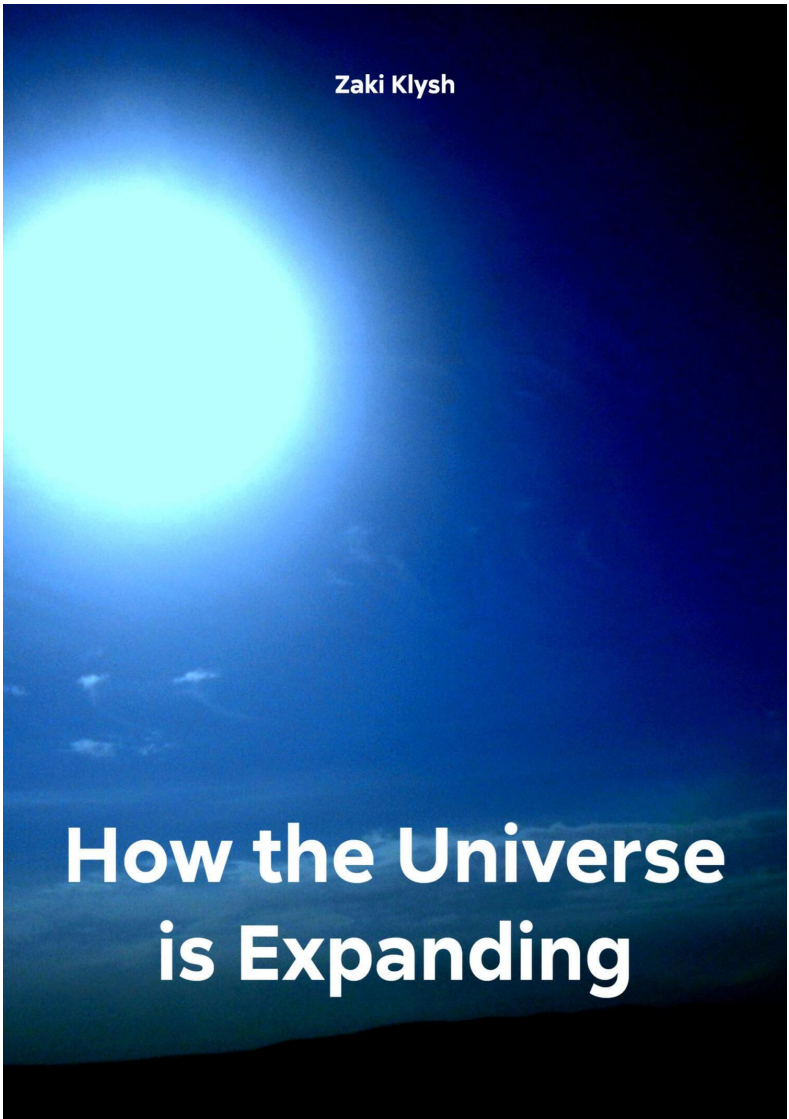
Zaki Klysh
How the Universe is Expanding

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http://www.litres.ru/pages/biblio_book/?art=70291216
SelfPub; 2024

Аннотация

Expansion of the universe. What is hidden under this? Maybe there is no expansion? Or rather, this is not what is currently being presented.A new vision of the expansion of the universe is proposed in this book.

Zaki Klysh
How the Universe is Expanding

Judge the day not by the harvest you have gathered, but by the seeds you have sown on this day.

Robert Louis Stevenson (1850-1894)

Expansion of the universe… It sounds somehow incomprehensible, but at the same time alarming and even threatening. If the universe is expanding, then there must be some limit.

Therefore, the question arises: the galaxies that make up the universe will eventually fly apart and get lost in the cosmic infinity, or will something else await them?..

