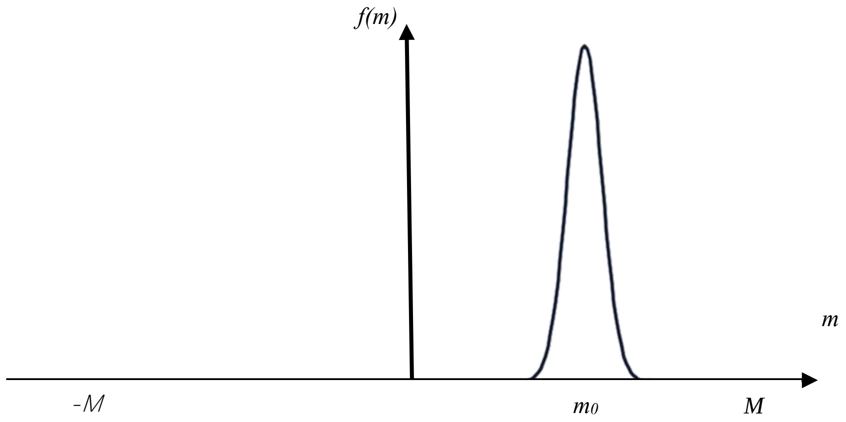

Figure 2. The distribution of cosmic mass

2.4 质量能量的对称性

反过来，我们也可以将质量看作是能量，对应了虚光子。将 $h\nu$ 项看作是质量，数学上并不会对计算结果有任何影响。

因此我们可以假设存在两个完全对称的时空结构。一个时空 R 中，mc^2 是质量，$h\nu$ 是虚光子能量。另一个时空 V 中，$h\nu$ 是质量，而 mc^2 是虚光子能量。

质量和虚光子能量只是两个概念，用来表示某个参照系中包含了系列物理属性的两个概念，它们是跟参照系无关的。因此我们完全可以将 R 时空中的质量看作是 V 时空的虚光子能量。反之亦然。

2.5 质能与时空

现在我们引入时空的概念。假设时空是一种弹性介质，能量场可以在时空中扩散，尽可能占据所有时空

因此如果存在时空的某种空洞，则能量场将能够对该空洞产生压力。

如图 3 所示。周围的能量场将对空洞产生压力，包括自由的光子，各种质量所携带的虚光子等的能量总和。

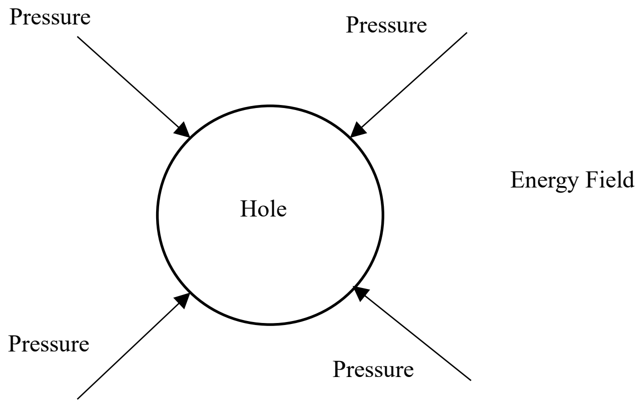

Figure 3. The pressures produced by energy field

图 3 显示的能量场对空洞产生的压力，即可以存在于实时空，也可以存在于虚时空。

由于虚实时空的能量场和质量会产生相互的转换，因此虚时空的能量场在实时空中表现出来的就是静止质量。

从虚时空物理学理论可知，虚时空与实时空的空间关系是一个互为倒数的关系，因此虚时空的能量场所产生的压力，在实时空中表现出来的就是向外对时空形成的挤压力。

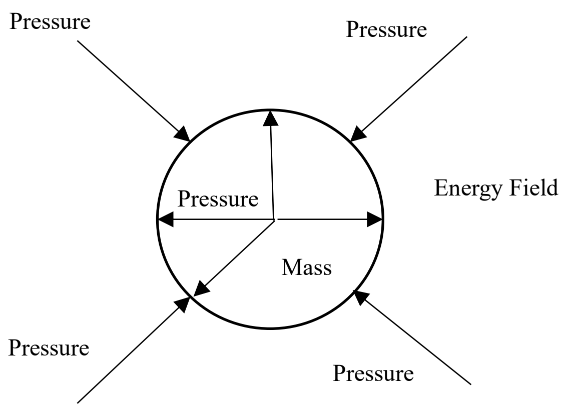

Figure 4. The pressures produced by mass

从图 4 可以看出，虚时空的能量场在实时空中表现出来的是质量，在图中的圆圈之内显示出来。而虚时空能量场所产生的压力，在实时空中表现为由内向外的压力，与实时空的能量场所形成的压力方向相反。

