"Dark matter", "Dark energy", and other problems in physics today

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ABSTRACT

The cause of the hypotheses of the existence of "dark matter" and "dark energy" is a consequence of the second biggest blunder in physics of the 20th century: "the accelerating expansion of the Universe". This is undoubtedly a big problem in physics because it is illogical for the Universe to expand, despite the existing and undeniably proven universal attraction (Newton's law of universal gravitation). Modern physics tries to explain this delusion by the existence of an illogically high percentage of some unknown type of "dark matter" in the Universe (which, if it existed, should have been discovered by now), as well as by the inexplicable myth of "dark energy" (the nature of which is inexplicable even to modern cosmologists themselves)!

The root cause of this delusion is based mainly on the unproven claim that the redshift of the spectral lines of the emitted electromagnetic radiation from remote galaxies is due to the Doppler Effect. Throughout his life, Hubble did not support Vesto Slipher's supposition that the "redshift" is a "velocity-like displacement" (as a result of the Doppler Effect). The Doppler Effect is an effect of the mechanical waves, but not of the electromagnetic waves. The real explanation of the incorrectly called "Doppler radar" with Schrödinger's dynamic interpretation is presented in the article.

According to the assistant and successor of Hubble, Allan Sandage, Hubble believed that the redshift "represents a hitherto unrecognized principle of nature".

The main contribution of this paper is the presentation of this "unrecognized principle of nature"– that is the "energy-spatial relationship" existing in the energy-space-time continuum of the Universe, that the so-called "empty space" between the celestial bodies and between the particles of matter is actually a "soup" of energy

Key Words: *Dark matter; Dark energy; Accelerating expansion of the Universe; Redshift*

INTRODUCTION

The claim that all the atoms and light in the universe together make up less than five percent of the total contents of the cosmos is based on the delusion that the Universe is expanding, which in turn is based on the assumption that the observed redshift of the electromagnetic radiation coming from distant galaxies is due to the Doppler effect. However, the Doppler Effect is an effect that is observed only with mechanical waves, which are vibrations of matter.

The introduction of this article presents the history of rising the problems of "dark matter" and "dark energy". The laws "redshift-distance" and "velocity-distance" are also discussed, which modern cosmologists indiscriminately call "Hubble's law". A real explanation of the incorrectly called "Doppler radar" with Schrödinger's dynamic interpretation is also presented. Irrefutable counterarguments for the existence of the Doppler Effect in the case of electromagnetic waves are also presented.

Vesto Melvin Slipher was the American astronomer who carried out the first observations of the shifting of spectral lines of electromagnetic radiation (of light) coming from distant galaxies. Slipher used spectroscopy to investigate the rotation periods of planets and the composition of planetary atmospheres. In 1912, he was the first to observe and discover that the spectral lines of hydrogen absorption in the spectrum of distant galaxies redshifted to the low-frequency spectrum. He was also the first to suppose that this redshift was related to velocity (with the unproven existence of the Doppler Effect at electromagnetic waves), thus providing the first empirical basis for the expansion of the Universe.

In September 1912, in "The Radial Velocity of the Andromeda Nebula" in the inaugural volume of the Lowell Observatory Bulletin, Slipher reported:

"The magnitude of this velocity, which is the greatest hitherto observed, raises the question whether the velocity like displacement

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might not be due to some other cause, but I believe we have at the present no other interpretation for it" [1].

By combining the distances with measurements of galaxy redshifts from the Vesto Slipher, Hubble and his assistant Milton L. Humason found a linear relationship between the galaxy distances and measured redshifts. In 1929 Hubble published the results of the work in his first book [2]. There, he indicatively concludes that there is a linear relationship between redshift and distance; that is, if one galaxy is twice as far away from another, its redshift is twice as large. This discovery later became known as Hubble's law. Hubble's law "redshift-distance" is represented as $\Delta\lambda/\lambda$ = constant*D, where $z = \Delta\lambda/\lambda$ is the redshift and D is the distance to the galaxy.

Two years later, in 1931, in "The Velocity-Distance Relation among Extra-Galactic Nebulae", Hubble and Humson presented what astronomers and cosmologists widely regarded as very convincing evidence that the relationship is indeed linear; therefore, the redshift of the spectrum of electromagnetic radiation from a remote galaxy is directly proportional to the distance to the galaxy [3]. The linear relationship is expressed by the equation $z = \Delta\lambda/\lambda$ = H.D, where H is the constant of proportionality, D is the "true distance" to the galaxy, and z is the redshift.

The theoretical basis of the delusion of "expansion of the Universe" was given by the Russian and Soviet physicist and mathematician Alexander Friedman, and the Belgian astronomer, cosmologist, and mathematician Georges Lemaître [4]. Practice in theoretical physics shows that even if the applied mathematics is perfect, but based on the wrong fundamental concept, the result is wrong. Georges Lemaître, the Belgian Catholic priest and physicist, predicted the "velocity-distance" relation and published observational support for it two years before the discovery of Hubble's law (which is actually different from the real Hubble's law "redshift-distance" relation) [5].

