The model of dark matter and dark energy

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ABSTRACT
I designed a model of dark matter and dark energy, and established some physical concepts and laws needed by the model. Then I used this model to analyze some physical problems, which is very effective.

1. Introduction

This model tries to explain dark matter and dark energy. There are several key questions. For dark matter, the key question is what gravity is? For gravity, the key question is what is the basic unit of matter? Matter is energy. For energy, the key issue is energy density. How does energy density work? For dark energy, the key question is where the repulsion comes from and how the amount of dark energy increases? All these problems are linked together. It is difficult to explain one part alone. It will be much easier to understand them as a whole. In order to reduce the confusion in reading, the article adopts a special order. In the second part, the conclusion is given, including new laws and new concepts. The third part gives clues and evidences. In the fourth part, the model is used to discuss some physics problems.

2. Conclusion

2.1 Energy Unit

The basic unit of matter is the energy unit. The energy unit is an energy sphere with infinite radius. The energy density is the highest at the core and decreases rapidly with the increase of radius. As the basic structure of the universe, the energy unit is absolutely stable. Fig.1

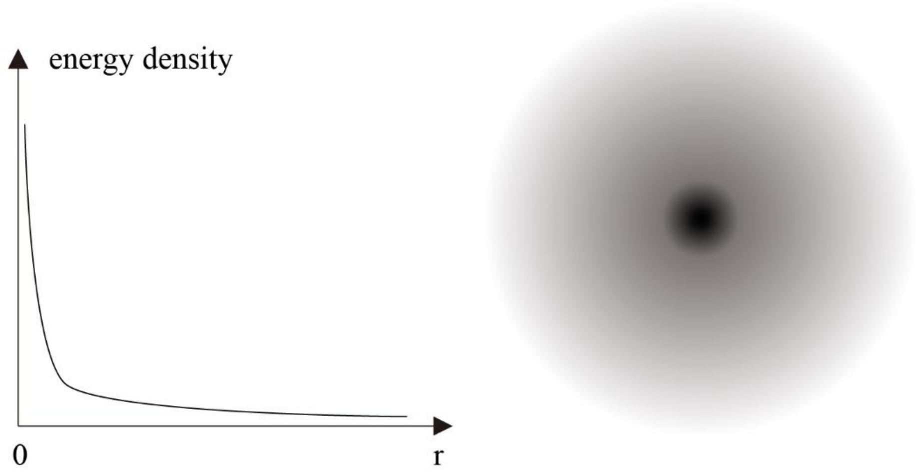


Fig. 1. Energy density distribution curve and imaginary shape of energy unit

2.2 Gravity

Gravity is a potential energy action. There is a trend of energy diffusion from high density to low density, and the potential energy effect caused by this trend is gravity. Positive correlation between gravity and energy density. For a single energy unit, the internal gravity is balanced. The gravitation between two energy units can be approximately expressed as the effect of the centroid on another sphere. We can use the 2D method to analyze the gravity of the centroid to another sphere. Draw a straight line through a centroid, perpendicular to the line between two centroids. The straight line divides the other sphere into two parts. When two centers of mass coincide, the two parts of the sphere are equal and the gravity is zero. When the two centers of mass do not coincide, the gravity is the difference between the two parts. Fig.2

Fig. 2. A straight line divides the sphere into two parts. The difference between the two parts is gravity. When two parts are equal, the gravity is zero. When two parts are different, the gravity is not zero.

2.3 Gravity and degenerate pressure coexist. They are the most basic forces. The energy unit has both gravity and degenerate pressure.

2.4 Revision of the first law of thermodynamics

The known part of the first law of thermodynamics: In our universe, the total amount of energy remains the same, and energy can be transformed between various forms.

Revision part: In our universe, the total amount of energy is constant, and the total density of energy is declining. All kinds of reactions are conversion process from high energy density to low energy density, or part of this conversion process. The decrease of cosmic energy density is irreversible.

As the energy density decreases, the energy density of some energy becomes extremely low. These energies are unusable to us. They don't participate in almost all reactions, so they can't be observed by existing technologies. In short, the total amount of energy remains unchanged, the available energy is decreasing, and the unusable energy is increasing.

