

**The Theory of Heavenly Structure
Explains the nature of dark energy**

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Abstract:

The Theory of Heavenly Structure is a complementary theory to the astronomical fluid theory ¹, which explains the so-called gravitational force.

This theory explains some of the characteristics of dark energy, its nature, and how electromagnetic waves and light travel and pass through space and matter.

It relies in its interpretation on what is called dark energy, which, according to scientists' estimates, constitutes more than 70% of the total mass of the universe. Dark energy, according to the hypotheses of this theory, consists of a three-dimensional cosmic fabric of non-atomic particles interconnected with each other, spreading throughout the universe.

This fabric is characterized by its superflexibility, so it is able to carry electromagnetic waves over very large distances without being dampened. The dampening that occurs to these waves is the result of the obstruction caused by the atoms of the substance that make up the celestial bodies.

Key words:

1- cosmic fabric CF, 2- cosmic fabric bubbles, 3- Astronomical fluid particles, 4- Dark energy particles, 5- Cosmic expansion, 6- Gravitational lensing

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1- Historical introduction:

The first direct evidence of an unknown force accelerating the expansion of the universe came in 1998, in two separate studies examining large stellar explosions, and since then, a large number of other studies have confirmed the existence of this force, called dark energy.

In physical cosmology and astronomy, dark energy is an unknown form of energy that affects the universe on the largest scales. Its primary effect (scientifically proven and known) is to drive the accelerating expansion of the universe. Assuming that the Lambda-CDM model of cosmology is correct ⁶, dark energy is the dominant element in the universe, contributing 68% of the total energy in the present-day observable universe while dark matter and ordinary (baryonic) matter contribute 26% and 5%. Respectively. ^{7, 8, 9, 10} the density of dark energy is very low: $7 \times 10^{-30} \text{ g/cm}^3$ ($6 \times 10^{-10} \text{ J/m}^3$ as mass energy), much lower than the density of ordinary matter or Dark matter inside galaxies. However, it dominates the mass and energy content of the universe because it is nearly uniform across space. The first observational evidence for the existence of dark energy came from measurements of supernovae. Type 1A supernovae have constant luminosities, which means they can be used as precise distance measures. Comparing this distance with the redshift (which measures the speed at which the supernova is retracting) shows that the expansion of the universe is accelerating. Before this observation, scientists believed that the gravity of matter and energy in the universe would cause the expansion of the universe to slow down over time. Since the discovery of accelerated expansion, several independent pieces of evidence have been discovered supporting the existence of dark energy.

The precise nature of dark energy remains a mystery, and there are many explanations and theories explaining it. Perhaps the most important of these theories (according to scientists at the present time) are:

A- The cosmological constant ^{11, 12} (which represents a constant energy density that fills space homogeneously), and is usually represented With the Greek letter λ (lambda, hence the name of the Lambda-CDM model). It is sometimes called vacuum energy because it represents the energy density of empty space

B- Quintessence (dynamic quantities that have energy densities that vary in time and space) ^{13, 14, 15, 16} such as Quintessence. The observed acceleration of the scale factor is due to the potential energy of the dynamic field, which is referred to as the intrinsic field. Substance differs from the cosmological constant in that it can change in space and time. In order for it not to clump together and form a structure like matter, the field must be so light that it has a large Compton wavelength.

C- Interacting dark energy: This category of theories attempts to reach a comprehensive theory of both dark matter and dark energy as a single phenomenon that modifies the laws of gravity at different levels. It can be assumed that cold dark matter decays into dark energy.¹⁷ Another class of theories that unify dark matter and dark energy are proposed to be variable theories of modified gravity. Dark energy could in principle interact not only with the rest of the dark sector, but also with ordinary matter.

D- Observational skepticism

Some alternatives to dark energy, such as inhomogeneous cosmology, aim to explain the observational data by a more refined use of established theories. In this scenario, dark energy does not actually exist, and is merely a measurement artifact. For example, if we are located in an emptier-than-average region of space, the observed cosmic expansion rate could be mistaken for a variation in time, or acceleration.^{18, 19, 20, 21}

Observational uncertainty explanations for dark energy have generally received little attention among cosmologists and have been refuted.

These are the most important theories related to dark energy, and the website (https://en.wikipedia.org/wiki/Dark_energy) can expand further in this field.

The nature of dark energy according to these theories is hypothetical, and much about it remains in the realm of speculation.

We note that all previous theories focus on certain points and specific characteristics that dark energy possesses, and perhaps some of these characteristics are true, but they do not describe what the nature of dark energy is and its physical characteristics, and thus it is closer to a ghost. It is believed that dark energy is very homogeneous and not dense, as its density is estimated About 7×10^{-27} kg/m³ - it is unlikely to be detectable in laboratory experiments. The reason why dark energy has such a profound impact on the universe is that it makes up 68% of the total mass of the universe despite its very low density, where it is thought to uniformly fill empty space.

The theory of heavenly structure is distinguished in that it focuses on the structure of dark energy, describes it accurately, and explains how it moves. Although previous theories acknowledge the spread of dark energy throughout the universe, they do not explain any relationship between it and the atoms of ordinary matter, how it interacts with them, or its relationship with electromagnetic waves. Or electric or magnetic fields, or how they interact with dark matter as well. While the theory of heavenly structure explains this relationship, and the theory of atomic structure, which will be published later, describes the relationship of dark energy with atoms of matter.

Both the astronomical fluid theory and the heavenly structure theory (and later the atomic structure theory) lay down the basic principles of modern physics, and we will see how

these theories were able to fully comply with cosmic observations while at the same time relying on logical explanations, far from imaginative explanations that are not logical.

The matter visible and observed by scientists constitutes only about 5% of the total matter in the universe, and 95% of the matter that makes up both dark matter and dark energy has been ignored and not given proper attention, which places strong restrictions on development and scientific progress.

We see with our eyes how ordinary matter (atomic) was able to be formed in several forms (gas, fluid, solid), so why not that non-atomic particles, just like atomic matter, can be formed in many forms as well.

Rather, rational logic suggests this matter, especially if these hypotheses are consistent with reality and astronomical phenomena, as we will see later.

2- The theory of heavenly structure:

The theory of heavenly structure consists of three hypotheses as follows:

2-1- The first hypothesis: The structure of the dark energy fabric (the cosmic fabric):

The so-called dark energy consists of a three-dimensional fabric of non-atomic particles, forming something resembling a membrane, This membrane curls into geometric shapes, forming what resembles soap bubbles gathered and stuck together, which completely fill the universe (It fills the vast space between and within galaxies, and even permeates celestial bodies, matter, and the atoms that make up the universe). I will call this great fabric that fills the universe the cosmic fabric (CF).



Figure (1): shows the shape of soap bubbles similar to the hypothetical shape of cosmic fabric bubbles

This membrane has a very, very weak thickness, a multiple of the diameter of the string that forms it, and the threads of the string are intertwined with each other in a specific geometric way to form membrane of aggregated bubbles, and the diameter of the string that makes up the network is very small, close to the Planck length.

2-2- The second hypothesis: The origin of the cosmic fabric (CF)

The fabric of dark energy (cosmic fabric) generates when particles of astronomical fluid (dark matter) inside celestial bodies interact with the atoms of the matter that make up these bodies. When particles of astronomical fluid collide with the atoms that make up celestial bodies, they interact with them (some forms of this interaction will be explained in the theory of Atomic structure.), to be able to interconnect these particles with each other in the form of a membrane, this membrane forms what is called the cosmic fabric (CF) that curls into cells or bubbles, and spreads and expands in cosmic space.

2-3- The third hypothesis: movement of the cosmic fabric:

The movement of the cosmic fabric is complex but consists of at least three main movements:

A- Since the transformation from dark matter to dark energy (cosmic fabric) often takes place within celestial bodies, this means that celestial bodies (planets, stars, black holes,...) are considered absorbers of dark matter (as we saw in the astronomical fluid theory) and generators of dark energy (cosmic fabric). The main flow of dark energy is from the center of the celestial body outward, in contrast to the main direction of dark matter, which is toward the center of the celestial body.

Direction of dark energy fabric propagation

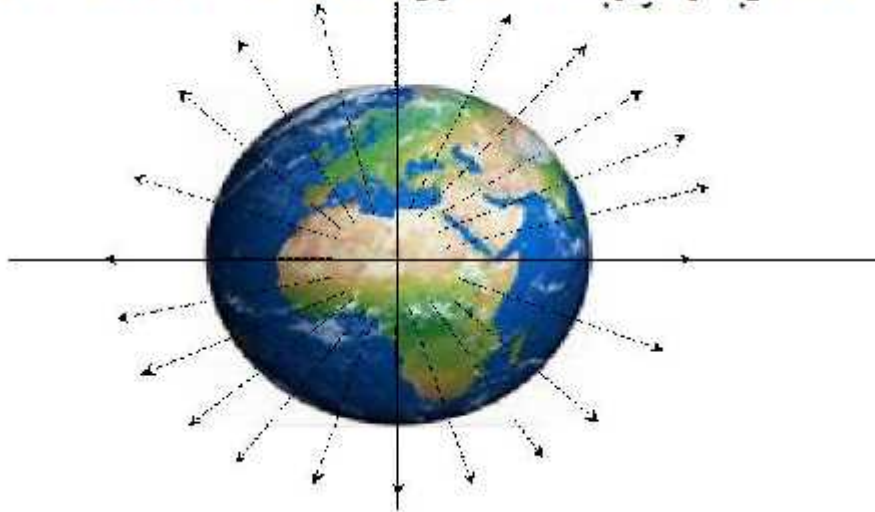


Figure (2): shows the direction of the flow of CF relative to the Earth's surface (it is vertical to the top).

Since the CF originates from the celestial bodies, it will acquire their movement, meaning that in addition to the vertical upward movement mentioned above, the CF will acquire the rotational movements that the celestial body rotates (for example, the CF resulting from the Earth will rotate with the Earth's rotation around itself With its rotation around the Sun and with its rotation around the center of the Milky Way Galaxy, in addition to its vertical flow upward)

B- The fabric of dark energy (cosmic fabric), according to the first hypothesis, consists of dark energy bubbles adjacent to each other and sliding over each other just as fluid molecules slide over each other. Therefore, when the bubbles resulting from two sources (such as the sun and the Earth) overlap, the density of the bubbles resulting from one of the two sources decreases. (On the line connecting the two sources The further we move away from this source, the more the density and pressure of the bubbles resulting from the second source increases, and the amount of flow from one of the two sources is determined according to the value of the pressure resulting from each source.

In the area between two sources, the density of bubbles produced by one of the sources decreases as we move away from this source and approach the second source, with an increase in the density and pressure of the bubbles produced by the second source.