Hubble estimates the distances to 24 extragalactic nebulae using a variety of methods. The established distances turn out to be more or less proportional to the true distances.

Yet, the reason for the redshift remained unclear. However, many cosmologists and astronomers (including Hubble himself) failed to recognize the work of Lemaître. Hubble remained doubtful for his entire life about Lemaître's interpretation. Although Hubble used the term "velocities" in his paper (and "apparent radial velocities" in the introduction), he later expressed doubt about interpreting these as real velocities. In 1931 he wrote a letter to the Dutch cosmologist Willem de Sitter expressing his opinion on the theoretical interpretation of the "redshift-distance" relation:
"Mr. Humason and I are both deeply sensible of your gracious appreciation of the papers on velocities and distances of nebulae. We use the term "apparent" velocities to emphasize the empirical features of the correlation. The interpretation, we feel, should be left to you and the very few others who are competent to discuss the matter with authority."

In the 1930s, Hubble was involved in determining the distribution of galaxies and spatial curvature. These data seemed to indicate that the universe was flat and homogeneous, but there was a deviation from flatness at large redshifts. According to Allan Sandage:
"Hubble believed that his count data gave a more reasonable result concerning spatial curvature if the redshift correction was made assuming no recession. To the very end of his writings, he maintained this position, favouring (or at the very least keeping open) the model where no true expansion exists, and therefore that the redshift "represents a hitherto unrecognized principle of nature".

In December 1941, Hubble reported to the American Association for the Advancement of Science that the results from a six-year survey with the Mount Wilson telescope did not support the expanding Universe theory. According to a Los Angeles Times article reporting on Hubble's remarks:
"The nebulae could not be uniformly distributed, as the telescope shows they are, and still fit the explosion idea. Explanations which try to get around what the great telescope sees, he said, fail to stand up. The explosion, for example, would have had to start long after the Earth was created, and possibly even after the first life appeared here".
If, according to modern physics, the Hubble constant represents the "velocity-distance" relationship, then it would tell us the velocity of an object at any distance. Since the distance between all objects in the Universe before the "Big Bang" should have been zero, the time in this equation should be the age of the Universe. (Therefore, Hubble's estimate of what we now call the Hubble constant would put the Big Bang only 2 billion years ago).

The Doppler Effect at mechanical waves and accepted illogical analogy in the case of electromagnetic waves

The Doppler Effect (or Doppler shift) occurs in mechanical waves; these waves are vibrations of matter particles belonging to a material propagation medium—vibrations (oscillations) of any material particle of the propagation medium around a stationary point in the frame of reference related to the propagation medium of the mechanical wave. This is the change in the measured frequency and length of a mechanical wave ascertained by an observer who moves in the medium of propagation relative to the source of the wave. The effect was named after the Austrian physicist Christian Doppler, who described the phenomenon in 1842 on the basis of his research with sound waves. Known mechanical waves propagate through a material medium (solid, liquid, or gaseous) with a wave velocity that depends on the elastic and inertial properties of this medium. There are two main types of mechanical waves depending on wave motion: "transverse waves" and "longitudinal waves".

We know that the sound waves in the atmosphere are mechanical longitudinal waves - they are oscillations of matter in which material particles (molecules) vibrate parallel to the direction of propagation. In mechanical waves, only the vibrations of the material particles are transmitted in space from particle to particle: any material particle oscillates around a stationary point in the reference frame related to the propagation medium (which medium can be stationary with respect to the stationary space or can move, e.g. running water). The particles themselves are not transported from the source to the receiver in the reference frame related to the propagation medium; only the vibration itself is transported transmitting in this way energy. In the case of mechanical waves, the Doppler Effect is observed if the source

or receiver moves within the frame of reference relative to the propagation medium; this effect can also occur with respect to the stationary space since the medium is material.

For Huygens, light is a longitudinal wave (like the sound waves in the air) that propagates through a medium called "ether", or "aether" at that time. The "ether" must fill all the space and be weightless and invisible. The reality is that electromagnetic radiation has no material character:
Electromagnetic radiation is a stream of immaterial small energy packets (quanta), propagating radially from the source in a stationary space distorted by gravitational forces.
This flow of quanta under certain circumstances manifests itself as a wave. For this reason, we agree that electromagnetic radiation has a dual nature – it has a wave-corpuscular character. However, in the case of electromagnetic waves, it is not permissible to draw an analogy with mechanical waves (i.e., if a "redshift" is observed, this does not mean that it is due to the "Doppler effect").

