The origin of large-scale structure in the universe

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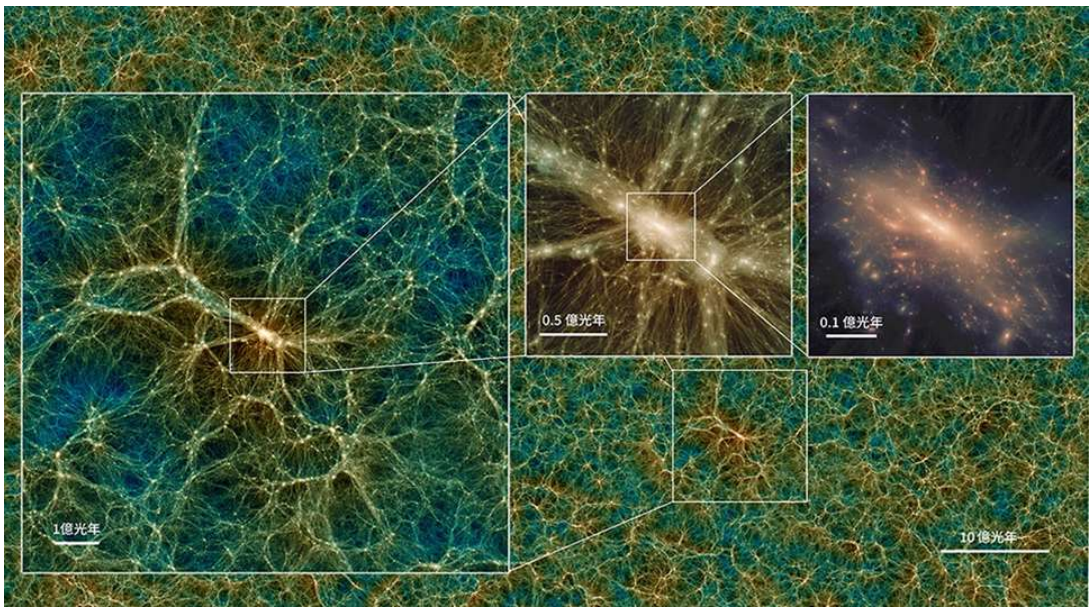
1. Overview

The large-scale structure of the universe is characterized by filaments, which are thread-like structures made up of galaxies and galaxy clusters, and voids, which are vast cavities in which almost no galaxies exist. This structure is said to resemble the nerves in the brain or a mass of bubbles. It is speculated that the principle of its formation is related to dark matter, and research is ongoing. (Fig1.)

This large-scale structure of the universe is speculated to be formed by the following two simple principles.

①. Stars and galaxies do not approach each other (do not fall), because gravity does not work even though gravity exists.

②. Dark energy is involved in the approach of distant stars and galaxies.



(Credit: Tomoaki Ishiyama, National Astronomical Observatory of Japan)
https://www.nao.ac.jp/news/science/2021/20210910-cfca.html
Fig1.

2. Gravity neutralized by stars and galaxies

Stars and galaxies are evenly scattered throughout the universe. If we were to assume that only the force of gravity were acting on these stars and galaxies, they would have to gather in

one place and become one huge mass. However, this is not the case in reality. The reason is that stars and galaxies do not approach each other (do not fall) in principle, contrary to the law of universal gravitation. The reason is as follows:

Universal gravitation is a law that describes the gravitational force acting between objects. Gravitation is proportional to the product of the masses of the two objects and inversely proportional to the square of the distance. There is no limit to the distance. This is because it is assumed that the gravitational forces of the two objects act separately. (Fig. 2.)