2.5 Energy density law of reaction

The energy density of an object participating in a specific reaction must reach a certain value or higher before the reaction can take place. It's self-evident. Fig.3

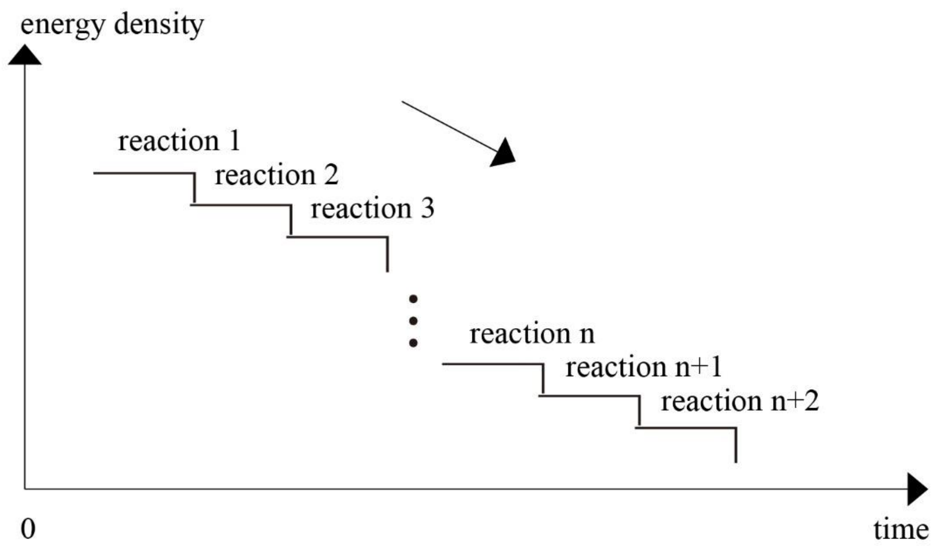


Fig.3. For each specific reaction, there is a minimum energy density requirement.

All detection methods are some kind of reaction, and also have their own minimum energy density requirements. The situation below this energy density cannot be detected.

2.6 Dark matter

Dark matter consists of the peripheral parts of the energy unit. As part of the energy unit, there is gravity, dark matter is extremely stable, and there is no interaction. Obviously, dark matter and matter are distributed in strict synchronization. Fig.4

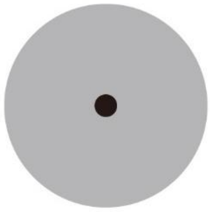


Fig. 4. Dark matter consists of the peripheral parts of the energy unit.

2.7 Matter

Matter consists of the core parts of a large number of energy units. A large number of energy units are integrated into the aggregate, which has a high energy density. All kinds of reactions can take place between aggregates, showing various complex interactions.

2.8 Dark energy

Dark energy is composed of single energy unit and small cluster energy unit, and its energy density is very low. According to the big bang model, a repulsion force causes the big bang. So we think that repulsion and gravity exist in the energy unit at the same time. This repulsion is called degeneracy pressure. The energy density of dark energy is very low, so the gravity of dark energy is very small, which is less than its own degeneracy pressure, so the whole performance is repulsive force. Fig.5

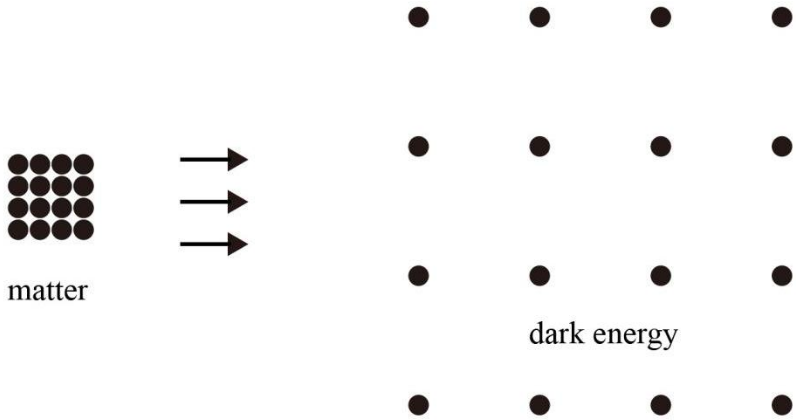


Fig. 5. Matter turns into dark energy.