The energy of each emitted or absorbed quantum from a particular atom is given by the Max Planck ratio, which is equal to the difference between the energy levels of the participating pairs of quantum energy states of a given atom ($Equantum = Ei - Ej = \hbar\nu$), where ν is the frequency, ħ is the Planck constant and Equantum is the energy of the quantum. In other words, the "quantum energy states" of an atom are fixed, therefore the energy (frequency) of the emitted quanta (photons) has discrete values that cannot be arbitrary. They are strictly defined and represent the difference between two adjacent energy levels of the atom. Therefore, the frequency, wavelength, and speed in vacuum of the emitted quantum (the properties of atoms) do not depend on the speed of motion of the atom; however, as proven, they depend on the intensity of the gravitational field in the local time-spatial domain, where the atom is located. Some of the statements of the "Thesis about the Behavior of the Electromagnetic Radiation in a Gravitational Field" were presented at the 3rd Annual International Conference on Physics in, Athens, Greece, 20-23 July 2015 [6].

The frequency, wavelength, and speed in vacuum of the emitted quanta (photons) do not change when they propagate in a region with a uniform intensity of the gravitational field (as in the region "close to the Earth's surface"). Quanta can pass through a substance if their energy is high enough (if the electromagnetic waves are at a high frequency); can be absorbed by the substance, but they can also be reflected.

Let us look at the case of the incorrectly called "Doppler radar" or "Doppler laser gun" according to Schrödinger's interpretation (Schrödinger's dynamic interpretation). When the quanta are reflected by a moving material body, their energy (frequency) changes if the energy (frequency) of the electromagnetic quantum is comparable to the momentum of the moving object. Each atom of the moving body has a quantity of motion (momentum). Thus, at the collision of the quantum (photon) with the moving atom, there is an energy exchange. The energy of the reflected quantum changes, depending on the momentum of the atom (depending on the velocity vectors of the quantum and the material body). This means that the frequency of the reflected quantum changes, because ($\Delta E = \hbar.\Delta\nu$), where ν is the frequency, and ħ is the Planck constant. In fact, the speed of the quantum remains the same ($c=\lambda\nu$), since the speed of light in vacuum is a local constant for all frequencies of the electromagnetic spectrum in any time-spatial region with uniform gravitational field intensity. However, its frequency ν, and therefore its wavelength λ, changes. This is the case with the incorrectly-called "Doppler radar", or "Doppler gun", because the result is not due to the "Doppler Effect", which is an effect only at mechanical waves!

Conclusion:
The claim of the existence of the "Doppler effect" in electromagnetic radiation (that the motion of the source of electromagnetic radiation causes a "redshift" or "blueshift" of the frequency of the electromagnetic radiation), is actually a big delusion in modern physics. This claim is the root cause of the delusion of the "accelerating expansion of the Universe", and hence of the emergence of the superfluous make-believes "dark matter" and "dark energy".

The laws "redshift-distance" and "velocity-distance"
As mentioned above, Vesto Slipher was the American astronomer who first reported an observed redshift. His assumption is that the observed shift in the spectral lines of the emitted electromagnetic radiation (of the light) from distant galaxies is caused by the velocity "velocity-like displacement" (which means due to the Doppler Effect). This is a brilliant example of how an assumption is perceived as scientific truth by the mainstream of physics without any experimental evidence!
Cosmologists generally fail to distinguish the linear dependence $z = \frac{\Delta\lambda}{\lambda} = H.D, z(D)$ "redshift-distance" proposed by Hubble [2] from the law V(D) "velocity-distance". As noted, in contrast to Hubble's law, the origin of the law of velocity-distance ($V=H_0*D$) actually remains unclear, where V is the recessional velocity, D is the distance to the galaxy, and H_0 is the Hubble constant.

Modern cosmologists ignore this difference, and the two laws are indiscriminately called "Hubble's law". As mentioned, the change in wavelength (displacement) is usually attributed to the Doppler effect, which is observed when the source of mechanical waves (such as sound waves) or the observer are moving at a velocity relative to each other in the material medium of propagation of a mechanical wave. However, thus far, there is no experimental evidence proving that the Doppler effect is valid for electromagnetic waves; i.e., there is no evidence that the two laws are equivalent. Counterarguments refuting the existence of the Doppler Effect at hand the electromagnetic waves are presented below.

With his works in 1922 and 1924, Friedman became the pioneer of "non-stationary" open and closed homogeneous and isotropic cosmological models, and over the next decade, these expanding models were further developed by Lemaître , and other cosmologists, e.g., Eddington , Robertson, and Tolman [5, 7]. During the formative stages of the expanding cosmic paradigm in the early 1930s, it became clear that expansion must be linear if the universe is homogeneous. However, with the 2011 Nobel Prize in Physics: "for the discovery of the accelerating expansion of the Universe through observations of distant supernovae", modern physics actually accepts that the law "redshift-distance" z(L) is not linear, and is time-dependent, which means that Hubble's constant is not a time-independent constant, and that modern cosmologists do not distinguish the law of "redshift-

distance" from the contrived law "velocity-distance".

