Journal of Physics and Astronomy

Research | Vol 10 Iss8

A Review of The Theory of Relativity and The Speed of Light by The Ether(Dark Matter)

Hyun-Chun Lee*

ALS, Geumcheon-gu, Seoul, Korea

***Corresponding author**: Hyun-Chun Lee, ALS, Geumcheon-gu, Seoul, Korea; Email: mediinco@naver.com

Received date: July 19, 2022, Manuscript No. tspa-22-69687; **Editor assigned:** July 20, 2022, PreQC No. tspa-22-69687(PQ); **Reviewed:**July 25,2022, QC No. tspa-22-69687(Q); **Revised:**Aug 4, 2022, Manuscript No. tspa-22-69687(R); **Published date:**Aug 8, 2022, DOI: 10.37532/2320-6756.2022.10(8).290

Abstract

We reveal that the ether(dark matter), which is the medium of light, is a being affected by gravity. We say that the Michelson-Morley experiment is not suitable as an experiment to find the ether(dark matter). We calculate the deflection angle of starlight passing around the Sun through classical mechanics by giving a mass to a unit volume of the ether(dark matter) that mediates light waves. The result confirms that it is a more accurate calculation method than the angle of deflection of starlight suggested in Einstein's general theory of relativity. This proves that the ether(dark matter) has infinitely small mass. If the ether(dark matter) exists, we say that Einstein's definition of light is incorrect. We dismantle the absoluteness of the speed of light and conclude with two new proposals.

Keywords: Ether; Dark matter; Gravity;Deflection angle of starlight; Special theory of relativity; General theory of relativity; Michelson-Morley experiment

Introduction

We analyze and exploresome of Einstein's general theory of relativity and special theory of relativity. Through classical mechanics, it is revealed that the ether(dark matter), which is a medium to light, is a being affected by gravity. If the ether(dark matter) has an infinitely small mass that is affected by gravity, the Michelson-Morley experiment is unsuitable as an experiment to find the ether(dark matter), and suggests new experimental methods [1]. It imparts mass per unit volume to the ether(dark matter) that mediates the quantized light wave. The deflection angle of starlight passing around the Sun is calculated through classical mechanics. The result is more accurately calculated than the deflection angle of starlight at solar perigee distance 2R to 10R suggested by Einstein's general theory of relativity [2]. This result proves that the ether(dark matter) is under the influence of gravity and has in finitely small mass. If the ether(dark matter) exists, it means that Einstein's assumption below is not correct. The theoretical background of the special theory of relativity is that the speed of light is always constant regardless of the motion of the observer or the motion of the light source [3]. We explain with some examples that the time reduction and expansion suggested by the special theory of relativity are not correct.

In the beginning, we confirm the error in calculating the deflection angle of starlight announced in Einstein's general theory of relativity. The existence of the ether(dark matter) is re-established through a review of the Michelson-Morley experiment, which is

Citation: Hyun-Chun Lee. A Review of The Theory of Relativity and The Speed of Light by The Ether (Dark Matter). J Phys Astron.2022;10(8):290.

the basis of the theory of relativity.

In the middle part, we calculate the deflection angle of starlight bending in the direction of starlight under the influence of the gravitational field of the ether(dark matter), which gives mass to a unit volume, using classical mechanics. And we show the deflection angle of starlight passing around Jupiter and the Moon. In the latter part, we deconstruct the absoluteness of the speed of light by reviewing the special theory of relativity.We conclude with two new proposals.

A review of the deflection angle of starlight by Einstein

Albert Einstein's papers on Special Theory of Relativity(describes the concept of time and space, etc., in 1905) and General Theory of Relativity(describes the gravitational field and the principle of equivalence, and the theory of energy, etc., in 1915) were an event and a mysterious shock that overturned the science we had seen before, especially the concept of space and time [4]. The theory made the scientific world of the twentieth century impressed, with reasoning, and with a blind approach.It also led to experiments and discussions to prove the theory.

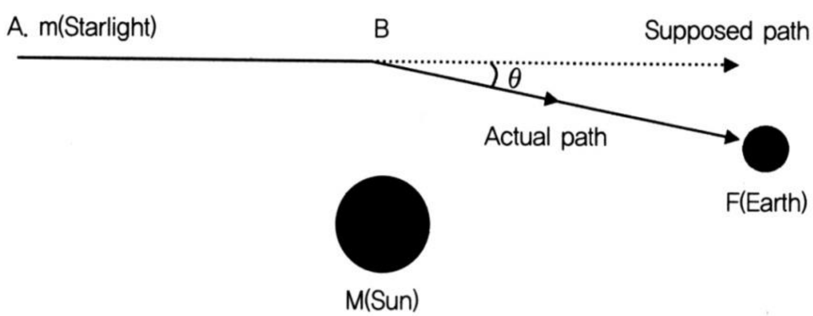

FIG. 1. **The supposed path andthe actual path of starlight due to the solar gravitational field. Starlight m, starting from point A, is expected to travel through a supposed path through point B. The actual path of starlight arrives at point F (Earth) due to the influence of the solar gravitational field.**