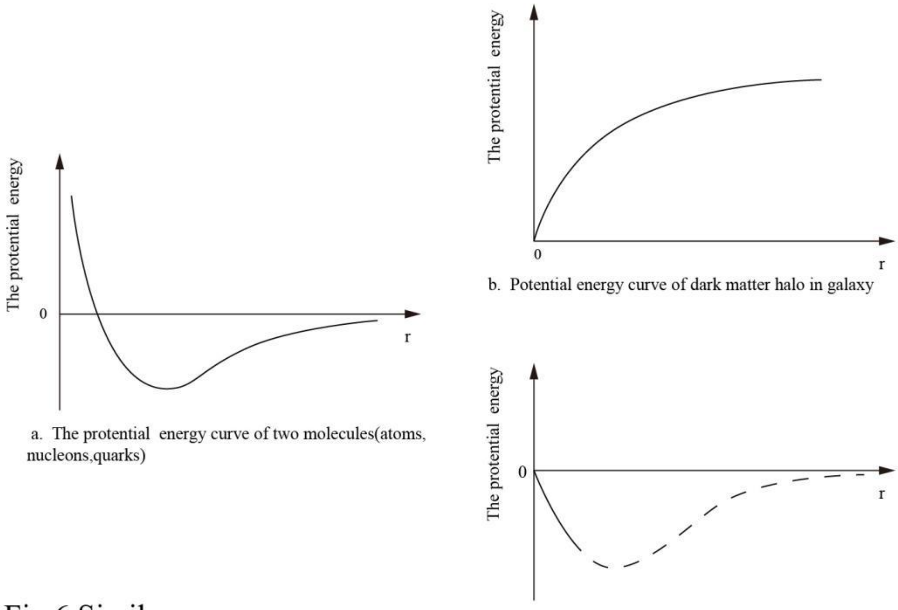
3. Clues and evidence

Here are important clues or evidence, but not all.

3.1 For the energy unit:

3.1.1 Mass is energy. (Einstein)

3.1.2 Several potential energy curves are very similar. They are among quarks, nucleons, atoms and molecules. Moreover, we complete the potential energy curve of Galaxy dark matter and change the direction of the curve. We find that all of these curves are very similar. Fig.6



a. The protential energy curve of two molecules(atoms, nucleons,quarks)

b. Potential energy curve of dark matter halo in galaxy

c. A complete potential energy curve of dark matter halo

Fig.6.Similar curves

In fact, asymptotically free phenomena occur simultaneously among quarks, nucleons, atoms, molecules, and dark matter halos. One possible explanation for this similarity is that they have similar principles of action. Dark matter halos are generally spherical, so other particles also have spherical fields. These fields are superimposed in a concentric sphere. The energy density of the sphere is the highest in the center, and the energy density in the periphery decreases rapidly. Fig.7