Therefore, Vesto Slipher's supposition:
"The magnitude of this velocity, which is the greatest hitherto observed, raises the question whether the velocity like displacement might not be due to some other cause, but I believe we have at the present no other interpretation for it" [1]. It remains valid for modern physics, although, according to Edwin Hubble, the redshift "represents a hitherto unrecognized principle of nature".

Counterarguments refuting the existence of the Doppler Effect at electromagnetic waves

In fact, no "redshift" or "blueshift" was observed at the electromagnetic waves, as a result of the "Doppler effect", at a relative velocity between the transmitting and receiving objects. The case of the so-called "Doppler radar", as was discussed above, is due to the collision of the quantum (photon) with the moving atom, where the case is an energy exchange. Here is some of this evidence for the non-existence of the "Doppler effect" in the case of electromagnetic waves:

1. To date, no deviation of the frequency of the electromagnetic signals, emitted by hypersonic airplanes when flying low over a point on the Earth's surface, has been observed (although modern technology makes it possible);
2. If the "Doppler effect" is valid for electromagnetic waves, then the frequency emitted by a suitable laser in "east-west" and "west-east" directions (from a stationary source relative to the moving Earth's surface) will be different due to the linear velocity of the Earth's surface, which, for example, is approximately equal to 0.465 km/s for any point on the equatorial line! The effect should be superimposed when receiving an emitted electromagnetic signal from a hypersonic airplane flying at a low altitude above the receiver, especially if it is close to the equator;
3. If the "Doppler effect" is valid for electromagnetic waves, then the frequency emitted by a space probe will change every half circumference when a space probe orbits a planet in the Solar system in the ecliptic plane (the plane in which the Earth and the other planets orbit around the Sun). However, such an effect is not observed.
4. Moreover: If the "Doppler effect" exists in the case of electromagnetic waves, then when observing the redshift of galaxies of suitable remoteness (in the Earth's orbital plane), the observed redshift of the incoming light from these galaxies should differ significantly in opposite positions of the Earth in its orbit around the Sun (in cases such as "January-July", "March-September", and "June-December"). Such a difference should obviously be observed because the speed of revolution of the Earth around the Sun is approximately 30 km/sec, and the Hubble constant is approximately 70 (km/s)/Mpc. Thus, a change from "redshift" to "blueshift" and vice versa during the different seasons should be easily observed if a galaxy is not too remote
5. If the "Doppler effect" is valid for electromagnetic waves, then the electromagnetic signals from the space probes "Pioneer 10", "Pioneer 11", "Galileo", and "Ulysses", when moving away from the Sun (and therefore from the Earth) must be redshifted, and the shift must change in different seasons because the speed of revolution of the Earth around the Sun is approximately 30 km/sec. However, the electromagnetic signals from these space probes (moving away from the Earth) shift toward the blue spectrum and the shift does not change from season to season.

It is obvious that the Doppler Effect is valid only for mechanical waves, which are vibrations of matter – of vibrating particles of matter in a material medium of propagation.

The electromagnetic field, together with the gravitational field, exists on the space, and the gravitational and electromagnetic forces themselves distort (contract) the space at the micro- and macro-levels. Unlike mechanical waves, electromagnetic radiation is a radially propagating stream of quanta of energy in the stationary space (which is actually an "energy soup"); therefore, the "Doppler effect" is not applicable to a nonexistent analogy with mechanical waves.
Moreover, modern physics silently avoids explaining many facts, such as the following:

1. What causes "the redshift" of the frequency of electromagnetic signals from a space probe which reduces its speed before landing on the surface of a planet in the solar system (for example, when a space probe is landing on the surface of Mars)? Obviously, if this is due to the Doppler effect, then we would observe a "blueshift";
2. What is the reason for the "blueshift" of the frequency of electromagnetic signals from the space probes "Pioneer 10", "Pioneer 11", "Galileo", and "Ulysses", which actually move away from the Sun (from the Earth);
3. If the Doppler Effect is proving that the Universe is expanding, then why is the Andromeda galaxy approaching our Milky Way galaxy?

Obviously, many paradoxes (such as Olbers' paradox – the "dark night sky paradox") remain, for which modern physics admits that scientific explanations cannot be provided (based on perceived delusions). In fact, the relationship between the "contraction of the space" and the "accumulation of the energy in the space" presented below not only provides a logical explanation for the observed "redshift" of the spectral lines of emitted electromagnetic radiation from the distant galaxies (explanation of the facts cited above) but also provides a reasoned explanation for the "Olbers' paradox".