TABLE. 1. **Results of observing the deflection angle of starlight during a solar eclipse.Minimum distance indicates when starlight passes through the closest distance to the center of the Sun. The maximum distance indicates when passing through the furthest distance. ϴ (”) is the observed deflection angle of starlight [2].**

Observation	Date	No. of stars	Minimum distance	Maximum distance	Deflection angle	Error
			(10^9m)	(10^9m)	(θ, ")	(")
Greenwich 1	1919.5.29	7	1.40(2R)	4.2(6R)	1.98	0.16
		11	1.40(2R)	4.2(6R)	0.93	-
Greenwich 2	1919.5.29	5	1.40(2R)	4.2(6R)	1.61	0.4
A-Greenwich	1922.9.21	11~14	1.40(2R)	7.0(10R)	1.77	0.4
					1.42	
Victoria	1922.9.21	18	1.40(2R)	7.0(10R)	1.75	-
					1.42	

Rik1	1922.9.21	62~85	1.47(2.1R)	10.1(14.5R)	1.72	0.15
Rik2	1922.9.21	145	1.47(2.1R)	29.4(42R)	1.82	0.2
Potsdam1	1929.5.9	17~18	1.05(1.5R)	5.3(7.5R)	2.24	0.1
Potsdam2	1929.5.9	84~135	2.80(4R)	10.5(15R)	-	-
Stenbeg	1936.6.19	16~29	1.40(2R)	5.0(7.2R)	2.73	0.31
Sendai	1936.6.19	8	2.80(4R)	4.9(7R)	2.13	1.15
Yekis1	1947.5.20	51	2.31(3.3R)	7.1(10.2R)	2.01	0.27
Yekis2	1952.2.25	9~11	1.47(2.1R)	6.0(8.6R)	1.7	0.1

In the gravitational field equation of general relativity, Einstein's formula for calculating the deflection angle of starlight passing through the Sun[2] is

$$\theta = \frac{4GM}{Rc^2}(Radian) \qquad (1)$$

R is the distance from the center of the Sun to the perigee (closest point). G$\left(6.67\times10^{-11}\ N.m^2/kg^2\right)$ and M$\left(1.99\times10^{30}kg\right)$ are the gravitational constant and the mass of the Sun, respectively, and c is the speed of light$\left(3\times10^8 m/s\right)$. According to Equation (1), Einstein's theoretical deflection angle(θ) caused by the bending of starlight due to the gravitational field of the Sun during a solar eclipse on Earth was 1.73” (Second) [1]. This value is possible when R is approximately $7\times10^8 m$ (1R), which is the distance at which starlight passes through the Sun's surface (**FIG. 1**).

The deflection angle at the perigee (solar surface (1R)) observed during an actual eclipse could not measure starlight because of the bright part of the Sun's surface, and it was possible to measure the deflection angle of starlight at a distance of approximately $2R(1.4\times10^9 m)$ to $10R(7.0\times10^9 m)$. The observed value θ was approximately 0.93” to 2.73”. (**TABLE. 1**) According to Einstein's gravitational field equation, when the observation distance r is 2R∼10R, θ is calculated as 0.173"∼0.867". The calculation of the deflection angle of starlight through Einstein's gravitational equation and observations do not match.

A review of the Michelson-Morley Experiment

Two scientists, Michelson-Morley, prepared an experiment on the existence of the ether(dark matter), the medium of light waves, as follows. In order not to be affected by external vibrations, it was performed in a stone basement. A light source was emitted on a sandstone slab(thickness: 1ft, area: $5m^2$). The device is designed so that the light source passes through a silvered glass plate and then travels in different paths and then merges again(**FIG. 2**).

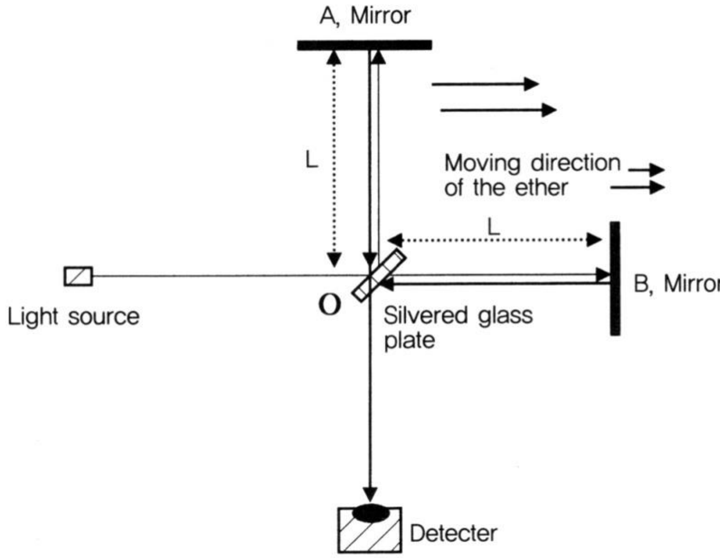

FIG. 2. **Interferometer for Michelson-Morley experiment. The two lights emitted from the light source are divided into mirror A and mirror B through a silvered glass plate and reciprocated. The detector checks the presence of interference using the phase difference [5].**

According to the experimental results, the velocity of the two light sources was the same regardless of which direction the experimental device was facing or the location of the Earth during the year. That is, there was no interference caused by the phase difference of light waves. The experiment was repeated several times, but the interference effect was never found. Therefore, through the Michelson-Morley experiment, it was concluded that there is no such thing as the ether(dark matter), which is the medium of light waves, and that the velocity of light is the same no matter what person measures it [5].