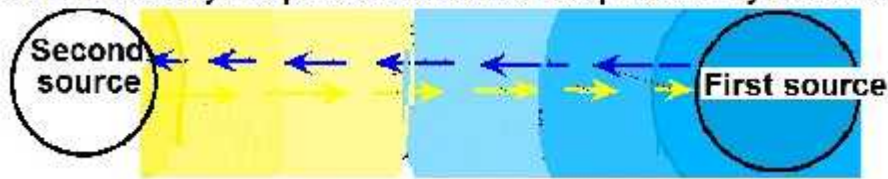


Figure (3): shows the changes in the density and pressure of the dark energy bubbles between two bubble sources.

for the direction in which there is no nearby source, the density resulting from this source and the pressure also decrease gradually, but at a slower rate. The pressure gradient of the dark energy bubbles is what we call the electric field

C- Cyclonic rotational movement: It is formed when bubbles resulting from two sources (as in the previous example) overlap with the rotational movement of one of the sources in relation to the other source, which causes the emergence of cyclonic vortices. These cyclonic vortices are what we call magnetic field lines, meaning that magnetic fields result from movement Rotation of a source of dark energy bubbles resulting in shear stresses

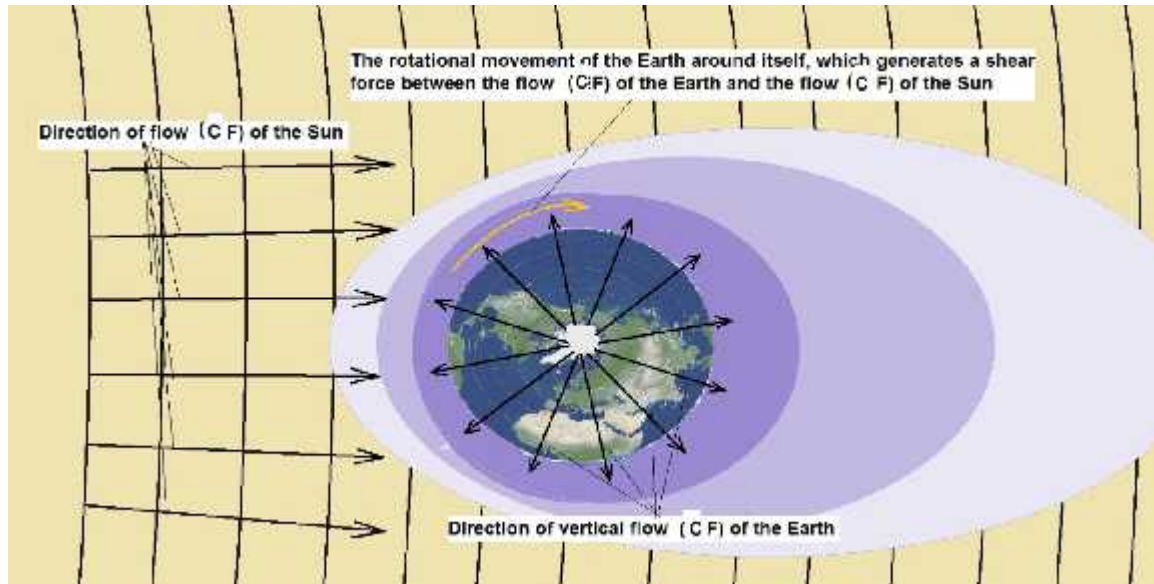


Figure (4): shows a region where shear stresses form between the CF resulting from a source rotating with the general direction of the surrounding CF.

2-4- The fourth hypothesis: Characteristics of the cosmic fabric (CF):

2-4-1- Any moving electrical charge can cause vibration and waves in this fabric (the mechanism will be explained in the theory of atomic structure)

2-4-2- This fabric has a very high modulus of elasticity (ideal) such that the waves it carries do not dampen.

Damping of these waves occurs in only two cases: when they spread spherically and thus the wave surface increases, leading to a decrease in intensity, or when these waves penetrate the atoms of the materials that make up the celestial bodies, causing those atoms to cause some obstruction to those waves.

2-4-3- The cosmic fabric (CF) has a very complex structure, as the bubbles that form the basic cell of this fabric (which are of unknown diameter) are composed of Superstring with very high strength when compared to the diameter of the string.

The diameter of this Superstring is of the order of the Planck length (ρ) 1.6162×10^{-35} meters, knowing that the estimated diameter of the proton is equal to 1.754×10^{-15} meters, meaning that the diameter of the Superstring that forms the cosmic fabric is about 1.08510^{20} times smaller.

The highly durable internal structure of the bubble is the reason for its ability to carry electromagnetic waves (those waves are in the form of transverse waves and transverse waves can only form if the bonding forces between the particles are strong), even though

the bubbles slide between them Each other, allowing it flexibility of movement and the ability to interact with bubbles resulting from several sources.

2-4-4- The cosmic fabric (CF) is continuous and there are no discontinuities in it at all throughout the universe. The dark energy bubbles are contiguous, continuous and compressed, and when any discontinuity occurs, this discontinuity is repaired instantly due to the pressure applied to the bubbles

2-4-5- Despite its high strength, proton can easily destroy it, because the diameter of the superstring is very small compared to the nuclei of atoms or even electrons, and also the mass of the proton is much greater than the mass of the particles that make up the superstring . Which forms the cosmic fabric. To clarify further, if we assume that we doubled the diameter of the superstrings of the cosmic fabric until it became equal to the diameter of a spider's thread, which is equal to about $3\mu\text{m}$, then the diameter of the proton, if we doubled it by the same ratio, becomes 1.78×10^5 meters = 178 kilometers, i.e. the size of an asteroid.

This means that if the superstring of the cosmic fabric intersect with a proton, they will be destroyed and those superstring will disintegrate from each other without having any noticeable effect on the proton or its movement, despite the relatively high durability of these superstring .

2-4-6- The possibility of astronomical fluid particles colliding with superstrings of dark energy is possible, but it is very weak. This is somewhat similar to hitting a football randomly in a very large field and the possibility of this ball colliding with a rope that is suspended in one of the corners of this field. The probability of this collision occurring is much greater than the probability of astronomical fluid particles colliding with cosmic fabric.

2-4-7- Celestial bodies are considered sources of the cosmic fabric, and the speed of the flow of this fabric on the surface of the celestial body depends on the mass of the celestial body. The greater its mass, the greater the speed of the flow of the fabric at the surface of the celestial body. It is directed perpendicular to the surface and upward, that is, in the opposite direction to the force of gravity. However, the force directed upward and resulting from it is very weak and does not compare to the force of gravity. This is because the speed of the flow of the cosmic fabric on the surface of the celestial body is much smaller than the speed of the astronomical fluid particles (whose speed is approximately equal to the speed of light). .

2-4-8- The cosmic fabric pushes celestial bodies apart from each other, but the attractive forces resulting from the particles of the astronomical fluid are greater and overcome them. However, its effect is clear when the distances are very large, such as the distance

between galaxies, where the attractive forces resulting from the particles of Astronomical fluid weaken

and appears clearly in this divergence of galaxies, which is considered the main cause of cosmic expansion, Figure (6) in the following paragraph illustrates the mechanism of this divergence.

2-4-9- Magnetic fields are formed wherever there are shear stresses resulting from the rotation of a source for cosmic fabric within the main cosmic fabric. How electric and magnetic fields are generated will be explained later in the theory of atomic structure.

2-4-10- The speed of propagation of electromagnetic waves (i.e. the speed of propagation of compression or shear stress) in cosmic fabric is equal to the speed of light.

2-4-11- According to this theory, light is considered to be bundles of electromagnetic waves within a specific range of frequencies, emitted by some types of particles within the atoms of matter (electron or proton) within the cosmic fabric in the form of quanta. (A wave packet as in Figure (5)), these quanta pass through the dark energy bubbles and move from one bubble to another and maintain their direction, where at high frequencies the bubble absorbs that range of waves (photon) and then sends it without any time delay (similar to the elastic interactions that occur between light photons and gas atoms in the atmosphere) while maintaining the direction of the basic photon.

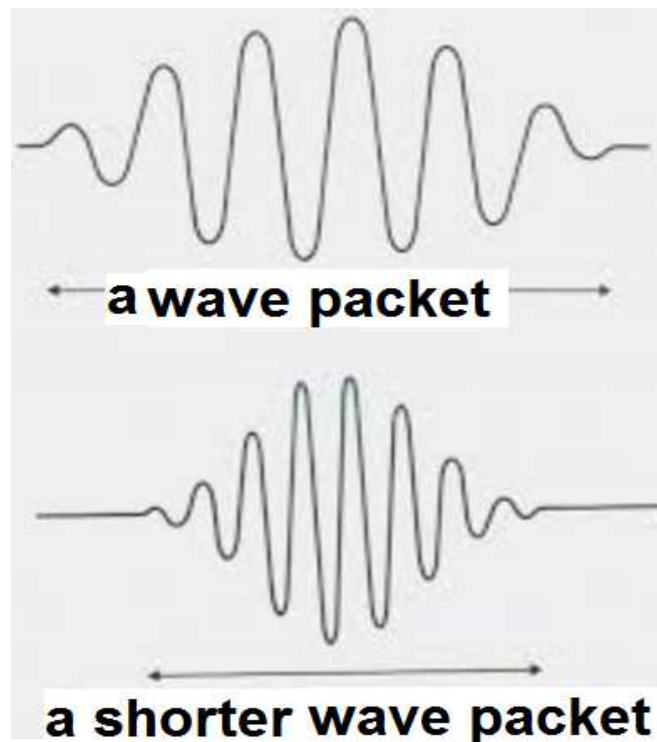


Figure (5): Shows the shape of light photons emitted by atoms.

2-4-12- The density of cosmic fabric is generally constant in the universe, but within material medium it varies according to the density of the material medium, its temperature, and the total mass of the celestial body in which cosmic fabric is permeated. The difference in density of cosmic fabric leads to the refraction of waves Electromagnetism (light).

3- Evidence and proof of the validity of the theory:

3-1- Cosmic expansion: The expansion that the universe is witnessing constitutes a major challenge for scientists in the modern era. It was mentioned in Nature magazine on February 25, 2021, by David Castelvecchi ²².

(Cosmologists suggest that an exotic substance known as ether may be responsible for accelerating the expansion of the universe. But evidence for its existence remains uncertain.

Some cosmologists say they have discovered signs of an interesting twist in the way primordial light moves through the universe, and that this twist may provide us with information about the nature of dark energy, the mysterious force that appears to be pushing the universe to expand faster than ever before.

Scientists have observed this twisting phenomenon through cosmic microwave background radiation data collected by the Planck space telescope, and they suggest that this twisting, and with it the accelerated pace of the expansion of the universe, may be the result of what is known as the cosmic 'ether', an exotic substance spreading throughout the universe. Such a discovery would require... A radical revision of current theories, while physicists warn that its evidence is still uncertain, as it does not meet the required level of confidence known as '5 sigma', which is used to determine whether a signal is a discovery or not, but this evidence It confirms that modern cosmology's conception of the contents of the universe is still incomplete.) End quote.

The first direct evidence of an unknown force accelerating the expansion of the universe appeared in 1998 in two separate studies examining massive stellar explosions, and since then, a large number of other studies have confirmed the existence of this force, called dark energy.

The researchers' first guess, which is still the dominant theory in the field, was that dark energy is an inherent property of space, which means that its amount per unit volume of space is unchanging as a "cosmological constant." But some cosmologists have assumed Dark energy is made up of something completely different, which they call the field of

the fifth element, or ether, which is the name given by ancient Greek philosophers to the invisible matter that was thought to fill all the empty space in the universe.

In 1998, Carroll proposed an experimental test of the ether hypothesis, based on expectations that it changes how light propagates in space. Then a team led by theoretical physicist Mark Kamionkowski, who currently works at Johns Hopkins University in Baltimore, Maryland, came along. This team calculated how... Measuring this effect in the cosmic microwave background, the primordial radiation often described as the afterglow of the Big Bang, the researchers suggested that signs of the ether could be detected by examining maps of polarized light along that radiation. Light is polarized when its electric field “oscillates” in a specific direction, not in a random direction, and the theory states that the ether twists the direction of polarization, in a way that can be monitored by studying the polarization of light across the entire sky.

Now, two cosmologists have succeeded in this mission: Yuto Minami, a researcher at the High Energy Accelerator Research Organization (KEK) in Tsukuba, Japan, and Ichiro Komatsu, director of the Max Planck Institute for Astrophysics in Garching, Germany. They were able to observe this distinctive pattern of cosmic microwave background radiation in data collected by the European Space Agency's Planck mission, which ended its operations in 2013.