DISCUSSION ON THE REAL CAUSE OF THE REDSHIFT OF THE ELECTROMAGNETIC RADIATION COMING FROM DISTANT GALAXIES

Logical rationale

Facts:

1. Atomic clocks tick faster high in the mountains. That is, the frequency of emitted electromagnetic radiation increases in regions with lower gravitational field intensities.
2. The shift in the hydrogen spectral series in the spectrum of electromagnetic radiation emitted on the surface of nearby stars is the same, regardless of the size (mass) of the star. Although the frequency of the emitted electromagnetic radiation differs due to the different strengths of gravity on the surface of different stars, it always arrives at the surface

of the Earth at a frequency as if it had been emitted at the surface of the Earth.

Conclusion 1 (the case of a static universe) [8]:

1. The frequency of the emitted electromagnetic radiation is in full synchrony with the intensity of the gravitational field at the location of the radiation. This means that the "quantum energy states" of the emitting atom (and therefore the energy (frequency) of the emitted quanta) depend on the intensity of the gravitational field in the location at the atom.
2. The frequency of the propagating electromagnetic radiation changes in full synchrony with the intensity of the gravitational field in the regions through which it passes.
3. Thus the frequency of electromagnetic radiation arriving at the Earth's surface is as if it had been emitted here at the Earth's surface. The interpretation of the astronomical spectroscopy results is based on this logic.

Conclusion 2

1. The frequency of electromagnetic radiation is actually the energy of the quanta ($E = \hbar.\nu$). Therefore, the energy of the quanta changes as the quanta pass through regions with different gravitational field intensities. Actually, the quanta give out part of their energy to the "energy soup" (the empty space/vacuum) when entering regions of stronger gravity, and some energy is returned back to them when the quanta enter regions of weaker gravity.

Conclusion 3

It turns out, that the vacuum (the so-called "empty space", which is the medium for propagation of the electromagnetic quanta), is compressed energy from the fundamental forces of nature!

Conclusion 4 (the case of an expanding or contracting universe):

1. If the Universe is expanding during the propagation of the quanta through space, then the quanta arriving at the surface of the Earth from distant galaxies will be of greater energy (blueshifted)! This is because the quanta arrive with additional energy upon arrival at the Earth's surface, which is received from the "empty space" that expands during travel.
2. If during the propagation of the quanta through the "empty space" of the Universe, the "empty space" is contracting, then the quanta arriving at the surface of the Earth from distant galaxies will be of lower energy (redshifted). This is because a part of their energy remains accumulated (stored) in the "empty space" contracting during propagation and will remain absorbed by the contracting space upon arrival at the Earth's surface. The longer they travel (from more distant galaxies), the greater part of their energy will be absorbed by the contracting space during the time of propagation and the greater the redshift will be. This is the real explanation of the law "redshift-distance" discovered by Edwin Hubble!

Experimental proof

The American astronomer Sandra Faber is known for her research on the formation and evolution of galaxies and the structure of the Universe. She has made significant scientific contributions to the structure and formation of galaxies and the motion of the stars in the galaxies related to their age; she maps the universe in three dimensions and analyses the flow patterns of a large number of galaxies. Her mapping techniques change the way we look at the Universe and contemplate its future.

The fact that the Universe is contracting is confirmed by the discovery of the team of Sandra Faber:

While mapping a vast region of the Universe, including our galaxy, they found that all the galaxies are moving roughly parallel, like a great river of galaxies, at approximately 600 kilometers per second, heading towards a very, very large supercluster, super-supercluster of galaxies– a supercluster of real matter. They called this super-supercluster of galaxies the "Great Attractor".

This is the undeniable argument that the 2011 Nobel Prize in Physics should have been awarded to Professor Sandra Faber and her colleagues:

"for the discoveries proving that the Universe is at a contracting state toward a region of global attraction of the Universe, and that this contraction is accelerating due to the increase in the incoming matter in the region of the "Great Attractor" (the region of the global attraction), and due to the decrease in the distance of the moving galaxies toward this region."

This is the explanation for why, from our galaxy, we are observing an increasing redshift of electromagnetic radiation coming from all other galaxies (which is wrongly accepted as the "recede of galaxies"). This is not only because of the greater travel time of electromagnetic radiation but also because the galaxies closer to the "Great Attractor" have greater attraction (Newton's Law of Universal Gravitation) and consequently greater acceleration, and those farther away have a smaller acceleration than the Milky Way. Exceptions are nearby galaxies with the same distance to the "Great Attractor" (to the center of the contraction), such as Andromeda.

For a bit of open-mindedness

This section provides further evidence that the Universe is contracting (for those who even accept that there is a Doppler effect in the case of electromagnetic radiation).

This discovery by Sandra Faber's team is extremely important because even if cosmologists have accepted that the redshift is due to the Doppler Effect and observe that the galaxies are running away from each other, this actually means that the Universe is contracting. Moreover, this is consistent with Newton's law of universal gravitation (it is illustrated in Figure 1 below).