In **FIG. 2**, the expected time difference(Δt) and interference fringe(ΔN) between the two lights after going back and forth between the paths O→A→O and O→B→O are as follows [5].

$$\Delta t \approx \frac{Lv^2}{c3} \qquad (2)$$

$$\Delta N = \frac{2c\Delta t}{\lambda} \qquad (3)$$

In this experiment, the relative velocity v of the ether(dark matter) was set as the earth's orbital velocity with respect to the Sun($v \approx 3 \times 10^4$m/s(30 km/s)). L is the travel distance of light (1.2 m), and λ is the wavelength of light(590 nm).

What was overlooked in the Michelson-Morley experiment was that in a universe without an absolute geostationary system, the relative velocity v with respect to the ether(dark matter) was set as the Earth's orbital velocity. The Earth orbits the Sun in the expanding universe and revolves around the center of the galaxy at a speed of about 200km/s. In addition, the Earth belonging to the galaxy expands and retreats in proportion to the distance(r) at a speed of v = Hr according to Hubble's law (H: Hubble constant) with respect to the outer galaxy. In this space system, it is a dangerous idea to set the speed of the ether(dark matter) to the speed of Earth's orbit in the solar system.

Let's make an assumption here.

[The ether (dark matter) has infinitely small mass.]

Based on the above assumptions, the ether(dark matter) will be denser as it approaches the planet's surface under the influence of gravity. The movement of the ether(dark matter) on the planet's surface can be thought of as very slightly similar to the movement of the atmosphere. Since the Michelson-Morley experiment was performed in a masonry cellar, the relative velocity (v) of the ether(dark matter) would be almost nonexistent. From Equation (2), the time difference Δt would not have occurred. Since Michelson-Morley's laboratory environment is isolated from the outside, it is more difficult to expect interference effects.

Exploring the path of light by the ether (dark matter)

The ether(dark matter), the medium of light, can be identified by changing the path of light. First, the medium of the light whose path is changed is confirmed by comparing the case when the incident light passes through a fixed glass cuboid and when it passes through a moving glass cuboid. Second, by applying hot heat to the path of the incident light (laser), it passes through a place where the density and flow of air are changed. At that time, energy(wind) is input from the outside to arbitrarily change the path of light, and the medium of light is checked.

In order to find the ether(dark matter), the medium of light, we compare the laser beam incident on a fixed glass cuboid (FIG. 3 (a)) and the laser beam incident when the glass cuboid moves(FIG. 3 (b)). In addition, in order to change the path of light in the atmosphere, the medium of light is arbitrarily moved by applying a force from the outside. At that time, it is studied that the path of light is changed (FIG. 3 (c)).

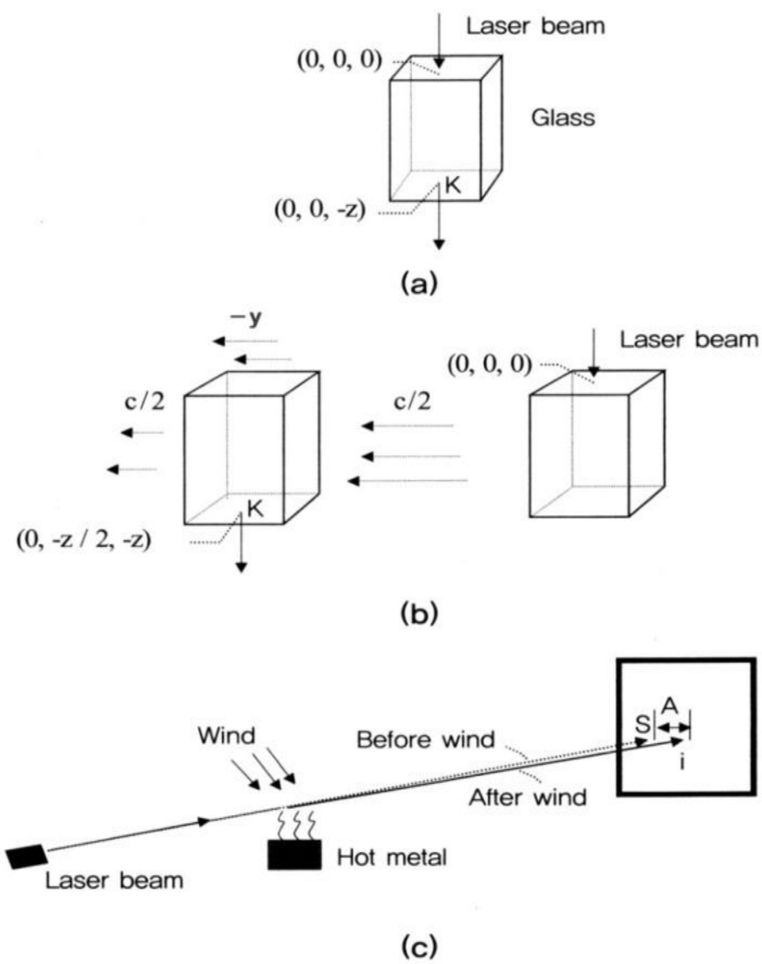

FIG. 3. **Identification of the ether(dark matter) by changing the path of light. (a): After the laser beam is incident on the**