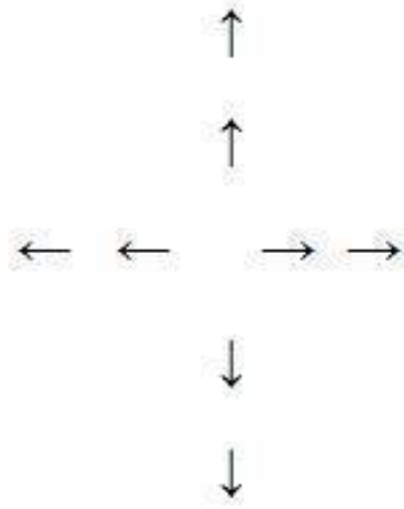
The expansion of the universe is sometimes presented in the form of an ordinary balloon with dots applied. When the balloon is inflated, the dots will evenly move away from each other, or another example, you can bake a pie from yeast dough with raisins.

During the cooking process, the dough increases, and the raisins also move away from each other.

But let's try to imagine the expansion of the universe even

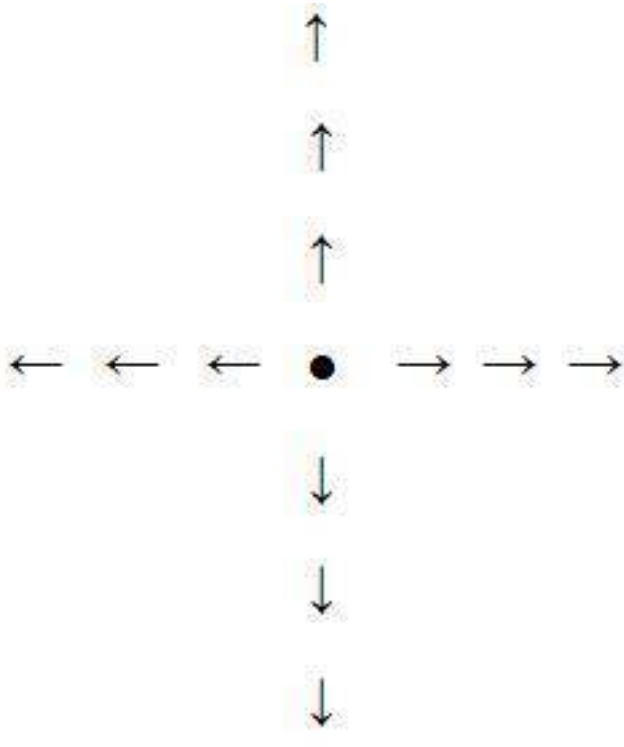
more simply, in the form of a scheme.

SCHEME 1



But if you look at the scheme differently, you can see that there is some
dot.

SCHEME 2



Perhaps this will be the birthplace of the universe. The Big Bang theory leads to such an understanding of the universe. This theory explains the birth of the world. The beginning was matter concentrated at one point. Further evolution led to the formation of the universe.

It would seem that everything is correct, and it is difficult to

question what is already becoming the truth.

But let's try to move away from this and look at everything differently.

Perhaps much of what is now difficult to explain will become clear.

In 1929, Edwin Powell Hubble (1889-1953) formulated a well-known law named after him, Hubble's law.

He found that the cosmological redshift of the lines in the spectrum of distant galaxies is greater than that of nearby galaxies, and increases in proportion to the distance.

That is, the universe is expanding, and not just expanding, but uniformly and in all directions.

Galaxies are moving away from each other at a certain speed.

Such a model only works over huge distances.

Hubble's law also allows us to determine the age of the universe —13.799 ± 0.021 billion years.

It has also been found that supernovae in distant galaxies have a lower brightness than expected. That is, the distance to these galaxies is greater than that which was calculated based on the established value of the Hubble parameter.

The current value of the Hubble parameter is 74.03 ± 1.42 (km/s) /Mpc.

Therefore, it was concluded that the universe is not just expanding, it is expanding with acceleration. For example, if the galaxy is located at a distance of 10 megaparsecs, then it is

moving away at a speed of 740 km/s.

But if the distances are small between the galaxies and the observer, these data may not correspond to the conclusions obtained. It turns out that there is a different pattern.