The main purpose of this mission was to map subtle variations in the temperature of the cosmic microwave background radiation across the sky, but the mission also measured the polarization of the radiation, and Minami and Komatsu were able to detect signs of the presence of the ether using a new technique that they reported developing in 2019, although their results were different from the results of other teams who did not find any distortion when they examined radiation polarization maps, which include those from the Planck mission, says Susan Staggs, a physicist at Princeton University in New Jersey, whose team measures cosmic microwave background radiation using the Atacama Cosmic Telescope in Chile. This team plans to test Minami and Komatsu's technique on Atacama telescope data.

George Efstathiou, a cosmologist at the University of Cambridge in the United Kingdom who was one of the lead scientists on the Planck mission, says the paper on this detection represents “a very elegant analysis,” but the noise in the Planck signals may make them more difficult to understand and interpret.

The previous paragraph is available in Nature magazine at <https://www.nature.com/articles/d41586-020-03201-8>

Major repercussions

“I think we should consider these results very carefully before we get too excited about them,” Kamionkowski agrees, adding that the existence of the ether would have implications not only for cosmology but also for fundamental physics. The Standard Model of particle physics does not expect this ether to exist in any form.

There are other projects currently being planned or implemented that aim to map the polarization of the cosmic microwave background radiation with greater precision than before, and that will subject the ether hypothesis to a rigorous test. These projects include the Simons Observatory, another experiment to study radiation that is currently being prepared in the Sahara Desert. Atacama, in addition to the “Lightbird” space probe, which Japan is leading and is planned to launch in the coming years.

If the aether eventually turns out to be a plausible explanation for this observed twisting, it will have a series of implications that affect our best estimates of the properties of the universe, including its age, which may be slightly younger than that estimated by cosmologists based on the Planck mission data. Which is 13.8 billion years, and the ether hypothesis could also contribute to explaining why radiation data indicate that the pace of the expansion of the universe should be slower than that currently observed, and Caldwell says about this: “The cosmological constant is the basis upon which researchers rely,” “If you change that foundation, it could affect everything else.”

This report was first published in Nature on 24 November 2020, and is republished with permission.

The ether, in the theories of the heavenly structure and the astronomical fluid, has a complex structure and is composed of several states, but the state responsible for cosmic expansion is dark energy fabric (cosmic fabric), this fabric that emanates from all the celestial bodies present in the universe to spread and expand continuously, transforming dark matter into dark energy, carrying with it all galaxies in the universe.

The cause of cosmic expansion is the result of two thrusts in the movement of galaxies. The first thrust results from the “Big Bang” at the birth of the universe, and this thrust causes a constant speed of expansion, and the second thrust results from the thrust caused by cosmic fabric as it spreads in the vast space.

The question here is whether the theory of heavenly structure explains this acceleration in cosmic expansion in a logical manner.

The expansion of the universe is likened in the scientific references to the process of inflating a balloon. Imagine that you have a balloon representing the entire universe, and you put stickers all over its surface to represent galaxies or clusters of galaxies. Then you start blowing air into the balloon - this is analogous to the Big Bang and the beginning of time as we know it. As the balloon expands and time passes, the distance between any

two stickers (or galaxies) increases. This is similar to how galaxies are moving away from each other, showing evidence that the universe is expanding.²³

The universe is not just expanding, it is expanding at an accelerating rate, meaning that it is growing faster and faster over time. In our balloon analogy, imagine blowing air into the balloon rapidly, causing it to expand faster and faster. This additional pressure represents dark energy, which is causing the balloon (or our universe) to grow at an accelerating rate.

But the question is what about the method and mechanism of the inflation process that occurs? All scientific references did not give a logical mechanism for this process and how it occurs. Only the theory of heavenly structure was able to give a logical explanation for this mechanism, where according to the theory of celestial structure, celestial bodies absorb the astronomical fluid and emit the fabric of dark energy (the cosmic fabric). This is how the inflation process is done simply. To expand the explanation further, let us assume 3 galaxies A, B, C as in the figure (6). The cosmic fabric emitted by these galaxies is collected in region O.

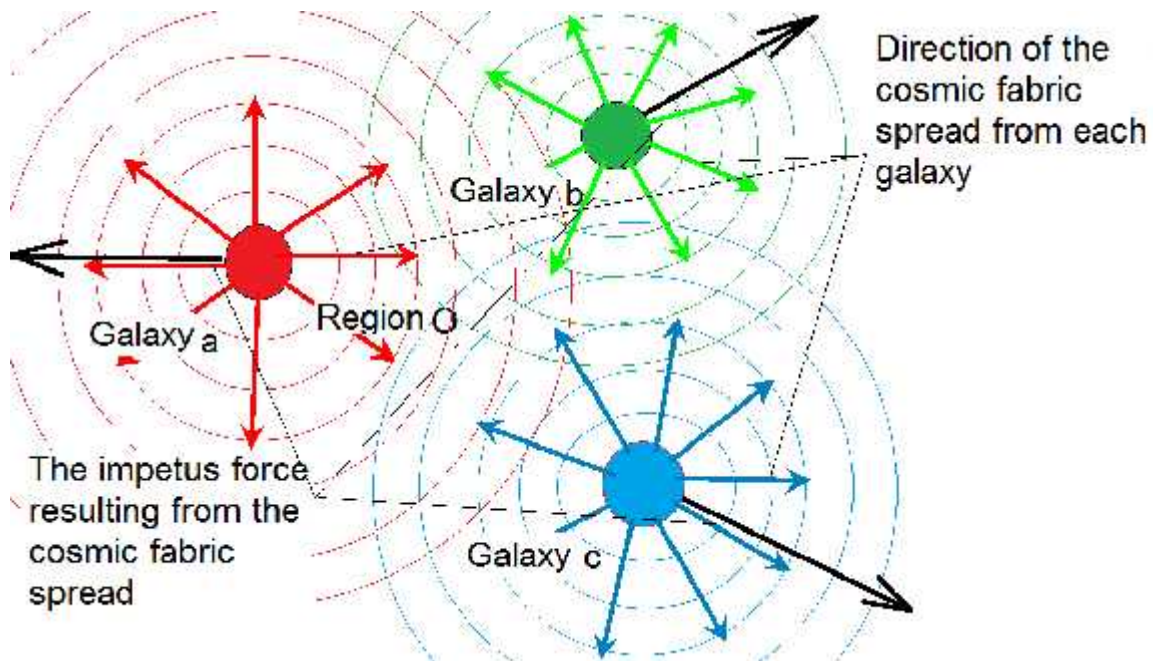


Figure (6): Shows the mechanism of cosmic expansion

One of the properties of this fabric is that when it is compressed, its density does not increase (except in special cases according to hypothesis 4, property 12), similar to solid or liquid matter, which leads to the formation of a pushing force towards the separation of galaxies from each other.

This pushing force is very weak and is much weaker than the force of gravity, when the distance between the celestial bodies is small, but the difference between it and the force of gravity is that the rate of decrease of (the gravitational force) is faster than the rate of decrease of the pushing force of the dark energy fabric, as the force of gravity is inversely proportional to the square of the distance between the two bodies,

$$F = G \frac{m_1 m_2}{r^2}$$
 where r is the distance between the two bodies whose masses are m_1 and m_2 . Therefore, the decrease of the force (gravitational) between the two bodies is faster than the decrease of the force of propulsion resulting from the fabric of dark energy. When the distance reaches a point where the pushing force of the galaxies is greater than the force of gravity, the pushing force overcomes the force of gravity and galaxies begin to spreading-out.

However, if the distance between galaxies is small (insufficient), the force of gravity resulting from the astronomical fluid is greater and overcomes the pushing force. In this case, according to the third hypothesis, paragraphs B and C, the electric and magnetic fields resulting from the interference of the cosmic fabric emanating from two neighboring galaxies are formed.

It is difficult to find a logical explanation for the process of inflating the cosmic balloon (cosmic expansion) except in the way that the theory of heavenly structure explains it, and this is what makes it one of the strong evidences of the validity of the theory.

3-2- The theory agrees with WMAP data:

The Wilkinson Microwave Anisotropy Probe (WMAP) is a space probe and rotating observatory designed to measure the rays that left behind the beginning of the universe. During less than two years in space, this probe mapped the cosmic microwave background radiation with an unprecedented degree of detail and accuracy. The WMAP probe has provided astronomers with the best picture yet of one of the stages of the universe's origins more than 13 billion years ago.

The project is Under the leadership of Professor Charles L. Bennett, of Johns Hopkins University, the mission was developed in a joint partnership between NASA, represented by Goddard Space Flight Center and Princeton University. The WMAP space probe was launched on June 30, 2001, at 19:46:46 GDT, from Florida ^{24. 25}

“WMAP data reveal that the universe currently contains 4.6% atoms, the building blocks of stars and planets. Dark matter makes up 23% of the universe. This matter, unlike atoms, neither emits nor absorbs light. It has only been discovered in an incomplete manner. Directly by gravity... 72% of the universe consists of “dark energy”, which acts

as a type of antigravity. This energy, which is different from dark matter, is responsible for the current acceleration of cosmic expansion.

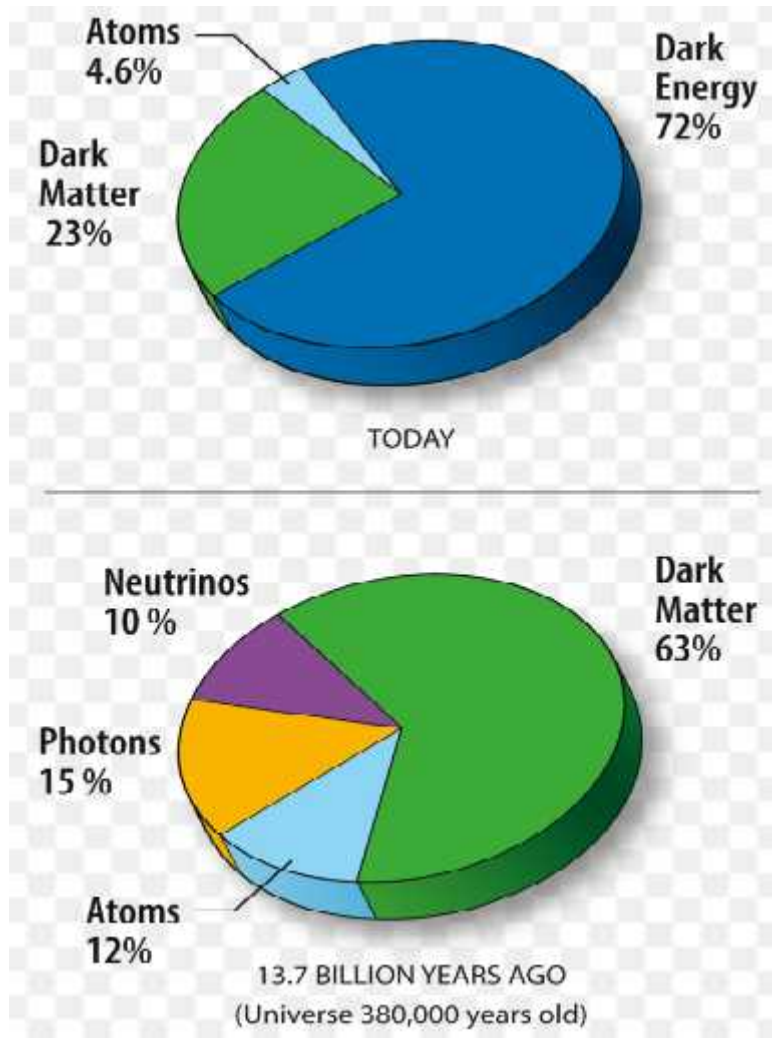


Figure (7): shows the dark energy content in the universe 13.7 billion years ago and the content at the present time

Estimated division of the total energy in the universe into matter, dark matter, and dark energy based on five years of WMAP data.