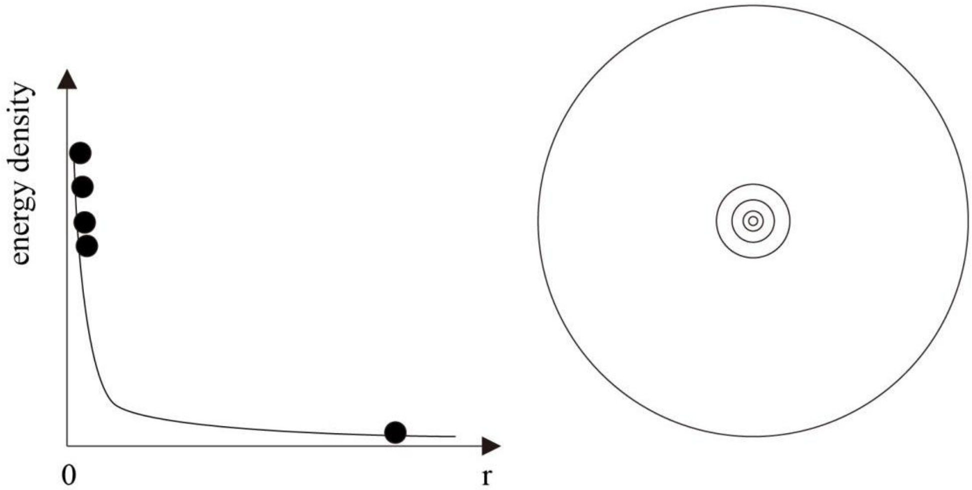


Fig. 7.

3.1.3 Field superposition principle.

3.1.4 Hard boundaries have never been found in any particle.

From these clues, we get the basic structure of the universe, the energy unit.

3.2 For dark matter and dark energy:

3.2.1 Gravitational lensing: The gravitational lens can only detect strong enough signals.[1]

The collision of bullet clusters: The observation data prove the existence of dark matter. The galaxy shows a good gravitational lensing phenomenon, which proves that there is dark matter accompanying it. Separation of plasma cloud from main gravitational lens. [2] However, there are two possible reasons for the separation of the plasma cloud from the main gravitational lens. The first possibility is that there is no dark matter around the plasma cloud. The second possibility is that there is dark matter around the plasma cloud, but the gravitational lens signal is not strong enough to be observed. If the shape of the dark matter halo is closely related to the shape of the plasma cloud, the plasma cloud will form a complex shape due to the intense collision, and the dark matter halo of the plasma cloud will also form a corresponding complex shape. The complex shape may destroy the signal of the gravitational lens, so the signal of the gravitational lens of the plasma cloud will become weak or invisible. Similarly, if the shape of the dark matter halo is closely related to the shape of the galaxy, the galaxy retains its original shape, and the dark matter halo of the galaxy will also maintain its original shape. So the gravitational lensing signal of the galaxy is not destroyed..

3.2.2 There is a constant density core in the center of the dark halos. [3]

3.2.3 Dark matter halos are not spherical.

3.2.4 Most of the dark matter is in the outer reaches of the galaxy, or in filaments and groups of galaxies. [4]

3.2.5 The dominant fraction of DM is probably cold and that it should be not only (sub)weakly interacting but also non-relativistic and massive. [5]

3.2.6 The cosmic coincidence, i.e., why dark energy started dominating the cosmic evolution only so recently.

3.2.7 Whatever the dark energy may be, it seems that physics beyond the standard model is necessary. [6]

4. Discuss some physics problems with this model

4.1 Why is gravity so weak?

Usually when people say that gravity is weak, they are at the scale of classical physics. According to our dark matter model, the scale of classical physics is in a very special position. Fig.8

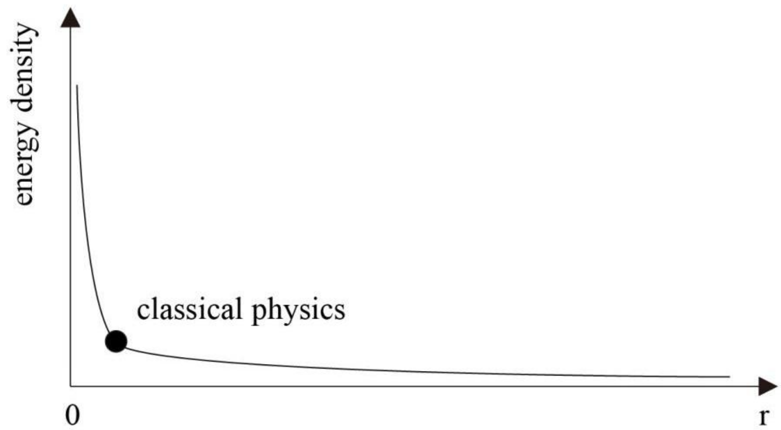


Fig. 8.