All galaxies are heading headlong into the Universe's region – the super-supercluster region of galaxies that Professor Sandra Faber calls the "Great Attractor". The gravitational attraction of each galaxy (i.e., its acceleration) to the region "Great Attractor" is inversely proportional to the square of the distance to this region:

$$F = G\frac{m_1 m_2}{r^2} \qquad (1)$$

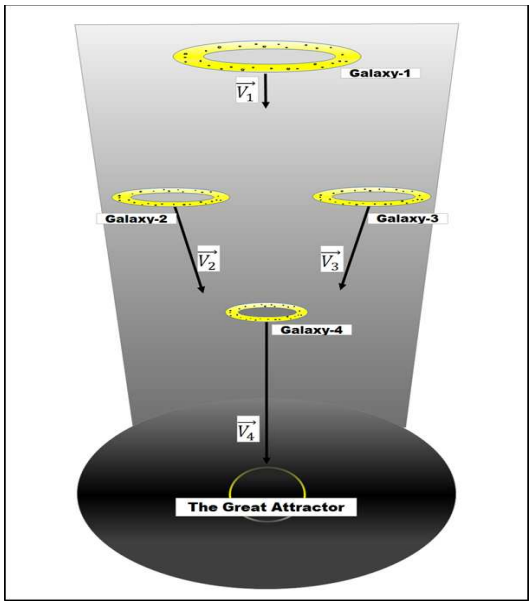

Figure 1) *Illustration of a segment of the contracting universe*

This means that the accelerations and velocities of the more distant galaxies to the Great Attractor, compared to those of our galaxy, are smaller, and the accelerations and velocities of the galaxies that are closer to the "Great Attractor", compared to those of our galaxy, are greater than the velocities of the Milky Way (from where we make the observations). In this sense, if:

1. "Galaxy-2" is our Milky Way galaxy, and its velocity and acceleration are $\overrightarrow{V_2}$ and $\overrightarrow{a_2}$, respectively;
2. Galaxy-1" is more distant from the "Great Attractor" than our Milky Way galaxy is, and its velocity and acceleration are $\overrightarrow{V_1}$ and $\overrightarrow{a_1}$, respectively;
3. "Galaxy-4" is a galaxy closer to the "Great Attractor" than our Milky Way galaxy is, and its velocity and acceleration are $\overrightarrow{V_4}$ and $\overrightarrow{a_4}$, respectively.

According to Newton's law of universal gravitation $F = G\frac{m_1 m_2}{r^2}$, we can write:

1. $(\overrightarrow{a_1} < \overrightarrow{a_2})$ and $(\overrightarrow{V_1} < \overrightarrow{V_2})$ which means that for an observer located in our galaxy: "Galaxy-1" will be moving away from us at a velocity of $(\overrightarrow{V_2} - \overrightarrow{V_1})$, and with acceleration $(\overrightarrow{a_2} - \overrightarrow{a_1})$.
2. $(\overrightarrow{a_2} < \overrightarrow{a_4})$ and $(\overrightarrow{V_2} < \overrightarrow{V_4})$, which means that for an observer located in our galaxy: "Galaxy-4" will be moving away from us at a velocity of $(\overrightarrow{V_4} - \overrightarrow{V_2})$, and with acceleration $(\overrightarrow{a_4} - \overrightarrow{a_2})$.

Therefore, although the Universe is contracting, from our Galaxy we observe that all galaxies are moving away!

However, not all of them! When two galaxies are equidistant to the Great Attractor and close to each other (such as our Milky Way Galaxy ("Galaxy-2") and the Andromeda Galaxy ("Galaxy-3")), we see a decrease in the distance between them because their velocity and acceleration towards the Great Attractor are the same.

Therefore, according to Newton's law of universal gravitation, when the universe contracts toward that high-gravity region:

From any point outside this region (see Figure. 1), "moving away" (recession) of the galaxies will be observed, and their recessional velocities will increase when the distance from the point of observation to them increases.

CONCLUSION

The main conclusion related to the essence of the topic of this article is that the Universe is in a state of accelerating contraction.

Yes, the Universe is in a state of contracting – and no need for myths such as "dark matter" and "dark energy".

The presented explanation of the observed redshift of the electromagnetic radiation coming from distant galaxies, the "energy-spatial relationship", is in full accordance with Newton's law of universal gravitation.

Because of the lack of conformity of the expansion of the Universe with Newton's law of universal gravitation, modern physics has tried to explain the delusion of the "accelerating expansion of the Universe" by the inexplicable myths of "dark energy" (whose nature is inexplicable even for the modern cosmologists themselves), as well as by the presence of an illogically high percentage of some unknown kind of "dark matter" in the Universe.

Throughout his life, Hubble did not support Vesto Melvin Slipher's assumption that the "redshift" is a "velocity-like displacement" (as a result of the Doppler Effect)!