The existence of dark energy, in any form, is necessary to reconcile the measured geometry of space with the total amount of matter in the universe. Measurements of the cosmic microwave background anisotropy indicate that the universe is close to flat. For the universe to be flat, the mass and energy density of the universe must be equal to the critical density. The total amount of matter in the universe (including baryons and dark matter), measured from the cosmic microwave background spectrum, is only about 30% of the critical density. This means there is an additional form of energy to make up the

remaining 70%. A seven-year analysis by the Wilkinson Microwave Anisotropy Probe (WMAP) estimated that the universe is composed of 72.8% dark energy, 22.7% dark matter, and 4.5% ordinary matter. Work done in 2013 based on the Planck spacecraft's observations of the cosmic microwave background gave a more accurate estimate of 68.3% dark energy, 26.8% dark matter, and 4.9% regular matter.²⁶

It is clear to us from the results of studies and research resulting from the aforementioned satellite data and other satellite data supporting these data that the universe at the beginning of its formation had a very weak percentage of dark energy, while today the percentage of dark energy is about 68.3% of the total cosmic content, and that dark matter is the opposite, it is decreasing, as 13.7 billion years ago it constituted about 63% of the total cosmic content, while today it represents only about 23% of the total cosmic content, and this is completely consistent with both the theories of the heavenly structure and the theory of the astronomical fluid, which state that there is a process of transformation. It occurs within celestial bodies in which dark matter is transformed into dark energy, and this transformation is what leads to celestial bodies absorbing dark matter and emitting dark energy.

3-3 Light and electromagnetic waves:

Light has been and still is a puzzling mystery to physicists, due to its sometimes conflicting properties, and it was the main reason for the refutation and rejection of the ether theories, because scientists were unable to impose a specific structure for that ether that is consistent with all the properties of light and other astronomical phenomena, so the statement of the compatibility of the properties of light with the theory of the heavenly structure was expanded.

3-3-1 The real reasons for the constancy of the speed of light:

3-3-1-1 Does the Michelson and Morley experiment deny or confirm the validity of the theory of heavenly structure?

On the other hand, is the speed of light constant regardless of whether the source is moving or not?

The ether theories that were developed in previous centuries were not completely compatible with reality, because in all of those theories the ether had a unified structure that had to describe all the physical phenomena in the universe, and this is contrary to reality, so For example, those theories is either compatible with electromagnetic forces, but it fails when we compare it with the force of gravity, or vice versa.

The theory of the heavenly structure differs from previous ether theories. as the universe consists of two worlds that live side by side. The first world is the world of the atom (it is the world that consists of atoms) and it is our tangible world that we can sense with our

senses, and the second world is the world of particles (or the world Non-atomic) We can sense the existence of the other world through what is called (Electromagnetic waves, forces of nature, force of gravity, electromagnetic and nuclear forces, electric and magnetic fields), and just as visible matter (the atomic world) consists of atoms, sometimes in the form of a gas, fluid, or solid, so the second world is composed From several cases, for example, the astronomical fluid (which is described by the astronomical fluid theory ¹) expresses a state that is very similar to a gas, and as for the dark energy fabric or cosmic fabric (CF) in the theory of the heavenly structure, it describes a new state that is more complex than the Atomic matter states, and there is nothing completely similar to it in atomic matter, it resembles solid matter in the internal structure of dark energy bubbles, and as for these bubbles, they move and slide over each other in a manner similar to the fluid state in the atomic structure.

This theory does not contradict at all the results of the Michelson-Morley experiment, but rather is completely consistent with it.

Scientists have imposed a certain direction for the movement of the ether, as shown in the figure

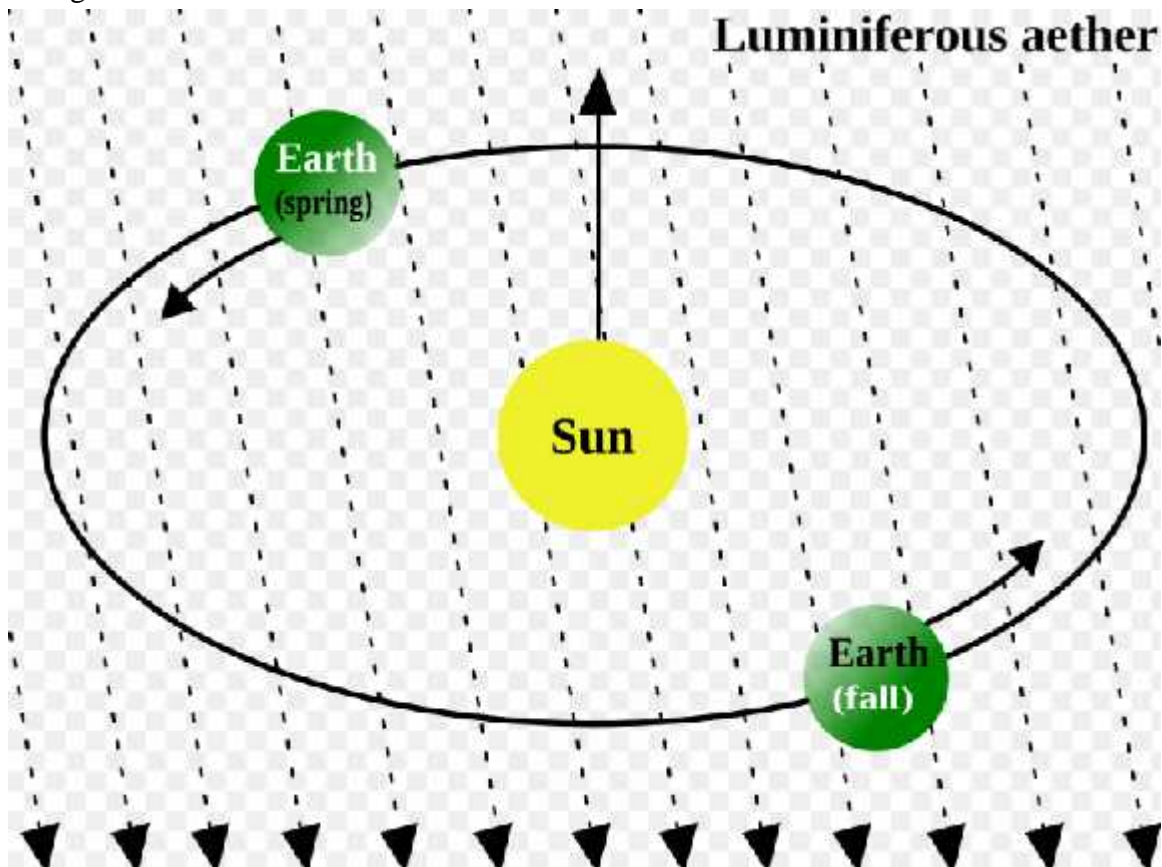


Figure (8): shows the direction of virtual ether movement in the past

In 1886, Michelson and Morley began experiments on the propagation and speed of light in space. He believed that he could determine this speed by determining the speed of the

Earth in the ether as it revolved around the Sun. Let us return to the Michelson and Morley experiment. The two scientists tried to prove the existence of the ether by comparing the speed of light moving in the direction of the Earth's movement with its speed in a direction perpendicular to the Earth's movement. Then he will not only prove the difference between the two speeds, but he will actually determine the speed of the Earth in its orbit around the sun, given that the ether is the absolute frame of reference in the universe. Details of this experiment can be obtained from reference ²⁷.

The expected value of the difference between the two paths was 3% according to the calculations, but the results of the experiment, when it was repeated several times, found a difference of no more than 0.02, which led to the denial of the hypotheses of the existence of ether.

However, the theory of heavenly structure imposes that the dark energy (fabric cosmic fabric), which is the fabric that carries electromagnetic waves, originates from the celestial body itself, according to the second hypothesis of the theory, and therefore (cosmic fabric) on the Earth's surface acquires the same speed as the Earth, whether in its rotation around itself. Or around the sun or around the center of the galaxy (according to the third hypothesis, paragraph A), and therefore it will be fixed relative to the Earth's surface, meaning that it will rotate with the Earth's rotation (similar to the atmosphere that rotates with the Earth). Therefore, the results of the Michelson and Morley experiment are completely consistent with the theory and don't contradict it.

Michelson and Gale Pearson prepared another experiment (Michelson–Gale–Pearson experiment (1925)) ^{28. 29} from the website: <https://physics.bg/home/physics-problems/speed-of-light-constancy/michelson-gale-pearson-experiment/> And the website: https://en.wikipedia.org/wiki/Michelson%E2%80%93Gale%E2%80%93Pearson_experiment

The Michelson-Gale-Pearson experiment is a modified version of the Michelson-Morley experiment and the Sagnac interferometer experiment. This experiment measured the Sagnac effect resulting from the rotation of the Earth (Sagnac effect: It is a phenomenon encountered in optical interferometry that becomes apparent through rotation, whereby a light beam is separated into two beams to cross two perpendicular paths in directions. The ejected light must remain within a closed space in order to act as a ring Upon returning to the entry point, light is allowed to pass through the device so that an interference pattern is obtained. The position of the interference of the fringes depends on the angular velocity of the experiment prepared. The system prepared for this purpose is called the Sagnac interferometer ³⁰. Thus, both the theories of special relativity and The luminiferous aether (the carrier of light) were tested through them and was used to measure the speed of the Earth's rotation around itself.

The goal, as first proposed by Albert A. Michelson in 1904 and then carried out in 1925 by Michelson and Henry J. Gale, was to find out whether the Earth's rotation had an effect on the propagation of light in the Earth's vicinity.²⁹