fixed glass cube at the x, y, z axis (0,0,0), it is emitted at the point K, the coordinate (0, 0, -z). Here, the linear distance is z = ct. (b): When the glass cube moves toward the -y direction at a speed c/2, the laser beam is incident on the coordinates (0,0,0). The laser beam will be emitted at the coordinates (0, -z/2, -z), which is the point K, as it travels in the glass cuboid system, which is not affected by the external environment. (c): A laser beam is being emitted towards a point s on the screen. The heated metal is then placed in the vicinity just below the path of the beam. At this time, if the wind blows from the outside, the final arrival point of the beam will be the point (i) moved by the distance A.

FIG. 3 (a) and (b) represent a glass cuboid system that is fixed or moved with respect to the atmosphere, which is a relative stationary system. We compared the path of the beam propagating in the two systems and the final destination. Here, the linear distance is z = ct.

FIG. 3 (a) shows that the two reference systems of the atmosphere and glass are relatively stationary. The beam traveling the shortest straight line is incident on the x, y, z axis (0,0,0) and is emitted at the point K of the glass cube, which is the coordinate (0, 0, -z).

FIG. 3 (b) shows that the glass cube is moving relative to the still atmosphere at a speed c/2 in the -y axis direction. Since the reference frame of the inside of the glass cube and the atmosphere are different, the initial beam in the reference frame of the glass cube directed to the point K arrives at the end point K. However, from the point of view of the atmospheric reference system, the beam will be emitted at coordinates (0, -z/2, -z).From this, it can be considered that the atmosphere and the inside of glass have different mediums of light.

FIG. 3 (c) shows that when no external force is applied, the projected laser beam passes through a straight path and reaches point s. To redirect the laser beam, the heated metal is placed directly under the path of the laser beam and blown into the path of the laser beam. At that time, the laser beam that will reach the point s on the screen will be moved to the point i due to the change in the path of the laser beam direction. This is different from the scattering phenomenon in which light collides with molecules and spreads. This is a concept similar to the path movement of light through the reference system in FIG. 3 (a), (b). The atmosphere around the heated metal is at a different density than the outside atmosphere. It can be said to be a different system relative to the atmosphere, such as inside a glass cube. At that time, if the wind is blown from the side, the atmospheric reference system will move due to the wind as described in FIG. 3 (b), and the laser beam will be emitted to the point i slightly shifted from the target point s when it was first incident. The path of light is moved by the action of the ether(dark matter), which is the medium of light.

The ether(dark matter) has an infinitely small mass, and it exists in outer space, which is in the atmosphere and vacuum state, and is present wherever light and electromagnetic waves are transmitted(gas, liquid, solid, vacuum). The ether(dark matter) will exist in high density around mass stars, galaxies, nebulae, and clusters.

With this assumption, we rethink the Michelson-Morley experiment. It has already been said that it is a dangerous idea to set the relative velocity (v) as the Earth's orbital velocity to measure a medium of light traveling at different 90-degree angles. To find the relative velocity of the ether(dark matter), which has mass, let's calculate it by determining the direction of motion of the atmosphere and the direction of rotation of the earth.With these two calculations, we are trying to say that the Michelson-Morley experiment cannot be done on Earth.

In the first method, the motion of the atmosphere under the influence of gravity in the Earth's atmosphere is defined as the relative velocity (approximately $v \approx 3$m/sec). In the second method, considering the characteristics of the ether(dark matter) under the influence of gravity, the relative speed is determined as the rotational speed($v \approx 363$m/sec) above the Earth's equator, which has the fastest relative speed. It can be explained as below.

It is calculated through Equation (2) and Equation (3). When v≈3m/sec, the time difference between the two lights $\Delta t = 4.0\times 10^{-25} sec$. The travel distance of light is when L=1.2m. Here, the wavelength phase difference of light becomes $\Delta\lambda = 1.2\times 10^{-16} m$. This is when $\Delta\lambda = \mathrm{c}\times\Delta\mathrm{t}$ and λ(wavelength of light) is $5.9\times 10^{-7} m(590nm)$. At this time, the interference fringes ΔN is 4.07×10^{-10}.

When the rotational speed is the relative speed(v≈363m/sec), the time difference between the two lights is $\Delta t = 5.86\times 10^{-21} sec$. The wavelength phase difference of the light is $\Delta\lambda = 1.76\times 10^{-12} m$. Interference fringes ΔN is 5.96×10^{-6}. When the relative velocities of the ether(dark matter) were v≈3m/sec and v≈363m/sec, the interference fringes ΔN were calculated to be 4.07×10^{-10} and 5.96×10^{-6}, respectively. Although this was different from the experimental conditions of the Michelson-Morley experiment, the ΔN expected by Michelson-Morley was too different from 0.04. The phase difference and interference effect of the two wavelengths measured in the Earth's surface atmosphere are too small to be observed.