当然无论是质量和能量场都将对时空产生压力，扭曲时空的结构。

3 黑洞的结构

如果虚时空的能量场不断增加，将导致对应的实时空质量不断增加，并不断对实时空进行挤压，导致实时空产生弯曲现象。进而产生引力。

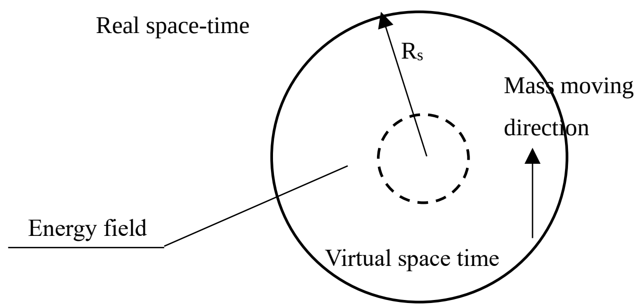

Figure 5. The Black hole

图 5 显示了一个黑洞的结构，图中的实线大圆半径等于史瓦西半径。大圆外部为实时空，而内部为黑洞内部，为虚时空。虚时空内部的虚线小圆为黑洞内部的能量场边界。黑洞内部的能量场位于史瓦西半径到图中小圆圆周部分之间。这是由于黑洞内部的任何质量都无法逃逸出去，因此能量场将集中在黑洞内部。一旦有质量进入黑洞，则通常会以快速旋转的方式进入黑洞的内部。因此黑洞的一个重要的特点就是能量场位于史瓦西半径之内。

按照虚时空物理学的预测，一旦质量进入虚时空之后将以超过光速的速度运动。当然这个超光速的速度是按照实时空参照系来进行表示的。如果以虚时空作为参照系，则这些质量的速度尽快仍然很快，但是其速度是不可能超过光速的。

虽然质量和能量场对于时空的作用方式是不一样的。质量导致对时空的挤压，并产生时空弯曲。而能量场则产生相反的作用。但是质量和能量场对时空的作用可以统一用爱因斯坦场方程来进行求解。

$$R_{\mu v} - \frac{1}{2} g_{\mu v} R = \frac{8\pi G}{c^4} T_{\mu v} \qquad (6)$$

如果$T_{\mu v} = 0$，则可以获得史瓦西黑洞解。黑洞有关的性质过去已经有很多的研究，这里不再赘述。

这里强调一下黑洞的史瓦西半径：

$$R_s = \frac{GM}{c^2} \qquad (7)$$

由于黑洞内部为虚时空，因此 R_s 也就成为了虚时空和实时空的边界。

4 白洞的结构

如果虚时空出现一个黑洞，则在虚时空该黑洞将拥有非常大的虚时空质量，而相对于虚时空质量而言，该黑洞中包含的虚时空能量相对来说还是比较小的。按照虚时空物理学的要求，虚时空的质量对应了实时空能量场，而虚时空能量场对应了实时空的质量。

由此可知，在实时空，将出现一个非常强大的能量场集中区域，其中也包含了相对少量的质量。

从公式（7）来看，由于质量较小，故史瓦西半径也相对来说比较小。而能量场非常强大，意味着该虚时空黑洞在实时空中的能量场将不断扩大，进而带动高能光子辐射以及质量的抛射。

假设白洞的总能量为 E_w，则：

$$E_w = -\frac{Gm}{r} + E_k$$

其中 m 为白洞质量。E_k 表示能量场能量，其中既包括了自由光子，也包括了白洞抛射出来的质量所携带的虚光子能量等。

注意到能量场的能量会随着白洞不断抛射物质的过程而逐渐减少，这通常是通过聚变核反应过程实现。在核反应过程中，能量场将不断"冷却"，并形成静止质量，因此总体上来看，包括抛射出去物质的整个白洞系统，其质量是不断增加的。