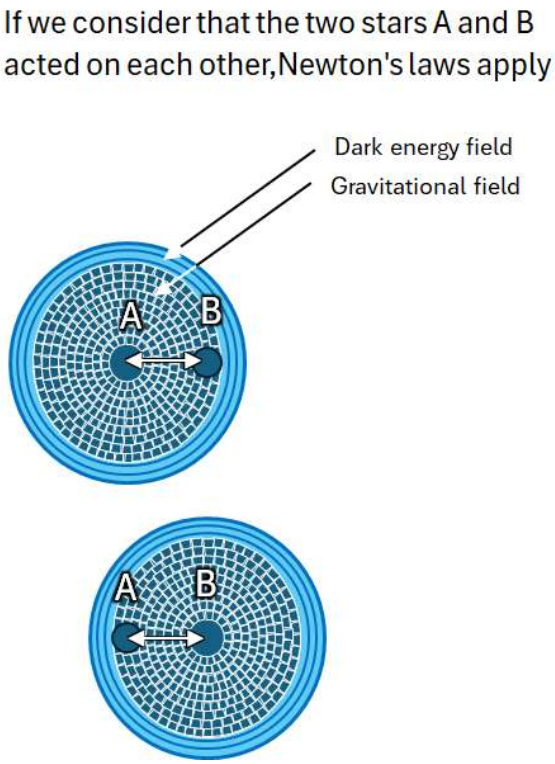


Fig2.

This relationship is valid when there is a large difference in the masses of the two objects and is predicted by the gravitational field model of the Energy Body Theory to not hold when there is no large difference in the masses of the two objects. Also, according to Einstein's theory of relativity, gravitation does not exist, and it is a phenomenon caused by the distortion of space. However, it does not show what the distortion of space is. According to the Energy Body Theory, which clarifies what the distortion of space is, the distortion of space is the gradient of the amount of energy between the spherical space layers generated in the space around the star. Space is made up of Planck-scale particles (energy cell bodies).

The energy cell bodies contract and line up in a spherical shape to form a space layer, which is positive energy. The outer space layer has a larger volume, so the ~~amount of~~ positive energy increases the further out you go. Conversely, the amount of energy decreases further in the space layer you go. Therefore, matter is attracted to the inside, where the amount of energy is smaller.

Matter within the gravitational sphere moves toward the inner star along the gradient of the amount of energy of this gravitational field. This is gravity. For this reason, gravity cannot be called an attractive force, nor is it a repulsive force. However, when stars or galaxies enter each other's gravitational spheres, they move along the gradient of the amount of energy between the space layers of each other's gravitational fields, but they do not get infinitely close to each other. When there is an overwhelming difference in mass, such as a meteorite falling on a star, there is no need to take this into consideration, but when the masses are close, such as between stars and stars or between galaxies and galaxies , it is necessary to consider whether an energy gradient occur by adding the energy difference between the space layers of each other.

When the gravitational fields of each other are superimposed and the energy of each space layer is added, if the energy gradient disappears, the stars and stars or galaxies and galaxies will stop approaching each other. (Fig. 3.)

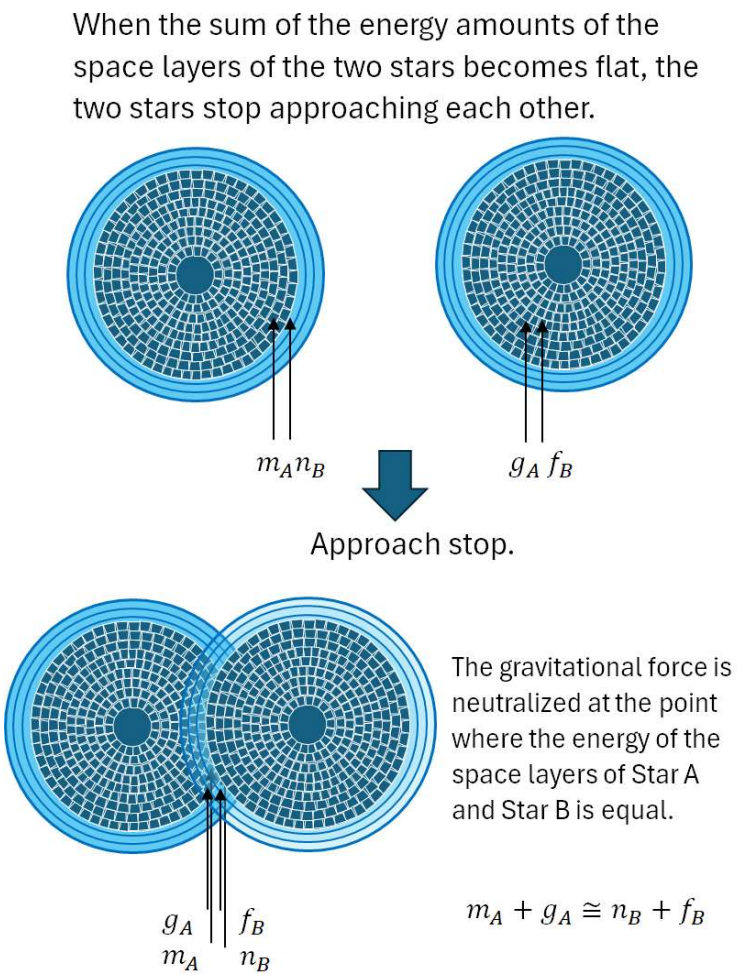


Fig3.