This particular location has two characteristics: low energy density and small relative distance. According to the concept of gravity, gravity is positively correlated with energy density. According to the dark matter model, gravity is positively correlated with relative distance in a certain range. This range is usually the scale of a cluster of galaxies. The scale of classical physics is the earth scale. The earth scale is very small relative to the cluster scale. Therefore, gravity is very weak in the scale of classical physics.

4.2 Strong force

Strong force is gravity. At the subatomic scale, the energy density increases rapidly with the decrease of particle size. According to the concept of gravity, gravity is positively correlated with energy density. So gravity is very strong on the subatomic scale.

4.3 Dark matter

In this part, we mainly discuss the shape of dark matter halo. According to the dark matter model, the shape of the dark matter halo is closely related to the shape of the galaxy. At the same time, the shape of dark matter halo near the galaxy is more similar to that of the galaxy, and that of the dark matter halo away from the galaxy is more spherical. The same thing happens in plasma clouds. Using five concentric circles to simulate the distribution of dark matter halos in galaxies.

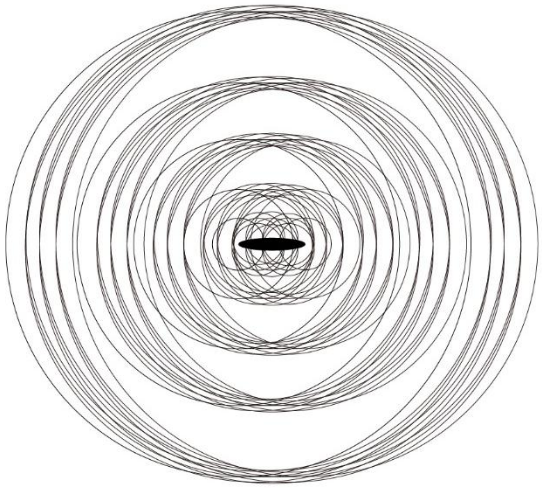


Fig. 9. Galaxy and dark matter halo

4.6 What is dark energy?

Dark energy has two characteristics: increasing in number and repulsion. According to these two characteristics, we found the best candidate for dark energy. They are single energy units and small clusters of energy units. Their energy density is extremely low.

According to the concept of gravity, gravity is positively correlated with energy density. So they have very little gravity. According to the big bang theory, repulsion and gravity exist in the energy unit at the same time. So there is a possibility: When the energy density is very low, the gravity will become very small. When the gravity is less than a certain value, the repulsion force is greater than the gravity, and the overall performance is repulsive force. There are huge holes between clusters of galaxies, where the energy density is very low. So the energy units here express repulsion. According to the revised version of the first law of thermodynamics, the total energy is unchanged, the energy of high energy density is decreasing, and the energy of low energy density is increasing. So, we found the best candidate for dark energy. They are small clusters of energy units and individual energy units located between clusters. Their energy density is very low, and they express repulsion as a whole. Their numbers continue to increase. Matter in the universe is transforming into dark energy. That's why the universe has accelerated in the last few billion years.

Fig.10

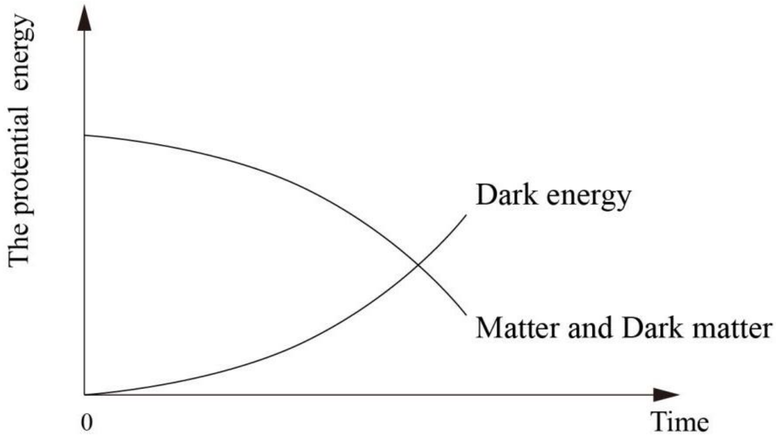


Fig.10.

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