The most incomprehensible thing about the universe is that it is comprehensible.

Albert Einstein (1879-1955)

It seems that the expansion of the universe is already a proven fact and everything is true. Galaxies are moving away, and the end is the disintegration of the universe.

But the world is so arranged that it makes sense and there is a need for its existence. Therefore, let's try to consider the expansion of the universe a little differently.

The Solar System, galaxies are the components of the universe. Most of all we know about the Solar System, so let's focus on it. This is necessary for further understanding of the universe.

SOLAR SYSTEM

SUN

Mercury

Perihelion, the closest point of the planet's orbit to the Sun,

as well as the distance from this point to the center of the Sun is 46 001 009 km.

Aphelion, the most distant point of the planet's orbit from the Sun, as well as the distance from this point to the center of the Sun is

69 817 445 km.

The average distance to the Sun is 57 909 227 km.

The orbital period around the Sun is 87.97 Earth days.

Mass (m) – $3{,}33022 \cdot 10^{23}$ kg.

The speed of the planet in orbit is 47, 8474808278 ≈ 47,85 km/s.

Venus

Perihelion – 107 476 259 km.

Aphelion – 108 942 109 km.

The average distance to the Sun is 108 209 184 km.

The orbital period around the Sun is 224,7 Earth days.

Mass (m) – 4,8675•10kg

The speed of the planet in orbit is 35,0031356376 ≈ 35 km/s.

Earth

Perihelion – 147 098 290 km.

Aphelion – 152 098 232 km.

The average distance to the Sun is 149 598 261km.

The orbital period around the Sun is 365,2564 days.

Mass (m) – 5,9726•10kg.

The speed of the planet in orbit is 29,769710549 ≈ 29,77 km/s.

Mars

Perihelion – $2{,}06655 \cdot 10^8$km

Aphelion – $2{,}49232 \cdot 10^8$km

The average distance to the Sun is $2{,}279435 \cdot 10^8 \approx$ 228 000 000 km

The orbital period around the Sun is 687 Earth days.

Mass (m) – $6{,}4171 \cdot 10^{23}$ kg.

The speed of the planet in orbit is 24,1225942099 ≈ 24 km/s.

Jupiter

Perihelion – $7{,}405736 \cdot 10^8$ km

Aphelion – $8{,}165208 \cdot 10^8$ km

The average distance to the Sun is $7{,}785472 \cdot 10^8 \approx$ 778 550 000 km

The orbital period around the Sun is 11,86 Earth years.

Mass (m) – 1,8986•10kg.

The speed of the planet in orbit is 13,0630806003 ≈ 13 km/s.

Saturn

Perihelion – 1 353 572 956 km.

Aphelion – 1 513 325 783 km.

The average distance to the Sun is 1 433 449 369,5 ≈ 1 433 000 000 km

The orbital period around the Sun is 10 759 Earth days (approximately 29.5 Earth years).

Mass (m) —5,6846•10kg.

The speed of the planet in orbit is 9,68099919792 ≈ 9,68 km/s.

Uranus

Perihelion – 2 748 938 461 km.

Aphelion – 3 004 419 704 km.

The average distance to the Sun is 2 876 679 082,5 ≈ 2 880 000 000 km.

The orbital period around the Sun is 84 Earth years.

Mass (m) —8,6813•10 kg.

The speed of the planet in orbit is 6,81491111335.

Neptune

Perihelion – 4 452 940 833 km.

Aphelion – 4 553 946 490 km.

The average distance to the Sun is 4 503 443 661,5 ≈ 4 500 000 000 km

The orbital period around the Sun is 164,79 Earth years.

Mass (m) —1,02409•10 kg.

The speed of the planet in orbit is 5,43828478811≈ 5,4 km/s.

Let's leave the calculations and consider only the speeds of

the planets.