If you expect the interference fringe ΔN to be 0.04 when the relative velocities of the ether(dark matter) are v≈3m/sec and v≈363m/sec using the Michelson-Morley experimental method, the distance L should be approximately $1.18\times 10^{8} m$ and 8,052m. The above experimental conditions would be impossible on Earth.

In conclusion, it is meaningless to say the presence or absence of the ether (dark matter) through the experimental conditions of the Michelson-Morley experiment.

The deflection angle of starlight calculated by classical mechanics

The calculation of the deflection angle of starlight through classical mechanics is approached while acknowledging the existence of the ether(dark matter). Here, the ether(dark matter) acts as a medium for light waves. Using the curvature of space created by the gravitational field of the Sun, the deflection angle of starlight is calculated. We slightly ignore the definition of the direction vector here.Here we consider the curvature of the sea surface for the computational approach.The curvature of the sea surface can be found by finding the direction of the wave travel and the tangential direction of the sea surface.The energy of waves is transmitted through the seawater, and the mass, which is the substance, is also contained in seawater. Similar to setting the mass to the unit volume of an arbitrary wave to find the direction of the wave, the calculation of the deflection angle proceeds with the concept of giving the mass of the ether(dark matter) to the unit volume of a quantized light wave [6].

Assume that an object with mass m orbits around the Sun in orbit C→B, and is moving in an imaginary orbit A→D with the same angular velocity as mass m(not orbiting through gravity). If the time (t) required for an object at each location to move through orbits A→D, A→B, C→B is the same, then the sum of the transmitted gravity will be the same unless there is a distance limit or obstacle of gravity.

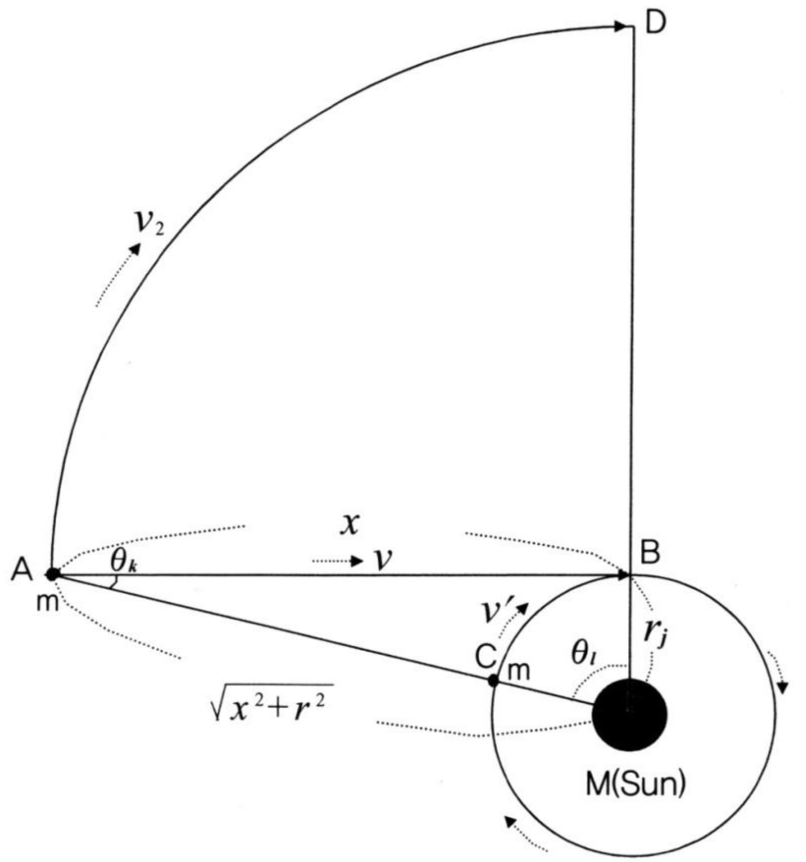

FIG. 4. **The deflection angle of starlight due to the solar gravitational field. In an orbit of radius r around the Sun with mass M, mass m revolves at a speed v', and an imaginary speed v_2 is moving at the same angular speed as the speed v'. The velocity of mass m moving along path A→B under the influence of gravity is v. The time t required to move the orbits A→D, A→B, and C→B is the same.**

In **FIG. 4**, when moving the path A → B, the gravitational force (F) acting at each point of mass m at time dtis [7,8]

$$F = G\frac{Mm}{(x^2 + r^2)} \qquad (4)$$

Here, the gravitational force acting on the j vector component (from B to the center of the Sun) is

$$F_j = G\frac{Mm}{(x^2 + r^2)} sin\theta_k = G\frac{Mmr}{(x^2 + r^2)^{3/2}} \qquad (5)$$

The sum of the gravitational forces acting on the j vector component during time t when moving the distance x along the path A→B is Converting to potential energy

$$F_j x = \int F_j dx = G\frac{Mmx}{r\sqrt{(x^2 + r^2)}} (6)$$

Converting to potential energy

$$V_{jx}(r) = \int F_{jx} \quad dr = -GMm \quad ln\left|\frac{x + \sqrt{x^2 + r^2}}{r}\right| \qquad (7)$$