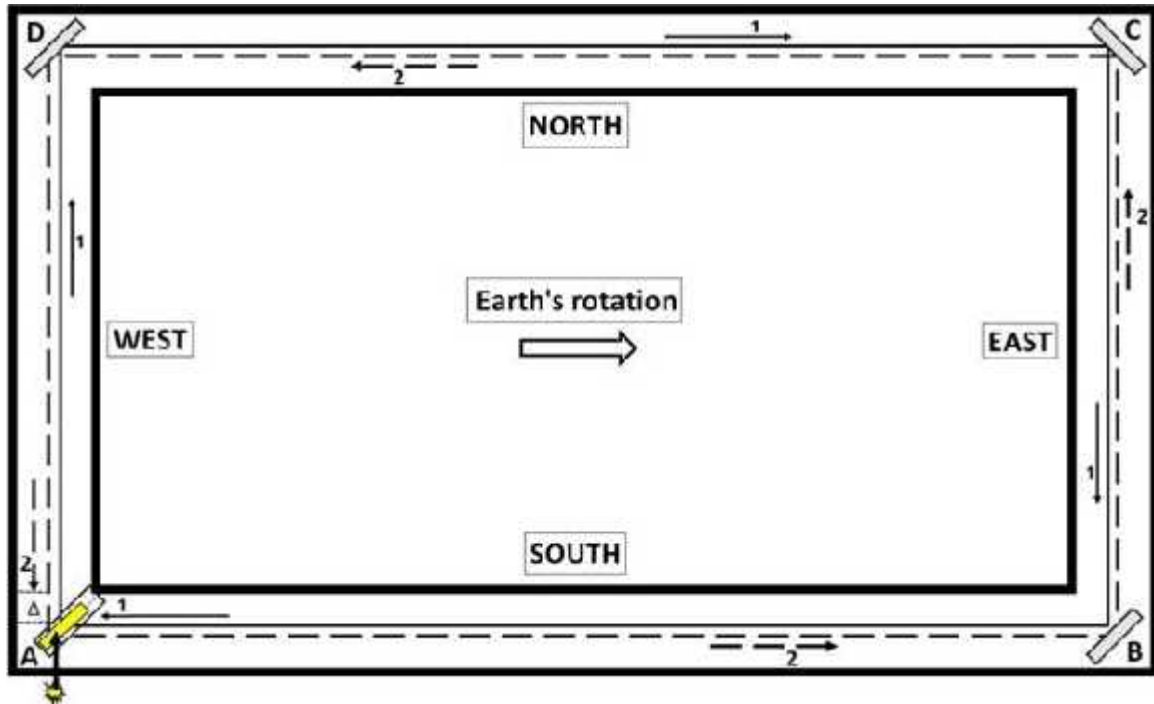


Figure (9): shows the elements of the Michelson-Gale experiment

The Michelson-Gale experiment was a very large toroidal interferometer (1.9 km in circumference), large enough to detect the Earth's angular velocity. Like the original Michelson-Morley experiment, the Michelson-Gale-Pearson version compared light from a single source (a carbon arc) after traveling in two directions. The main change was to replace the "arms" of the original Michelson and Morley (MM) with two rectangles, one much larger than the other. The light was sent to the rectangles, which would reflect off the mirrors in the corners, and return to the starting point. The light emerging from the two rectangles on the screen was compared just as the light returning from the arms would be in a standard MM experiment. The expected phase change was studied according to the fixed ether and special relativity, and Michelson concluded it as follows:

$$\Delta = \frac{4A\omega \sin \phi}{\lambda c}$$

Where: Δ is the displacement at the ends,

A: Area in square kilometers,

Ø: Latitude of the experiment site at Clearing, Illinois ($41^{\circ} 46'$),

C: speed of light,

W: angular velocity of the Earth,

λ : Effective wavelength used. In other words, this experiment was aimed at discovering the Sagnak effect caused by the Earth's rotation.

Experiment result: The result was that the Earth's angular velocity was consistent with what had been measured by astronomy and was therefore confirmed within the limits of measurement accuracy. The measured displacement was 230 parts per 1000, with an accuracy of 5 parts per 1000. The predicted displacement was 237 parts per 1000. According to Michelson/Gale, the experiment is consistent with both the idea of a fixed ether and special relativity.

The Michelson-Gale-Pearson experiment was meticulously executed - and the accuracy of the experiment cannot be denied.

“The displacement of the ends due to the Earth’s rotation was measured on several different days, with full adjustments of the mirrors, with the reflected image sometimes to the right and sometimes to the left of the transmitted image, and by different observers.” (Michelson and Gale, 1925).

Michelson pointed out in 1904 that the positive result in such experiments contradicted the hypothesis of complete aether drag, where the rotating surface of the Earth is subject to aetheric wind. The Michelson–Morley experiment, on the contrary, showed that the hypothetical aether could not move relative to the Earth i.e. that as the Earth rotates the aether must be dragged. These two results are not mutually exclusive, But at that time there was no model of ether to reconcile them., so both experiments were explained within the framework of special relativity.

We also note that the Michelson-Gale experiment is consistent with the hypothesis of the stationary ether (where Michelson made his calculations when deducing the previous law by assuming that the speed of light is variable and not constant, and his calculations gave results identical to the results of the experiment), but the ether must rotate with the rotation of the Earth around the sun without rotating with the rotation of the Earth around itself, and this contradicts the Michelson-Morley experiment in which the ether must rotate with the rotation of the Earth around itself. This is what made the theory of relativity triumph in the end after a very long discussion, despite the lack of physical logic in the theory of relativity in explaining the phenomenon, because the aforementioned law can also be deduced by the laws of relativity) since the speed of light according to the theory of relativity is constant and what changes is distance and time,

and we know that speed equals distance over time, so any change in speed can be attributed to distance and time and will give us the same result, except that physical logic requires that the variable is speed and not distance and time as relativity claims (That is, relativity won the aforementioned debate because of its ability to explain this contradiction mathematically, not physically).

The interpretation of the Michelson-Gale experiment according to the heavenly structure theory is more logical. In the Michelson-Morley experiment, the experiment gives negative results, which means that the speed of light is constant. This is consistent with the theory because according to the theory, the cosmic fabric (CF) that carries electromagnetic waves originates and flows from the Earth itself, so it rotates and moves with it, and therefore it is fixed relative to the Earth's surface. Therefore, it is consistent with the results of the Michelson-Morley experiment. As for the Michelson-Gale experiment, it was found that there is a phase shift, and this phase shift between the two rays is also consistent with the theory according to the third hypothesis, paragraph B, which states that the dark energy bubbles resulting from the Sun reach the Earth's surface and interfere with the bubbles resulting from the Earth.

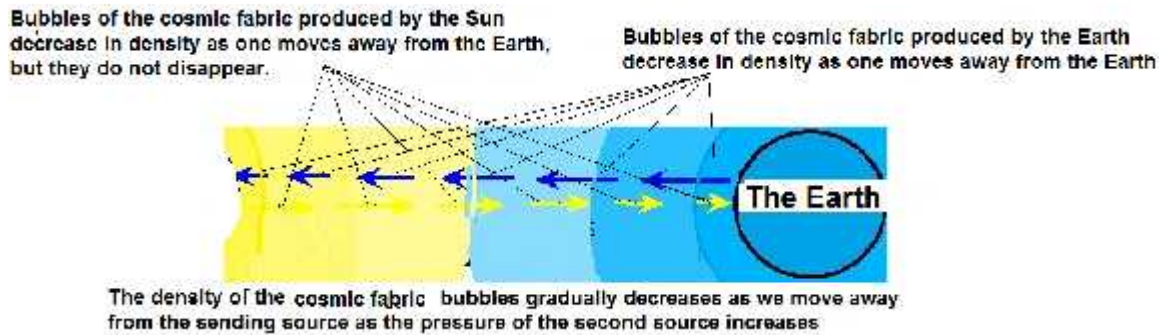


Figure (10): Shows the interference of dark energy bubbles resulting from the sun and the earth and the arrival of solar bubbles to the earth.

The cosmic fabric resulting from the sun is completely consistent with the Michelson and Gale experiment, as this fabric does not rotate with the rotation of the earth around itself and therefore it can be considered the fixed medium with the rotation of the earth around the sun, through which the speed of the earth's rotation around itself can be measured. However, since the pressure and density of the cosmic fabric resulting from the sun and capable of reaching the surface of the earth are relatively weak compared to the cosmic fabric resulting from the earth, a rectangular frame 1.9 km long was used for the light path in the experiment so that the device could sense the effect of the cosmic fabric resulting from the sun, which led to the appearance of a phase difference between the two light beams on the device's screen.

3.3.1.2 Paul Marmet experiment: the scientist Paul Marmet (PhD in Physics (1932-2005), received the Order of Canada in 1981. He is a senior researcher at the Herzberg Institute for Astrophysics of the National Research Council of Canada, and director of the Laboratory of Atomic and Molecular Physics at Laval University) measured the speed of light by sending electromagnetic signals from San Francisco to New York and vice versa, and measuring the time required for the signals to cover this distance. Precise atomic clocks were used for this task, so that three synchronized clocks were used, one at the North Pole NP (where the linear rotation speed of the Earth is zero), the second in New York α , and the third in San Francisco β ³¹

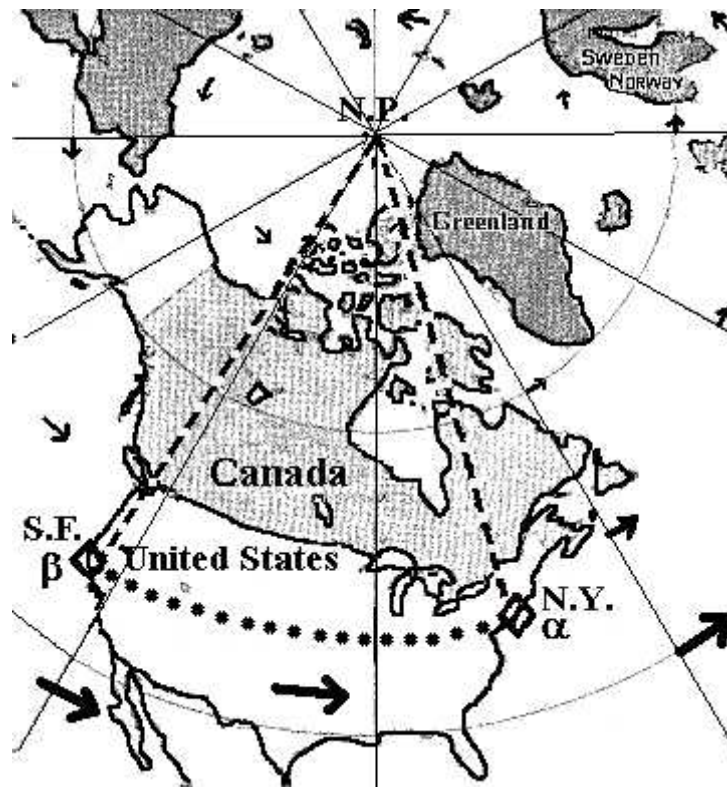


Figure (11): Shows the locations of San Francisco, New York and the North Pole with the direction of the Earth's rotation.

The absolute time of transmission and reception can be measured directly in each of the two local clocks (α and β). The average time interval of the speed of light measured simultaneously in both directions is about 15,000 microseconds.

The accurate measurement of the time interval given by the above synchronization with the North Pole (in agreement with GPS) shows that light takes an additional 0.014 microseconds to travel east (from S.F. to New York). The light also arrives (from New York to San Francisco) 0.014 microseconds earlier than the average time interval of 15,000 microseconds needed to travel a distance of about 4,500 km. Since there is a difference of 0.014 microseconds between each direction, this indicates that light travels

at a different speed eastward than westward. Since the measurements were made for an independent observer at the North Pole, this means that time did not contract or expand. As for distance, as Paul Marmet said, it is not reasonable that the distance from New York to San Francisco is not equal to the distance from San Francisco to New York (this is an illogical result). Therefore, the only logical result is that the velocity is equal to $c + v$ between N.Y. and S.F. and $c - v$ between S.F. and N.Y. And not as special relativity claims that distance and time are the ones that contract and expand because this is completely illogical.

In fact, we must admit that the theory of special relativity is incorrect, although it is excellently woven. When the speed of light is actually constant, then the theory is of course correct in this case, and this is what it states. In the exceptional cases where the speed of light is not constant, it is possible to simply consider that it is distance and time that change, not speed.

But why are there cases where the speed of light is constant?

It should be taken into account that when electromagnetic waves collide with the atoms of any transparent material (such as air), they are absorbed by the atom and then re-emitted again with a very small time difference, and this is what we call the elastic interactions of the photon that preserve the direction and energy (frequency) of the photon. This time difference is what causes the existence of the refractive index of the materials, which makes the speed of light (and electromagnetic waves) in that material less than its speed in a vacuum. This idea was previously adopted by the ballistic theory, but it incorrectly considered that light is composed of particles (photons) and did not take into account the wave nature of the photon. There are several studies that confirm the occurrence of this interaction. One of the evidences for the occurrence of these elastic interactions is that visible sunlight can penetrate the entire atmosphere and cannot penetrate a sheet of paper with a thickness of less than 1 mm, although the weight of 1 square meter of this sheet is less than 1 kg, while the weight of the air column of the atmosphere located on 1 square meter in kilograms is equal to 10282.8 kg/square meter. As previously shown, wave interactions Electromagnetism with the atom will be explained in the theory of atomic structure.