The real cause for the observed redshift of electromagnetic radiation coming from distant galaxies is the "energy-spatial relationship" existing in the energy-space-time continuum of the Universe – that is the "unrecognized principle of nature", as was the belief of Edwin Hubble!

However, this conclusion is not suitable for the common cosmological community because they would lose not only their social status, but their whole life work would be meaningless! In relation to this, the conclusion of Professor Karl Popper states that in modern physics "a theory must be falsifiable to be scientific"!

SOME OTHER IMPORTANT CONCLUSIONS THAT CAN CHANGE OTHER "BELIEFS" OF MODERN PHYSICS

Concerning the dependence of the characteristics of electromagnetic radiation on the gravitational field intensity

The units of measurement are the primary, the most basic physical constants, which we have defined and chosen to be constants. With the help of these primary physical constants, we have the opportunity to create equations, to use mathematics in the field of physics.

As mentioned above, it has been experimentally proven that atomic clocks tick faster high in the mountains (that time runs faster at higher altitudes); i.e., the frequency of emitted electromagnetic radiation increases in regions with lower gravitational field intensity. This means that in regions with weaker gravity, the time runs faster (the unit of time is shorter). This is consistent with the general theory of relativity, and if we define the unit of time "second" as defined in the SI system according to the 13th meeting of the CGPM, Resolution 1, 1967/68: "The second is the duration of 9 192 631 770 periods of the radiation corresponding to the transition between the two hyperfine levels of the ground state of the caesium 133 atom, at rest at a thermodynamic temperature of 0^0K.".

According to the general theory of relativity, the unit of length "meter" will become longer (lengthened) in regions with lower gravitational field intensity (at higher elevations). This is also in accordance with the definition of the unit of length given by the 11th meeting of the CGPM, Resolution 6, 1960, because the wavelength of any electromagnetic radiation will increase in regions with weaker gravity: "The metre is the length equal to 1650763.73 wavelengths in vacuum of the radiation corresponding to the transition between the levels 2p10 and 5d5 of the krypton 86 atom."
It was proposed that this fact (increasing the frequency and wavelength of any electromagnetic radiation) be experimentally proven onboard the International Space Station (ISS) by means of atomic clocks and a platinum-iridium rod (sized and scaled) for the purpose of comparison with the wavelength of a suitably chosen monochromatic source of electromagnetic radiation. This idea was not accepted because the increase in the wavelength and frequency of any electromagnetic radiation in regions with lower gravitational field intensities will prove that the speed of light in vacuum will increase ($c=\lambda\nu$).

The fact that the speed of light in vacuum increases in regions with a weaker intensity of the gravitational field (near the border of the Solar system) is the explanation and proof of the "inexplicable" anomalies in the accelerations of the space probes "Pioneer 10", "Pioneer 11", "Galileo", and "Ulysses", which in fact experimentally proves the presented logic: "the expected travel time of the communicational electromagnetic signals between the spacecraft and the Earth (based on the universal constancy of the speed of electromagnetic radiation everywhere in the Universe), turns out to be much greater than the real travel time. So we register backward attraction (acceleration anomaly) of the space probe to the Sun" [9].
Conversely, the fact that the speed of light in vacuum decreases in regions of stronger gravity was proved experimentally by the American scientist Irwin Shapiro in 1964 (Shapiro time-delay) and was confirmed again highly accurately, using controlled transponders aboard space probes "Mariner-6" and "Mariner-7" when they were in orbit around the planet Mars [10].

The conclusion is that the speed of light in vacuum is not constant for the whole Universe, and the unit of length "light year" should not be used.
This conclusion actually means that if the results of the general theory of relativity are true (the length contraction and time dilation), then the speed of light in vacuum is different in regions with different gravitation. Conversely, if the speed of light in vacuum is a fundamental constant for the entire Universe, then the results of the general theory of relativity are wrong [11].
However, the characteristics of any electromagnetic radiation from the electromagnetic spectrum (frequency, wavelength, and speed of light in vacuum) do not change during propagation near the surface of the celestial body (such as the Earth). This occurs because the intensity of the gravitational field on the surface of the celestial body remains constant (dominated by the mass of the celestial body) during the motion of the planet Earth around the Sun and during the motion of the solar system in the galaxy. This is the reason why there are no experiments on the surface of Earth that can determine any changes in the speed of light in vacuum.

However, all the experiments, in our local time-spatial domain "near the Earth's surface" prove that the measured speed of light is not the same in all inertial frames of reference.
The only exception is the Michelson-Morley experiment because of the inappropriate conceptual design, embedded in the construction of the Michelson interferometer. This type of interferometer uses perfectly the same paths in two-way opposite directions for each light beam, and that is why, the difference between the velocity of light in the two opposite directions of each light beam is completely compensated, [6,12].