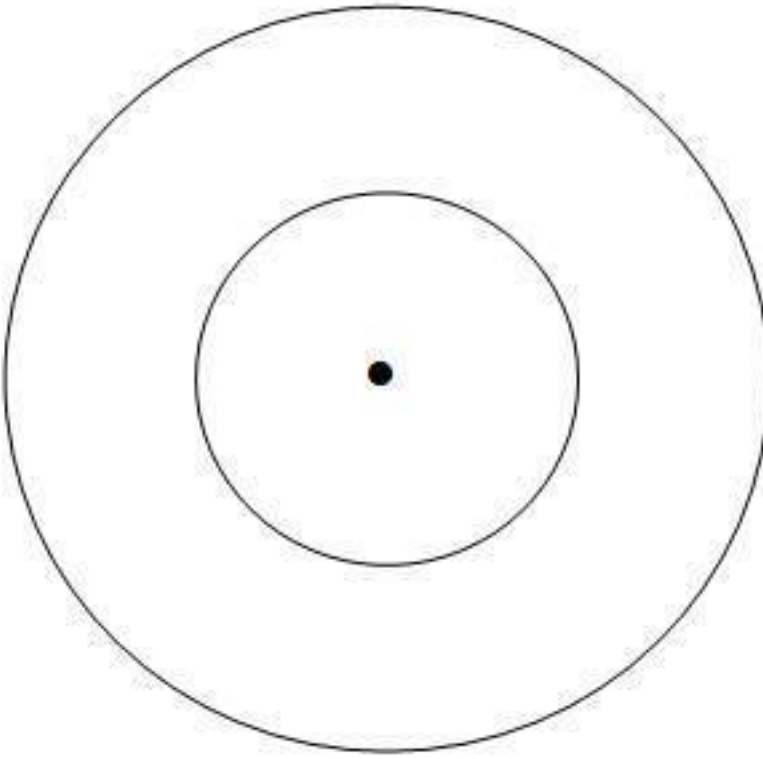
Mercury – 47,85 km/s.
Venus – 35 km/s.
Earth – 29,77 km/s.
Mars – 24 km/s.
Jupiter – 13 km/s.
Saturn – 9,68 km/s.
Uranus —6,8 km/s.
Neptune —5,4 km/s.

Many have noticed that the speeds at which planets revolve around the Sun do not depend on the mass of the planets, as well as the number of satellites. The determining factor is the distance to the Sun. The closer the planets are to the Sun, the faster the planets move. This is due to gravitational forces. If the planet is farther from the Sun, then the gravitational forces are weaker, so the speed decreases.

These data are necessary for further consideration of the issue. But to get closer to our conclusions, let's first consider concentric circles.

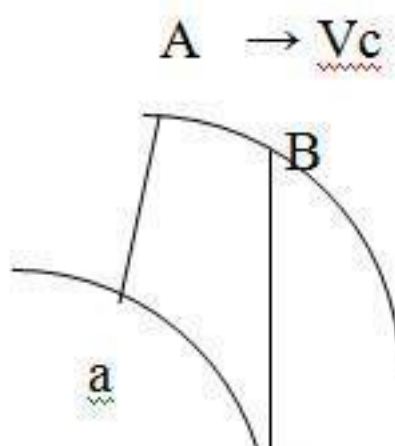
SCHEME 3
Concentric circles

Our concentric circles have a common center.



Consider the arcs of these circles.

SCHEME 4



Now imagine that two points are moving along concentric circles. One point is on the outer circle, and the other is on the inner circle.

An observer who is at point “a” is observing the object “A”.

The object with the observer at the point “a” and the object “A” move with their constant speeds: Vc and Vd.

After some time, the object with the observer at the point “a” will move to the point “b”, moving with a speed Vd.

The object “A” (Vc) will be at the point “B” during the same

time.

Now let's compare the distances “Aa” and “Bb”. In this scheme, “Aa” will be less than “Bb”.

Aa Bb

For the observer at the point “b” it will seem that the observed object “A” is moving away.

If we calculate the speeds of objects “a” and “A”, we get that we are not determining the true speeds of Vc and Vd objects, but the assumed ones, since the calculations are based on the distances that were determined relative to the observer, that is, Aa and Bb.