At emission, electromagnetic waves move with speed C relative to the source, but only before meeting the first air atom, which absorbs it. After some delay, the atom emits electromagnetic waves again and again these waves move with speed C relative to this atom at the same time until meeting the next air atom. Thus, electromagnetic waves move in a medium with an average speed C/n , which is always less than C . If electromagnetic waves are emitted from a moving source, before the first re-emission by atoms in the gaseous medium, they move relative to a certain inertial frame with speed $C+V$, but immediately after the first re-emission their speed changes and becomes equal again to C/n , which does not depend in any way on the speed $C+V$. The speed $C+V$ can only be judged by the Doppler frequency change that occurs at the moment when the photons first meet the air atoms or medium, on the following site scientific research on how the frequency changes with the speed of electromagnetic waves:

The elastic interactions between electromagnetic waves and the atoms of the medium are the reason why the speed of electromagnetic waves appears to be constant in many applications, i.e. the electromagnetic waves that our devices measure are not the waves emanating from the primary source but the waves emanating from the atoms of the medium. The Global Positioning System (GPS) and all related experiments provide striking evidence that the speed of light is not constant relative to the observer³², contrary to Einstein's assumptions, although these applications are compatible with the mathematical relations of relativity they are not compatible with the physical logic of relativity. The measured speed of light is $c-v$ in one direction and $c+v$ in the other direction. The dark energy fabric (cosmic fabric) imposed by the heavenly structure theory gives us a logical explanation for all the anomalies we encounter when measuring the speed of electromagnetic waves and thus there is no need to make the illogical assumption of the constancy of the speed of light.

3.3.2 Properties of Light (Electromagnetic Waves):

3.3.2.1 The Cosmic fabric (CF) is a very suitable medium for carrying electromagnetic waves

Despite the importance of electromagnetic waves in our lives as they enter into many details of our lives in this modern era in which the devices that use these waves have diversified in very diverse modern devices, modern science defines electromagnetic waves as (waves that pass through any body or material through space, and do not need a medium for transmission or propagation, unlike mechanical waves, and electromagnetic waves are produced from vibrations resulting from the electric and magnetic fields together).

There is no doubt that this definition contains a lot of ambiguity, for example, what is the nature of those electric and magnetic fields that modern science is unable to explain, or explains them with illogical explanations that the mind does not accept.

Secondly, modern science assumes that there is no need for a medium through which electromagnetic waves can travel, although they are very similar in their characteristics to those of sound waves, as they have a very wide range of frequencies, and there are two types of waves: electric waves and magnetic waves, which are similar to transverse sound waves (which only pass through solid objects). The assumption that there is no need for a medium through which electromagnetic waves can travel is an illogical hypothesis, as the idea of waves is formed from the principle of causing vibration in a medium and the transmission of this vibration through that medium. As for merely describing it as a type of energy, this is not enough, because this raises several questions. For example, why does this energy behave exactly like waves, as it has a very wide frequency range? What is the nature of this energy if it is not material particles (as science describes it) and is not waves in a medium?

The theory of heavenly structure gives a very logical explanation for these electromagnetic waves. The dark energy network, which has a very high elasticity coefficient according to the hypotheses of the theory, allows electromagnetic waves to move through it logically and without any obstacle. Comparison between sound waves and electromagnetic waves

| | Sound waves | Electromagnetic waves |
|--|---|--|
| Definition | Mechanical waves resulting from mechanical vibrations that travel through a medium of a material | Produced by vibrations of an electric charge that lead to the formation of electric and magnetic waves (logically assumed to travel within a medium) |
| Speed | Relevant to the medium they travel through | Equal to the speed of light and also changes according to the medium it passes through |
| Origin | Mechanical vibrations | Vibrations of an electric charge |
| Human receiving device | Ear | Eye |
| Human receiving frequency range | From 20 to 20,000 Hz | From 400 to 790 terahertz (THz) |
| Refraction | Sound refracts when it travels from a medium of a certain density to another medium of a different density. The angle of refraction is related to the speed of sound in the two media, and Snell's law applies to it | Light refracts when it moves from a medium of a certain density to another medium of different density and the angle of refraction is related to the speed of light in the two media, and Snell's law also applies to it |
| Interference property | Sound waves interfere with each other and form antinodes and nodes under certain conditions. Under special conditions, a resonance occurs (when the frequencies of the inductor are consistent with the Natural frequency of the medium to which they are applied. This is similar to the resonance state in light waves) | Light waves interfere with each other in a manner similar to sound waves and form bright fringes and dark fringes under certain conditions. Also, under special conditions, a resonance state occurs, which has very wide applications in the electric, magnetic and electromagnetic fields. |
| Nature | Vibration of the particles of the medium (a material) and the transmission of this vibration through the particles of that medium | According to the theory of heavenly structure: vibration in the superstring of the fabric of dark energy (cosmic fabric) and the transmission of these vibrations through that fabric |

Table 1

The propagation of electromagnetic waves in a vacuum made scientists assume the existence of the ether for a long period of time estimated at hundreds of years. Although the ether is the only logical explanation for this propagation, the inability to describe a specific structure for this ether that is consistent with all astronomical observations in the universe led to the emergence of ghost theories from a physical point of view. Scientists became interested in mathematical relationships that are consistent with astronomical observations without paying much attention to the logical physical explanation of these relationships. The door was closed in the face of new theories of the ether. As I have previously shown, the main reason for this trend is that the previously assumed ether has a specific and definite structure, so it could not be consistent with all the observed astronomical physical phenomena.

The theory of heavenly structure proposes the idea of a dark energy fabric (cosmic fabric) that is very suitable for carrying electromagnetic waves in a logical and consistent manner with the theory of astronomical fluid and with all observed astronomical phenomena. According to the fourth hypothesis, the bubbles are composed of a fabric of high strength and high elasticity and thus it is able to carry electromagnetic waves despite the sliding of the bubbles on each other, but these bubbles are contiguous so this sliding does not hinder the movement of the waves

3.3.2.2 Interference Property: How Does Light Interference Occur?

Here is an explanation of how light waves interfere with each other. Suppose there is a pair of light waves from the same source that travel, for example, in direction D (direction of propagation) as shown in Figure (12), and if the vibrations (which are perpendicular to the direction of propagation as shown by C in Figure (12) are parallel to each other and also parallel with respect to the direction of vibration, the light waves may interfere with each other if they are in the same plane.

Constructive Interference: Figure (12 A) illustrates constructive interference of light waves

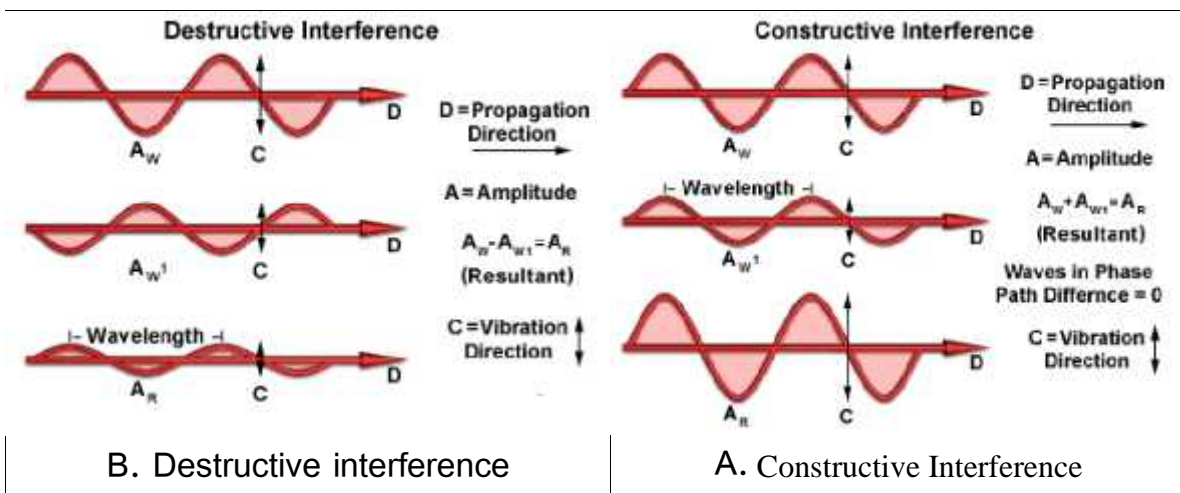


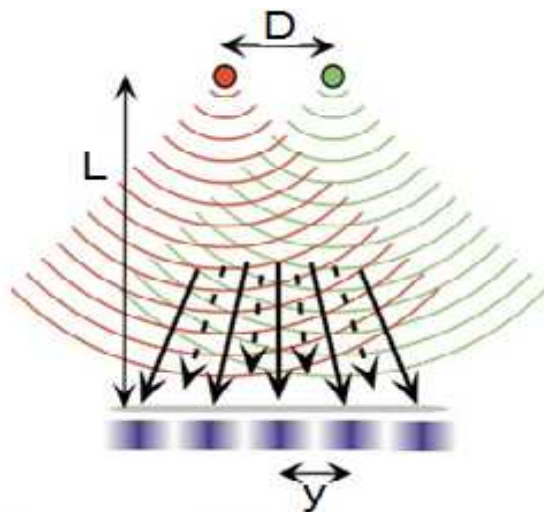
Figure (12): Shows constructive and destructive interference of waves

Assuming all the above criteria are met, waves can interfere either constructively or destructively with each other. If the crests of one wave coincide with the crests of the other, the resulting amplitude is equal to the sum of the two amplitudes. If the amplitudes of both waves are equal, the resulting amplitude is doubled. This additional interference is called constructive interference (as shown in Figure (12. A)).

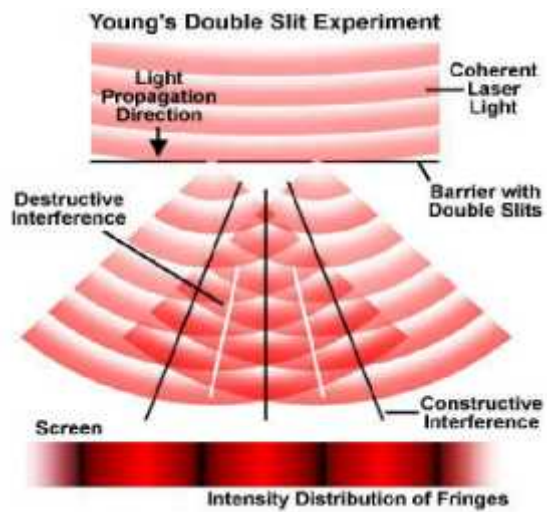
Destructive interference: Figure (12.B) shows destructive interference of light waves

If the crests of one wave coincide with the troughs of the other, the resulting amplitude is reduced or may be completely cancelled out, as shown in Figure (12 B). This is called destructive interference. The result is a state of complete cancellation of light (blackness). Thomas Young was an early 19th century physicist who demonstrated interference by showing that light is a wave phenomenon. He also postulated that different colours of light are made up of waves of different lengths. This was contrary to the prevailing view at the time, which was widely biased towards the theory that light is a stream of particles. In 1801, Young performed an experiment that provided important evidence that visible light has wave-like properties. It is called the double-slit experiment ³³.

Double-slit experiment: Figure (13.a) Schematic illustration of Young's double-slit experiment, in which coherent laser light is allowed to illuminate a barrier containing two small slits that allow only a portion of the light to pass through. A screen is placed in the area behind the slits, and a pattern of bright and dark red interference bands becomes visible on the screen.