然而这里就有一个问题，白洞系统总质量的增加，并不意味着白洞中心的质量的增加。如果白洞抛射出来的能量场冷却之后形成的质量足够分散，分布范围超过史瓦西半径，则并不会重新形成实时空的黑洞。当然如果抛射出来的质量在比较小的范围集中在一起，则可能形成一些中小型黑洞。

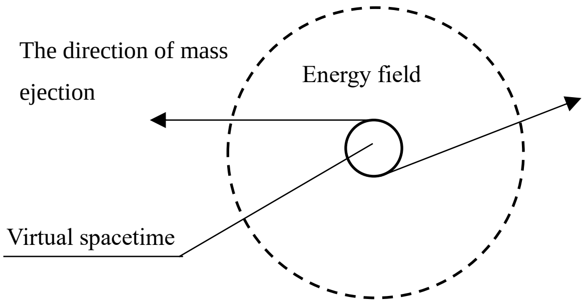

Figure 6. The white hole

图 6 显示了白洞的结构。白洞中心是史瓦西半径大小的虚时空，即图中的实线小圆。考虑到虚时空黑洞的能量场在史瓦西半径内部。因此转换到实时空，能量场将落在史瓦西半径外部，即虚时空外部。因此白洞的一个重要特点就是能量场位于史瓦西半径之外。

因此白洞周围存在非常强大的能量场，该能量场能够对白洞所包含的质量进行加速，将其抛射出白洞中心范围。同时能量场在不断冷却的过程中，通过聚变核反应，可以形成新的质量，这些质量吸收到白洞周围能量场的能量（光子、虚光子）之后，也将被抛射出白洞。

考虑到黑洞中质量存在高速自旋，因此白洞能量场也是存在高速自旋的。故各种质量被抛射出白洞之后将围绕白洞中心做椭圆运动。如果这些质量能够被能量场持续加速，则通过计算可知[2]，这些质量将做一个轴径不断扩大的椭圆螺旋运动。

6 总结

前几天我思考了银河系中心的问题，开始的时候我也认为银河系中心可能是一个巨大的黑洞。然而通过搜索相关的银河系的资料我发现，很多的资料似乎都不支持银河系中心为巨大黑洞的理论，因为如果确实是黑洞，即便是由于质量坠落黑洞产生了霍金辐射，也不可能形成我们现在观察到的银河系中心那么强烈的光线。另外银河系中心不断产生的新的星系，也同黑洞的假设相悖。当然还有其他的很多证据。

因此我反过来思考，认为银河系中心为白洞的可能性更大。为此我具体分析了银河系中心如果为白洞，进而形成银河系螺旋结构的动力学机制，分析结果表明，理论计算与实际的银河系螺旋结构符合的还是比较好的[2]。这也促使我对黑洞和白洞的形成机制以及结构做进一步的理论探索。虽然广义相对论对黑洞的结构已经有很好的理论和计算，但是对于白洞的计算却需要时间反演这样让人难以接受的假设。这才有了本文从虚时空物理学的角度来探讨黑洞和白洞结构的分析过程。

我们认为从虚时空物理学的角度来进行分析，黑洞与白洞存在的机会是一样的。如果将虚时空和实时空看做宇宙的两个不可分割的组成部分，则宇宙中的黑洞和白洞数量一定是完全相等的。这是因为一个实时空的黑洞一定会对应一个虚时空的白洞。

另外本文将宇宙中的总能量分成了质量和能量场两个部分。因此黑洞可以看作是能量场小于史瓦西半径而产生的。对应的白洞则正好相反，它是能量场超过史瓦西半径而形成的。

由于白洞周围的能量场非常强大，因此白洞中的质量将会吸收大量的能量而被持续抛射出去。而能量场本身也存在一个冷却的过程。能量场在冷却过程中，还会不断形成新的质量，并随同其他质量一起被抛射出去。

当然本文的分析并不是说银河系中心一定不会有黑洞。相反，本文的分析也指出，在白洞集中抛射出质量的同时，也有可能会有部分质量聚集在一起，如果其质量分布范围小于史瓦西半径，确实有可能会形成中小型黑洞。比如几百万个太阳质量的黑洞等。但这样的黑洞相对于整个银河系中心巨大的质量和能量而言，基本上是微不足道的。

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