In FIG. 4, when mass m moves in orbit C→B, the sum of forces acting in the direction of the center of the Sun for time (t) causes mass m to transform by angle θ_1 with respect to the initial direction of travel.As it moves through orbit C→B, the gravitational force during each dt' is

$$F' = G\frac{Mm}{r^2} \qquad (8)$$

The sum of the gravitational force of the Sun acting perpendicular to the direction of travel of mass m when moving the distance a of orbit C→B during time (t) is

$$F'_a = \int F' \ da = G\frac{Mma}{r^2} \qquad (9)$$

Finding the potential energy for a distance (r)

$$V'_a(r) = \int F'_a \ dr = -G\frac{Mma}{r} \qquad (10)$$

Equations (7) and (10) are the respective potential energies when moving the path A→B and the orbit C→B for time (t). The kinetic energy of the path A→B and the orbit C→B moving at constant velocity perpendicular to the direction of gravity is

$$K = \frac{1}{2}mv^2 \qquad (11)$$

$$K' = \frac{1}{2}mv'^2 \qquad (12)$$

Mass (m), which has kinetic energy moving through each path and orbit, is tilted toward the Sun by $\mathrm{d}\theta/\mathrm{dt}$ and $\mathrm{d}\theta'_1/\mathrm{dt}'$ from the original travel direction due to the action of potential energy through gravity. At this time, consider the energy relationship between the movement direction of kinetic energy and the direction in which potential energy acts. If the directions of the two energies are at right angles to each other and the potential energy has an effect on changing the direction of the kinetic energy due to gravity, it can be expressed as follows.

$$\frac{Potential\ energy}{Kinetic\ \ energy} = \frac{d\theta}{dt} \qquad (13)$$

When the kinetic energy is K, K', respectively, if the potential energy is $V_{jx}(r)$, $V'_a(r)$, the ratio can be expressed as Equations (14) and (15).

$$\frac{v_{jx}(r)}{k} = -\frac{2GMm \quad \ln\left|\frac{x+\sqrt{x^2+r^2}}{r}\right|}{v^2} = \theta \qquad (14)$$

$$\frac{V'a(r)}{K} = \frac{2GMa}{rv'^2} = \theta_1 \qquad (15)$$

θ and θ_1 are the respectivedeflection angles due to potential energy when moving the path A→B and the orbit C→B. The deflection angle θ can be obtained from Equations (14) and (15).

$$\theta = \theta_1 \times \frac{rv'^2 \ln \left| \frac{x + \sqrt{x^2 + r^2}}{r} \right|}{av^2} \qquad (16)$$

Using Equation (16), we can calculate the angle of deflection of starlight passing around a planet(stellar) with mass.

In Equation (1), the angle of deflection at the perigee distance(1R: $7.0 \times 10^8 m$) calculated by Einstein was 1.73". At perigee distance 1R, the light of the Sun is too bright to observe starlight. We will calculate the actual observed perigee distances from 2R to 10R.(**TABLE. 1)** First, we will calculate the deflection angle at the perigee distance $2R(r = 1.40 \times 10^9 m)$, then at $4R(r = 2.80 \times 10^9 m)$ and $10R(r = 7.0 \times 10^9 m)$.

From now on we will find each variable. The orbital speed v' orbiting the orbit of the perigee distance 2R(r=1.40×10^9m) is 3.08×10^5m/s using the formulas of gravity$\left(F = G\frac{Mm}{r^2} \right)$ and centrifugal force$\left(F = m\frac{v^2}{r} \right)$. To find the distance x of path A→B, we use the same time when moving path A→B and trajectory C→B. The time (t) can be obtained by properly retrieving an imaginary orbit A→D having the same angular velocity as orbit C→B. Of course, the moving speed (v) of path A→B is the speed of light c and $v < v_2$. The distance between orbits A→D is a_2.

$$a = v't = 2\pi r \frac{\theta_1}{360} \qquad (17)$$

$$a_2 = v_2 t = 2\pi \sqrt{x^2 + r^2} \frac{\theta_1}{360} \qquad (18)$$

From equations (17), (18)

$$x = r\sqrt{\left(\frac{v_2}{v'} \right)^2 - 1} = vt \qquad (19)$$

Equations (19) is again

$$v_2 = \frac{v'}{r} \sqrt{(vt)^2 + r^2} \qquad (20)$$

Equations (20) is again

$$v_2 = 2.2 \times 10^{-4} \sqrt{(x)^2 + r^2} \qquad (21)$$

From equations (18)

$$2.2 \times 10^{-4} \sqrt{(x)^2 + r^2}\, t = 2\pi \sqrt{x^2 + r^2} \frac{\theta_1}{360} \qquad (22)$$

Here, the sum of θ_k and θ_1 is 90˚. The distance x traveled at the speed of light c is r≪x compared to the radius r. Therefore, θ_1 is close to approximately90˚.