B. It shows the interference of sound waves .similar to light waves



A. It illustrates the double-slit experiment .for light waves

Figure (13)

The waves meet in step (or in phase; in a way that they are in agreement with each other (constructive interference)), sometimes they meet out of step (or out of phase; i.e. antiparallel to each other; destructive interference), and sometimes they meet partially in

step.

When the waves meet in step, they add together due to constructive interference, and a bright area is displayed on the screen. In areas where the waves meet completely out of step (antiparallel), they subtract from each other due to destructive interference, and a dark area appears in that part of the screen. The resulting patterns on the screen, which are the result of interference between the two diffracted laser light beams, are often referred to as interference fringes.

Other types of experiments have been devised to demonstrate the wave nature of light and the effects of interference. The most notable are Humphrey Lloyd's single mirror experiment and Augustin Fresnel's double mirror and prism experiment. This property of light has several applications, such as hologram, which produces a three-dimensional image.

This interference property applies to all types of waves, for example waves induced in a still pool of water.

Sound waves also have these interference properties. In Figure (13.B), there are two sources of waves in sync. We can see in the figure how the two waves interfere, just like the interference that occurs with light waves.

Let us discuss (logically) whether light does not travel through a medium that carries it, how does this interference between waves occur to draw bright and dark fringes on the screen, so that it behaves similarly to sound waves and other waves that cannot be imagined to occur without a medium through which it travels, and what is the nature of this photon that achieves this interference without the need for a medium through which it travels? In addition to what was mentioned above, there is the case of electrical, magnetic and electromagnetic resonance, which has many technological applications, and it is also similar to the resonance cases of sound waves and other waves. This similarity in properties between electromagnetic waves, sound waves and other waves cannot be a mere coincidence, without being related to the nature of these waves, and sufficing with saying that the photon has a wave nature without stating what this nature is is unacceptable, as there is no logical nature for the photon that gives it the wave characteristic unless it is a wave in a medium.

But how do we justify the quantum property that the photon shows in some experiments (such as the Compton effect), especially since the theory of heavenly structure gives the photon a wave property only within the fabric of dark energy (the cosmic fabric)!

Since the photon is emitted by the atom, to answer this question we must delve into the composition and atomic structure of atoms, and this is what will be described and explained in the upcoming research (the theory of atomic structure)

On the other hand, some types of particles show wave properties despite their particle nature, so what is the reason for that?

To answer this question, there are two axes:

1- The vast majority of the devices we use to detect particles sense electromagnetic waves, and do not sense particles directly, and therefore they sense the waves formed in the fabric of dark energy (the cosmic fabric) and resulting from their interaction with those particles, so it is natural to believe that these particles have a wave property, except that the wave property results from their interaction with the cosmic fabric.

2- Some types of particles, such as electrons and protons, are linked to continuous

interactions with the cosmic fabric, which makes them affected by the waves of the cosmic fabric. These interactions will be explained in the theory of atomic structure.

3.3.2.3 Quantum property of light:

The impossibility of light having a particle nature:

It is scientifically known that light is electromagnetic waves with specific frequencies emitted by the atoms of materials, which means that what applies to electromagnetic waves applies to it, and visible light is characterized by a specific frequency range, Figure (14).

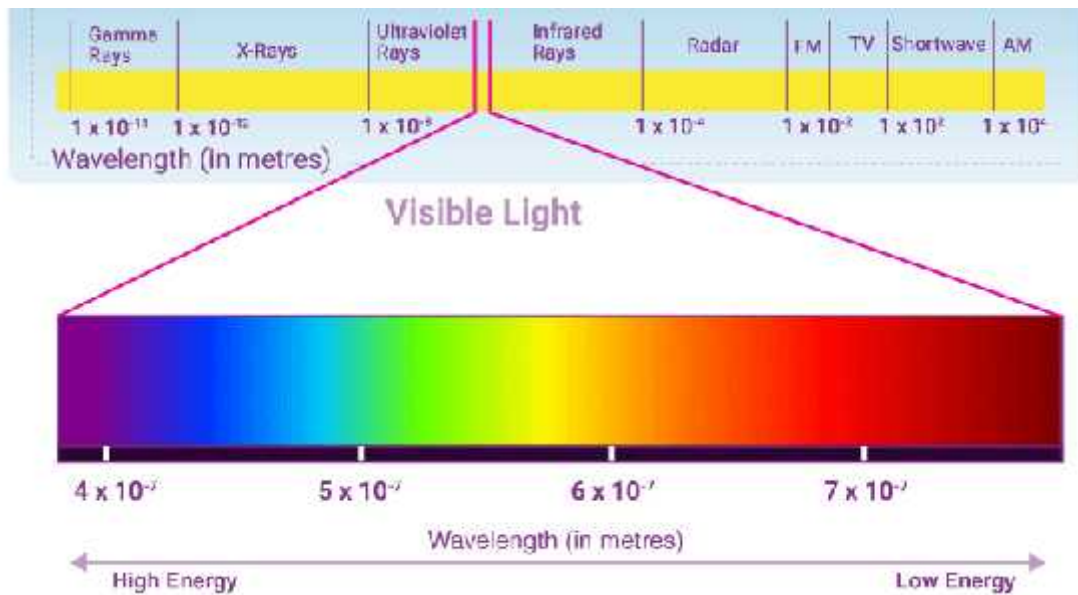


Figure (14): The field of electromagnetic waves and the visible spectrum range is specified on it

We notice in Figure (14) that the field of electromagnetic waves and its wavelengths extend over a very wide range, which confirms the wave nature of electromagnetic waves and completely denies the particle nature, for the following reasons:

1- It is illogical for each of these frequencies to have a type of photon particles that corresponds to it, as this requires infinity of photon types to cover this wide range.

2- We notice in the range of radio waves that the wavelength may extend to several meters, so what is the form of that photon that can achieve this knowing that the mass of the photon is zero? And even if we consider that the photon is a quantum of energy, what is the nature of this energy that extends to several meters. Knowing that the energy of a photon decreases as its wavelength increases, Simply calling it “quantum of energy” does not solve the problem. The person who claims this name must explain the nature of this energy that achieves the aforementioned characteristics. In fact, this photon, which is more than a meter long and can penetrate objects, is more like a ghost.

3- The mechanism of electromagnetic waves formation indicates greatly the presence of something in space that transmits electromagnetic waves, and the following example illustrates this idea, let us have a stationary electric charge, it is known that an electric field will be generated in the vicinity of the charge, this field will remain stationary as long as the charge is stationary, and as soon as the charge moves with a vibrating motion, electromagnetic waves will be formed with the same frequency of the charge's movement.

This is exactly like when we hold the end of a rope fixed from the other end, the rope will remain stationary as long as our hand is stationary and as soon as we make a vibrating motion with our hand, waves will be generated in the rope that will travel through that rope.

The question here is where were the electromagnetic photons (energy quanta) before the electric charge moved? And why were these photons generated with the movement?

But in our previous example, the moving charge was an electric charge that generated an electric field only, so where did the changes in the magnetic field come from? In fact, even this phenomenon is also similar to what happens in sound waves. When sound waves pass from one medium to another, what is called mode conversion occurs in them. If the waves are longitudinal, a part of the wave energy is converted into transverse waves at the boundary between two mediums, and longitudinal waves + transverse waves are formed in the second medium. This is exactly what happens in our previous example. When the changes in the electric field pass through the medium, which is the fabric of dark energy (the cosmic fabric), through the bubbles of dark energy, mode conversion occurs at the membranes of the bubbles in a manner similar to sound waves. Therefore, independent electric waves or independent magnetic waves cannot be generated in air or vacuum because the medium, which is the fabric of dark energy (the cosmic fabric), will form the other waves.

The theory of the heavenly structure gives a logical explanation that is consistent with all observations in reality.

In the fourth special hypothesis 2-4-11, it gives us a logical explanation for the quantum property of light photons.

This property imposes that light is a quantity of waves in the dark energy fabric network (the cosmic fabric) and Figure (15) represents the shape of this quantity,

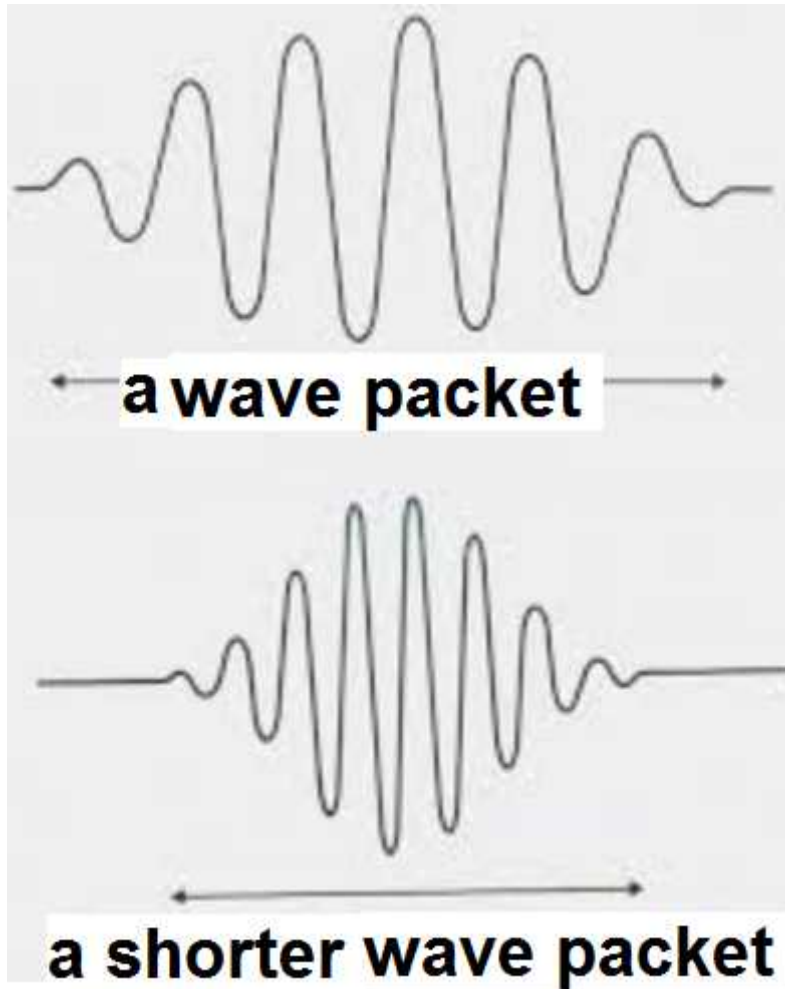


Figure (15): shows the shape of the light photons emitted by atoms

This aforementioned property also imposes that the dark energy bubble absorbs the photon and then emits it without a time delay, and thus the bubble membrane surrounding that burst of waves keeps it independent and gives it the quantum character of photons,

As for the mechanism of absorption and release of electromagnetic waves by the bubble, there are many similar examples, including the elastic interactions of light. In these interactions that occur between photons and atoms of materials, photons in this type of interaction maintain their energy (frequency), but they may not maintain their direction when moving from one medium to another. As long as they are in the same medium, the direction does not change. The same happens when a photon moves from one bubble to another. The photon maintains its direction and energy except in the case of a difference in the pressure or density of the bubbles. As for the process of the bubble absorbing and releasing the photon without a time delay, it can be represented by the previous example in the rope fixed at its end through which the waves pass. The fixation point is exposed to the incoming wave, so it absorbs the energy of this wave and releases that energy at the

exact same moment without any time delay in the opposite direction to release the reflected wave. Although the fixation point does not vibrate, it absorbs the energy of the incoming wave and releases the reflected wave at the exact same moment.

the atoms' emission of photons may be accompanied by the emission of some types of particles, some of these particles may be detectable by our devices used in observation processes and others may not be detectable (i.e. they belong to the particles of the astronomical fluid (dark matter particles)), and these particles have kinetic energy (like the particles resulting from the sun that push the sails of spacecraft).