To determine the speeds Vc and Vd, it is necessary to know the true distances traveled by objects “A” and “B”.

The arcs “AB” and “ab” are the true distances traveled by objects “a” and “A”.

Now back to the main question.

As you may have guessed, if the universe is represented in the form of concentric circles with a single center, then the galaxies do not move away from each other, but revolve around a nucleus with colossal energy.

That is, the point “a” is an observer on Earth who is watching the supernova “A” in one of the galaxies. After a certain time, the object “A” will be at point “B”, at the same time the observer will move to point “b”.

According to the cosmological redshift, the observer will determine that the distance between objects is increasing, so it

will seem that the galaxies are moving away from each other.

These reasonings will be true for large distances between objects.

In reality, galaxies are not moving away, but moving at certain speeds in their orbits.

But let's try to figure out in which cases it will seem that the universe is expanding.

Consider the possible orbits of galaxies.

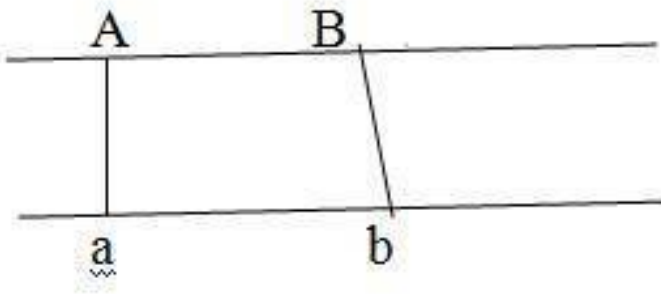
There can be only three variants between two objects.

But first we note once again that the distances are huge, so the orbits that are furthest from the center will be depicted by straight lines. The near orbits have curvature.

Possible orbits of galaxies

Variant 1

Two objects are located in distant orbits. The distance between objects "a" and "A" is less than 1 Mpc.



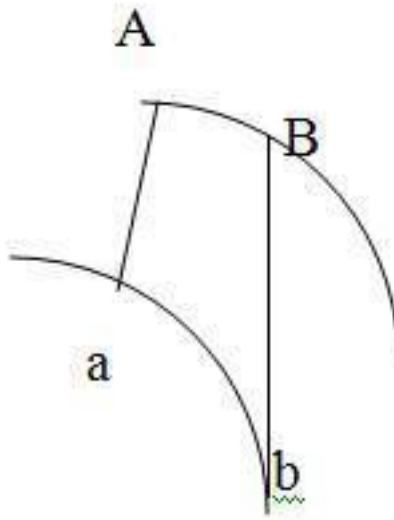
Objects “a” and “A” move in their orbits with certain speeds, which do not change during the movement, since these are orbital speeds.

Therefore, the distance between objects will not change.

Variant 2

The objects are closer to the center. The distance between “a” and “A” is also less than 1 Mpc.

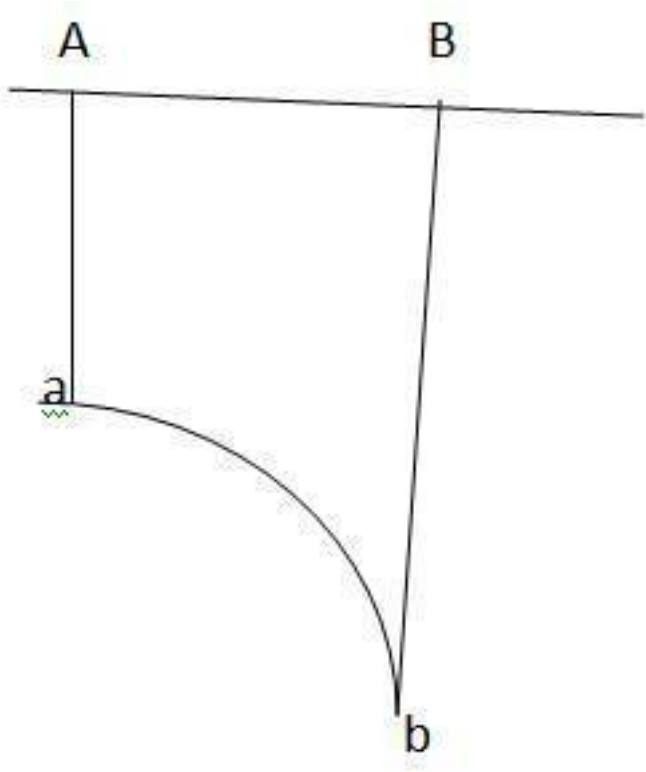
In this case, changes in distances will depend on the speeds of objects, as well as on the number of observed objects.