From equations (22)

$$t=\frac{\pi}{2\times\left(2.2\times10^{-4}\right)}=7,136.4\sec \quad (23)$$

By applying time (t), we can find the orbit a and the path x. $a=v't=2.20\times10^{9}m$, and $x=vt=2.14\times10^{12}m$. By inserting each numerical value calculated from Equation (16), the deflection angle θ when the path A→B moves can be obtained.

$$\theta=4.8\times10^{-4^\circ}=1.73''sec \quad (24)$$

In Equation (24), θ is the deflection angle of the path A→B, and if the path B→F is considered under the same conditions, the final deflection angle observed at the perigee distance $2R(r=1.40\times10^{9}m)$ is calculated **(FIG. 5)**.

$$\theta_{sun}=2\times\theta\approx3.46''\sec \quad (25)$$

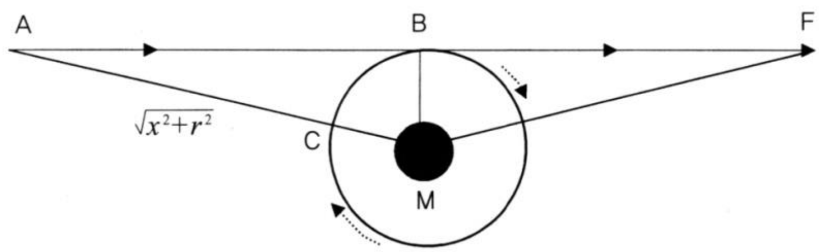

FIG. 5. **The path A→B→F of light. Mass m starting from point A is moving along the path A→B→F via perigee B.**

If $4R(r=2.80\times10^{9}m)$ and $10R(7.0\times10^{9}m)$ are calculated with the above calculation method. For 4R, it is 1.82"(Second) and for 10R, it is 0.77"(Second). It can be seen that the deflection angle of 10R(r=7.0× 10^9 m) at the perigee distance $2R(r=1.4\times10^{9}m)$ is 0.77″ to 3.46″. The above result is the angle of divergence of starlight passing through the Sun, which is consistent with the observation values of 0.93″ to 2.73″ in **TABLE. 1**.

In conclusion, it can be seen that the calculation of the starlight's deflection angle using classical mechanics is an accurate numerical value encompassing the observation results. It can be seen that the calculation presented in Einstein's general theory of relativity is inaccurate to explain the angle of deflection of starlight(0.173" to 0.867" in 2R to 10R). We calculated the deflection angle of starlight by assigning mass(m) to the unit volume of the ether(dark matter), the medium of light waves. This proves that the ether(dark matter) exists and has mass.

To verify the above calculation method, calculate the deflection angle of starlight passing around the Moon and Jupiter.

Calculating the angle of deflection of starlight passing around the Moon is as follows:

The mass and radius of the moon are $M=7.38\times10^{22}kg$ and $R=1.74\times10^{6}m$, respectively. The calculated deflection angle θ_{Moon} at perigee distances 1R to 10R is $1.86\times10^{-5''}$ to $1.72\times10^{-4''}$.

Calculate the angle of deflection of starlight passing around Jupiter as follows:

Jupiter's mass and radius are $M=1.90\times10^{27}kg$ and $R=7.15\times10^{27}m$, respectively. The calculated deflection angle $\theta_{jupiter}$ at perigee distances 1R to 10R is $8.96\times10^{-3''}$ *to* $8.15\times10^{-2''}$.

A review of Special Theory of Relativity and the Speed of Light

Einstein's special theory of relativity starts with the assumption that the speed of light is always constant regardless of the motion of the observer or the motion of the light source, and that no matter can travel faster than light. The speed of light is always the same whether the observer is moving or not [3]. As the ether(dark matter), the medium of light, was denied by the Michelson-Morley experiment, Einstein assumed that light was an absolute being. However, as mentioned earlier in exploring of the path of light by the ether(dark matter), the Michelson-Morley experiment was inappropriate to find ether(dark matter), and said that ether(dark matter), the medium of light, has mass.

In addition, the existence of the ether(dark matter), which has a mass affected by gravity, was proved by calculating the deflection angle of light using classical mechanics.

Einstein referred to the expansion of time as follows.