3. The cause of distant stars and galaxies approaching each other

Gravity is a very weak force. It is thought to be difficult for this very weak force to pull distant stars to form galaxies and pull galaxies to create large-scale structures. However, there is energy that can do this. It is dark energy. Dark energy is negative energy, where energy cell bodies expand symmetrically outside the gravitational field, which is positive energy, where energy cell bodies contract at the time of a star formation.

When a star approaches another star, the dark energy field that has formed around it, the dark energy is transferred onto the outer periphery of them. Eventually moving to the outer periphery of the entire galaxy, a single dark energy field is formed throughout the universe.

Therefore, if a dark energy field spreads around a galaxy, another galaxy will approach it. However, once the galaxy enters the gravitational field of this galaxy, it will not approach any further. This is as explained in 2 above. This is how the large-scale structure of the universe is formed.

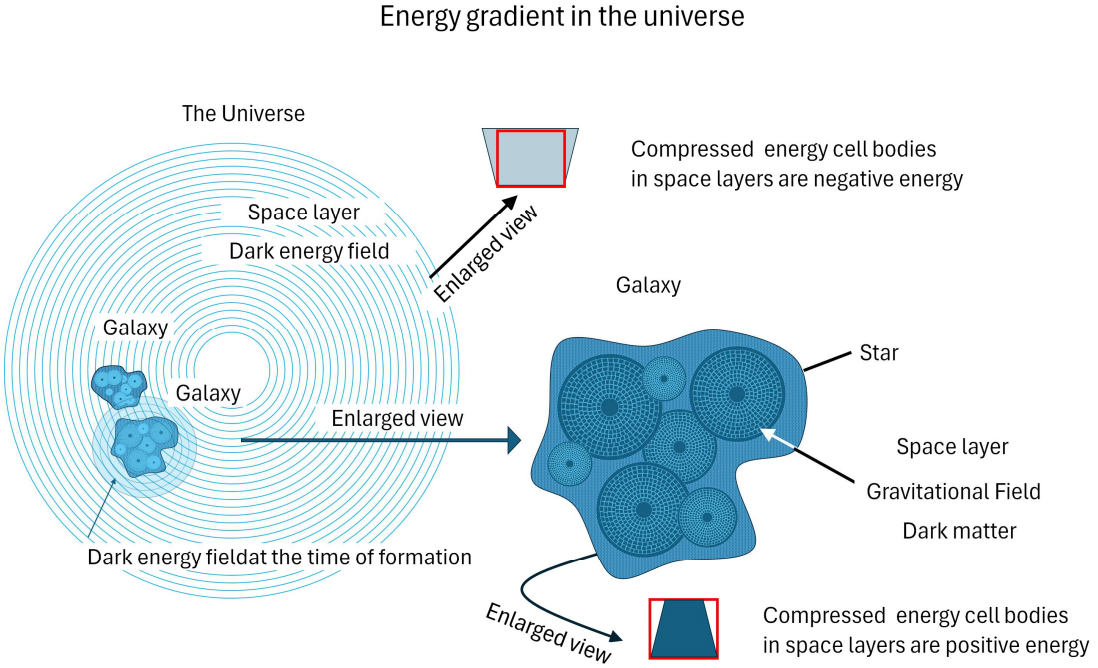


Fig4

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4. Conclusion

It is speculated that the large-scale structure of the universe resembles a bubble, although the scale is completely different, because the same principle is at work. Bubbles shrink due to surface tension, and bubbles try to stick together, but do not merge due to the air pressure that surrounds the bubbles. Similarly, stars and galaxies try to stick together due to gravity and dark energy, but when they approach each other, gravity no longer works, and they maintain their distance from each other. This is thought to be the cause of the large-scale structure.