Concerning the measurement units, as defined in the SI system

1. For an equation of theoretical physics to be true, the units of measurement used must be constants within the scope of the equation. Otherwise, this "equation" is just a string of symbols and its solution is meaningless! Let us assume that the results of the general theory of relativity are true and that the unit of time "second" and the unit of length "meter" (defined by the characteristics of electromagnetic radiation) are different in regions of different gravity (for example, on board the International Space Station). This cannot mean that the rotation period of the Earth and the meridian distance between the pole and the equator have changed (as the units of time and length were defined in the past). However, this means that: The units of measurement in the SI system thus defined, based on the characteristics of electromagnetic radiation, are applicable and useful only for the local time-spatial domain "near the surface of the Earth". However, the units of measurement defined by means of characteristics of electromagnetic radiation should not be used in equations of theoretical physics, which concern the outside of our local time-spatial domain where the units are changing and are different. This concerns all equations in the field of cosmology in whose scope the units of measurement are not constants.
2. Another fundamental problem is the failure to understand the difference between the mathematical equations and the equations of theoretical physics.
    a) We work only with numbers in the mathematical equations. Actually, the mathematical equation is an assertion of the equality of two purely numeric expressions.
    b) In Physics, however, the use of Mathematics (writing/creation of an equation of theoretical physics), is possible only with the help of the measurement units of the physical quantities involved in the equation. Each equation of theoretical physics is written on the basis of a certain system of units of measurement – for example, the International System of Units (SI), and the used units must not change in the scope of the equation.

That's why the units of measurement are of paramount importance to Theoretical Physics.
So, we can highlight: The units of measurement are the primary, the most basic physical constants, which we have defined and chosen to be constants!

With the help of these primary physical constants, we have the opportunity to use Mathematics in the field of Physics!

In this way, the sign of equality between the physical expressions in the equations of theoretical physics (formed using units of measurement), represents, in fact, the relationships between the physical quantities in nature. On the basis of the equations of theoretical physics, we have discovered the physical laws and have determined the physical constants (like the speed of light in vacuum c, the gravitational constant G, the electric constant ε_0 (vacuum permittivity), the magnetic constant μ_0 (vacuum permeability), the Planck's constant, the Boltzmann constant, etc. All these physical constants are actually secondary constants, because they are obtained on the basis of the defined (and accepted) primary physical constants – the measurement units. That is why we have different numerical values for physical constants when we use units of measurement of other measurement systems.

For many scientists in the field of relativity and cosmology, it is a mistake that they (it seems unconsciously and unintentionally) overlook the following fundamental fact:
The equations of theoretical physics can exist only if the units of measurement are constant and do not change inside the scope of the given equation. Only then, the use of the "equality sign" between the expressions on both sides of the equations is correct!
In this regard, let's consider a simple example that shows the importance of the above-mentioned fact:
Let us compose a physical equation for the average speed of a seagoing ship traveling between two ports A and B. Obviously, it is equal to V = S/t, where S is a real number showing how many times the used unit of length (meter) is applied to the distance between points A and B; t is the real number showing the number of elapsed seconds (the used unit of time), for which the ship passes the distance between the two points. The result obtained for the average speed is again an exact real number, but with a certain dimension (m/s), which shows the units of measurement, used to obtain the resulting number. This example undoubtedly shows that mathematically, everything is accurate and true..., but remember that the base units of length and time do not change within the scope of the equation – they are constant, defined at sea level!

Important question: "Will the equation V=S/t for the average speed be valid if during the trip the measurement units of time and of length do not stay the same (if they change for any reason)? For example, if the units of measurement depend on the changing unknown distance to the bottom of the sea (on the unknown relief of the bottom of the sea) over which the ship passes?"
Simply, it won't be an equation at all - it will just be a string of symbols! Furthermore, it will not be serious, if we try to look for a solution to this "equation".

It is the same if point A is our Earth, and point B is another planet or a star on the opposite side of our Galaxy. In this case, during the voyage, the spacecraft will pass through areas with different and unknown strengths of the gravitational field, where the unit of length (meter) and the unit of time (second) will be indeterminately different if they are defined by means of the characteristics of electromagnetic radiation. Defined on the Earth "meter" can contract to a millimeter in a strong gravitational field, and the "second" there will be equal to minutes or hours on the Earth. Obviously, if we write the equation for the average speed of the spacecraft between points A and B: (V = S/t), on the basis of the defined units of length and time on the surface of the Earth by means of the characteristics of the electromagnetic radiation, then this equation in terms of physics would not be true. In fact, we cannot determine either the number of miles (the length of the unit "meter" has changed) or the duration of the voyage (the duration of the unit "second" has changed) in the scope of this equation. Therefore, the average speed of the ship will be indeterminable – in fact, this equation has simply become a "symbol string". This concerns Einstein's Field Equations of General relativity too!

In this sense, it appears that, in addition to the uncertainty principle in quantum mechanics, it turns out that we have actually uncertainty in the "macro-world" (in the Universe) too [13].

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