It will seem to the observer that some objects are moving away, while others, on the contrary, are approaching.

Variant 3

The distance between objects “a” and “A” is over 1 Mpc. That is, the objects are located at a considerable distance from each other. For example, the observed object will be in a distant orbit, and the observer is closer to the center.



The distance between objects will increase, regardless of their speed.

Bb Aa

Therefore, it will seem to the observer that the object is

moving away.

In this case, to see other results, the observation time for one object should be millions of years, and this, of course, is impossible.

Logic will get you from A to B. Imagination will take you everywhere.

Albert Einstein (1879-1955)

We continue on.

Our Milky Way galaxy and the Solar System have a center, an axis. For the Solar System, it is, of course, the Sun. What about other cosmological objects?

The rotation of objects around the center increases the radii of their orbits. For example, every year the Moon moves away from the Earth by 3.8 cm. Therefore, the orbits will most likely have the form of a spiral.

If our reasoning is correct, then the universe is expanding, but expanding in a different way.

Galaxies move in their orbits around the center of the universe. The orbits of the galaxies will have the form of a spiral, which is why the universe is expanding.

Thus, and the age of the universe will be different.

Another mystery of the universe is the Hubble parameter.

It is 74 (km/s) /Mpc. In calculations based on relic radiation, this value is 67.4.

If our reasoning is correct, cosmic microwave background radiation is something else. Because it is still unclear what is

behind the Big Bang.

That's why we were guided by the cosmological redshift.

The Hubble parameter is far from a simple parameter. But how does all this relate to the expansion of the universe?

The Hubble parameter is 74 (km/s) /Mpc. Based on the above, we can conclude that this is not the speed of expansion of the universe. This is the speed at which the Milky Way galaxy rotates around the center of the universe.

It's time to take stock.

The closer the planets of the Solar System are to the Sun, the higher the speed of their movement around the star. Perhaps this will also apply to other cosmological objects.

The universe resembles a disc. Galaxies revolve around the center of the universe in spiral orbits.

The expansion of the universe occurs as a result of the movement of galaxies in spiral orbits.

The Hubble parameter indicates the speed at which the Milky Way galaxy is moving in orbit around the center of the universe. The speed is 74 km/s.

The currently observed expansion of the Universe based on the study of the cosmological redshift, as well as the increase in speed when galaxies are more than 1 Mpc away, is the result of

the fact that the starting point for calculations was the distance to the observed objects, and not the true distance to the galaxies.

False step has more than once led to the opening of new roads.
Leszek Kumor (1924—1987)

If our assumptions are correct, then we hope that in the future spaceships will be able to fly to distant galaxies.

To do this, you need to correctly calculate the orbit, and launch spaceships not towards the location of the galaxy, but to where it will be after some time. Therefore, there is no need to catch up with the fleeing galaxy.

The process of scientific discovery is, in essence, a continuous escape from miracles.
Albert Einstein (1879-1955)

That's how it turns out…

Sky… The endless distant night sky with alluring twinkling stars, with playful young reddish stars calls there, into this dark mysterious space.

The lingering echo of distant stars runs through eternity, trying not to get lost in the crowd of galaxies. The light of stars that have gone into oblivion, rushes through the abyss of time, giving hope that nothing ends…

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