The atomic structure theory will discuss how light photons interact with the atoms of matter.

But electromagnetic waves are changes in the electric and magnetic fields that are equal in intensity, and each of these fields has different properties from the other and can be generated in a different way from the other,

for example, the electric current that we use in our daily lives in many areas is the result of changes in the electric field and is not much related to the magnetic field, on the other hand, the Earth's magnetic field, permanent and electric magnets, electric motors, generators and many other applications depend more on changes in the magnetic field, and here we will see several contradictions, which are as follows:

1- If the light that consists of electromagnetic waves and thus of changes in the electric and magnetic fields and at the same time consists of photons (and photons have a particle nature in addition to the wave nature), this means that both the electric field and the magnetic field also consist of photons, and this is not accepted by logic, and has not been stated by any of the reliable scientific references.

2- The number of values that can be generated by both the electric field and the magnetic

field is infinite. For example, the law of the electric field, $\vec{E} = \frac{\Delta V}{\Delta x}$ and Δx an infinity of values can be given, and likewise ΔV an infinity of values can be given, and thus the field resulting from them can be given an infinity of values, and what was said about the electric field can be applied to the magnetic field, meaning that the magnetic field can also take an infinity of values, and since photons are changes in the electric and magnetic fields, this requires the existence of an infinity of types of photons that differ from each other according to the changes in the electric field on the one hand and the changes in the magnetic field on the other hand, This can be seen from Figure (14) which shows a continuous field of electromagnetic waves, and this is consistent with industrial applications. For example, cell phones each have their own frequency range to distinguish them from other devices. However, no matter how large the number of these devices is, they can operate without any problem in searching for additional frequencies

to conduct communications between them. It is clear from the above that it is illogical to have an infinite number of photons of a particle nature..

3-3-2-4 gravitational lensing: Why does light bends when it passes close to celestial bodies? Einstein was able to predict the vision of the star hidden behind the sun during a solar eclipse.

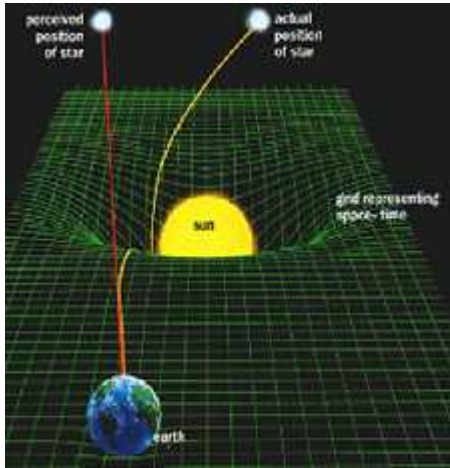


Figure (16)

However, he interpreted it as a result of the curvature of space-time, as in Figure (16). The real interpretation of this phenomenon is as follows:

According to the theory of heavenly structure, the cosmic fabric originates from celestial bodies and then spreads out into the surrounding space. In the case of very large celestial bodies such as the sun, the density and pressure of the cosmic fabric increase in the area surrounding the celestial body. The very large mass of the sun makes the density of the dark energy fabric (cosmic fabric) close to the sun large, in addition to the presence of atoms of the solar atmosphere, which also increase the density of the cosmic

fabric, which together form a medium with a high density relative to the medium far from the sun. We know that when light travels from a medium with a low density to a medium with a high density, it is refracted.

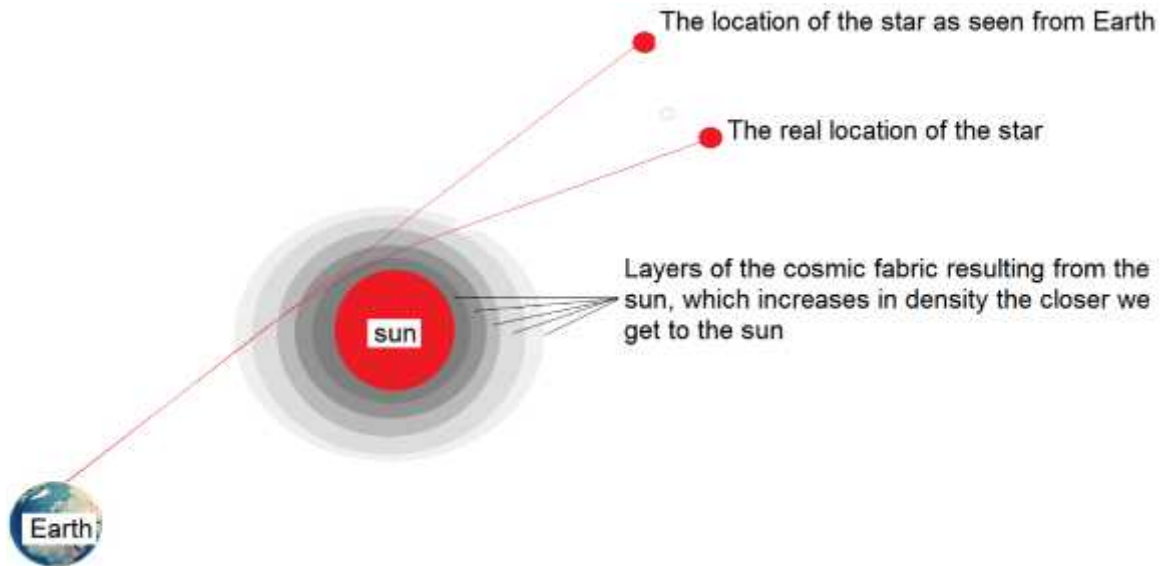


Figure (17)

The solar atmosphere acts as a convex lens that increases the angle of refraction of sunlight, knowing that the sun is made up of flaming gases, and therefore the upper layers of the sun can also act as a convex lens.

But why does this refraction event not follow the known laws of refraction but rather follow the relationships established by Einstein? According to the heavenly structure theory, dark energy bubbles flow from the sun towards the ocean, and both their density and pressure depend on the mass of the celestial body. Since the sun has a very large mass, the density and pressure of dark energy bubbles near the surface of the sun are high and gradually decrease as we move away. The decrease in this density as we move away from the sun leads to the refraction of the light beam coming from behind the sun towards the earth. This phenomenon, as we notice, does not depend on the difference in density between two material media (composed of atoms) which leads to the refraction of the light beam when moving from one to the other, but rather depends mainly on the mass of the celestial body. The larger the mass of the celestial body, the more evident it is and is observed in objects with large masses such as stars, black holes and large galaxies. As I have previously shown, both the astronomical fluid theory and the heavenly structure theory do not conflict with the equations of special and general relativity, and the equations of quantum theory, but rather conflict with illogical physical explanations of cosmic phenomena, such as the existence of what is called the fabric of spacetime.

From here we notice that in both general relativity and heavenly structure, the mass of the celestial body is the way large mass bends the light coming from behind the sun, but the difference between them is in the physical interpretation of this refraction. The bending of the light beam in general relativity is the result of the bending of the fabric of spacetime, this imaginary fabric is an immaterial fabric that has no mass and is therefore closer to a ghost, while the bending in the theory of heavenly structure is the result of a change in the density and pressure of the fabric of dark energy (cosmic fabric), which is a material fabric that has mass, and its mass constitutes about 70% of the total mass of the universe. Galaxies and massive black holes act as magnifying lenses and deflect the rays of the stars and galaxies behind them. In the scientific research on the website (<https://www.scirp.org/journal/paperinformation?paperid=79923>), the angle of deflection of light from a distant star behind a massive body was derived with an accurate solution, based on Newton's classical law of gravity $F = GMm_0/r^2$, where m_0 is the mass of the assumed photon that is calculated from the photon energy of the form m_0c^2 and h which gives $m_0=hv/c^2$ and M is the mass of the celestial body which gave a more accurate solution than the result provided by general relativity based on the Schwarzschild scale (this solution remained for a long time as evidence of the validity of relativity). This solution confirms the relationship between the refraction of the light beam and the mass of the celestial body causing this refraction and is a solution completely compatible with the theory of celestial structure. Below we review the following table that compares the

fabric of dark energy (cosmic fabric) in the theory of heavenly structure and the fabric of spacetime in the theory of relativity.

| Comparisons | Space-time fabric in Theory of Relativity | Cosmic fabric in Theory of Heavenly Structure |
|--------------------------|---|--|
| The nature of the fabric | A fabric made up of time and space, it is an immaterial fabric (i.e. it is not a real, tangible, material fabric and therefore it is an imaginary or ghostly fabric) | A material fabric made up of particles interconnected with each other to form what resemble threads or superstring with extremely small diameters to form cells similar to bubbles that fill the universe |
| The nature of light | It is photons (energy packets) that have no mass and have frequencies in an unknown way and are affected by the fabric of spacetime, bending with its curvature in an unknown way and for unknown reasons | It is transverse and longitudinal waves in the fabric of dark energy (cosmic fabric), these waves are refracted when they pass between two media of different densities |
| The speed of light | Constant for unknown reasons | The speed of electromagnetic waves depends on the density of the medium through which they pass, and since the medium here is cosmic fabric, which has a nearly constant density throughout the universe (except within atomic matter), the speed of light is constant and varies depending on the material medium through which they pass |

Table 2

4- Conclusions:

Scientists from the sixteenth century until the beginning of the twentieth century were unable to reach a specific structure for what is called the ether that is compatible with all astronomical phenomena.

For example, when this ether is compatible with electromagnetic forces, we find it conflicts with the force of gravity, and when it is compatible with the force of gravity, we find it conflicts with electromagnetic forces, which made a large number of scientists reject the idea of the ether, and scientists began to rely on mathematical equations compatible with practical experiments and not rely on correct physical principles, which slowed down the pace of scientific progress.

The Michelson and Morley experiment with the Michelson-Gall Pearson experiment, which eliminated the idea of the ether, are themselves confirming the validity of the theory of the heavenly structure, as these two experiments are compatible with the hypotheses of the theory mathematically and at the same time provide a logical physical explanation for the two experiments, while although the theory of relativity is compatible with the two experiments mathematically, it provides illogical physical explanations

Both the heavenly structure theory in this research and the astronomical fluid theory previously and the atomic structure theory later were able to describe how the so-called forces of nature are formed without the need to resort to illogical hypotheses, to lay the foundation on which modern physics must be built. The heavenly structure theory was also able to explain the nature of dark energy, which was and still is to this day a puzzling mystery to scientists about how it is the cause of the acceleration of cosmic expansion.

It was also able to explain how electromagnetic waves travel in a vacuum in a logical way without the need to resort to illogical imaginary assumptions, and it laid the principles on which the formation of electric and magnetic fields is based, which are considered the cause of the formation of electromagnetic forces, as these electromagnetic fields will be expanded in the atomic structure theory.

Both the astronomical fluid theory and the heavenly structure theory (and later the atomic structure theory) are compatible with each other and there is no contradiction between them, and at the same time they are able to build modern physics logically, unlike the theories of relativity, both special and general, and quantum mechanics, which conflict with each other, as the validity of one of them requires the invalidity of the other.

Finally, the scientific community must take both the astronomical fluid theory and the heavenly structure theory seriously and confirm their validity as soon as possible, as it is not reasonable for both the theory of relativity and quantum theory to continue to dominate the scientific community for more than 100 years despite the ghostly and illogical physical ideas contained in each of these two theories.

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