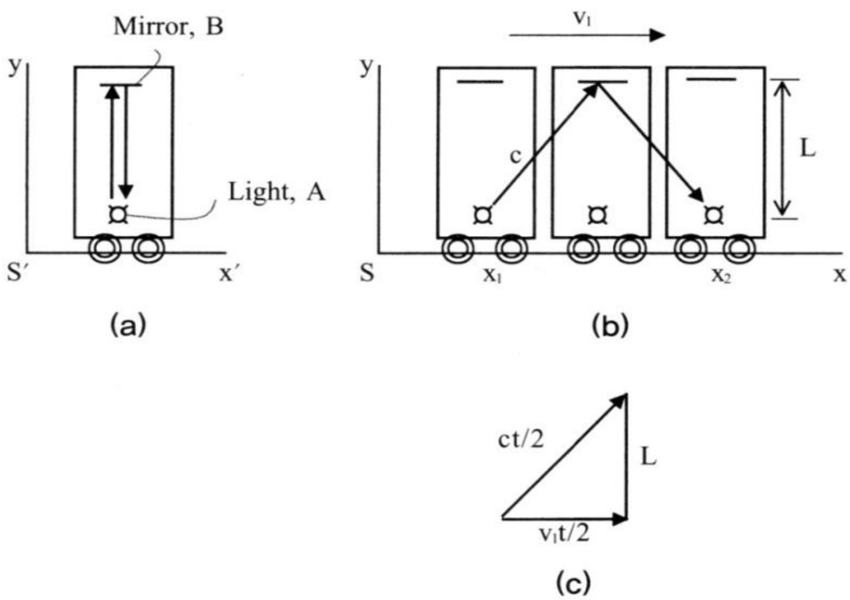

FIG. 6. **The path of light in a train by Einstein's theory. (a): In a train of the stationary S' system, the light source starts from A, goes to mirror B, and then reciprocates to arrive at point A again. (b): Consider a train of S system moving at speed v_1. This is the path of light as seen by the observer when the light source starts from A, goes to mirror B, and then reaches point A again. When the train is stationary or moving, the speed c of light does not change from the point of view of the observer. (c): The shape of the observer's movement during time t is illustrated for distance calculation [9,10].**

Let's approach Einstein's theory by comparing the reciprocating motion of a light source in a stationary S' train and the reciprocating path of a light source in an Ssystem in a moving train.

FIG. 6 (c) shows the dilation of time as Einstein calculated as follows.

$$\left(\frac{ct}{2}\right)^2 = L^2 + \left(\frac{v_1 t}{2}\right)^2 \qquad (26)$$

Equation (26) is again

$$t = \frac{2L}{c}\frac{1}{\sqrt{1-v_1^2/c^2}} \qquad (27)$$

In the above equation, when the moving speed v_1 of the train approaches the speed of light c, the time t expands proportionally [9,10]. Einstein's assumption was that the speed of light was absolute, and that it was always the same whether the observer was moving or not. If the ether(dark matter) existed, time expansion and contraction would not have occurred in the train, and it would be explained as follows **FIG.7**.

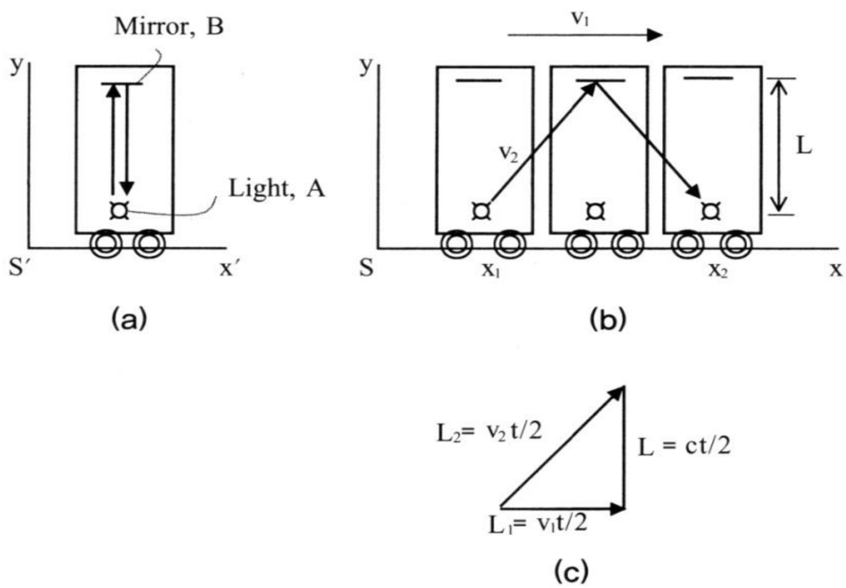

FIG. 7. **The path of light in a train by the observer. (a): In a train of the stationary S' system, the light source starts from A, goes to the mirror B, and then makes a reciprocating motion to reach the point A again. (b): The light source starts from A in a train of S system moving at speed v_1. This is the path of light as seen by the observer when it goes to mirror B and then back to point A. As the train moves, the speed of light changes to v_2 from the observer's point of view. (c): Since the distance L is constant, it is equal to L(ct/2) when stationary or moving. According to the distance L_1(v_1t/2) that the train moves, the distance that the actual light source moves also changes to L_2(v_2t/2).**

FIG. 7 (c) shows the motion path of the light source when the observer sees it from the outside. Since the distance L between the light source A and the mirror B in the train is constant, L=ct/2 is the same whether it is stationary or moving. The distance that the train moves at the speed of v_1 during time t/2 is $L_1 = v_1 t/2$, and the actual distance traveled by the light source is also $L_2 = v_2 t/2$. If we represent the formula for the actual light source velocity v_2.

$$\left(\frac{v_2 t}{2}\right)^2 = \left(\frac{ct}{2}\right)^2 + \left(\frac{v_1 t}{2}\right)^2 \qquad (28)$$

$$v_2 = \sqrt{c^2 + v_1^{\,2}} \qquad (29)$$

The observer P would have viewed the actual moving speed v_2 of the light source as $\sqrt{c^2 + v_1^{\,2}}$ through Equations (28), (29). This is faster than the speed of light.

The special theory of relativity starts with the assumption that the speed of light is always constant regardless of the motion of the observer or the motion of the light source, and that no matter can be faster than light, but it is a scientifically inconsistent process. The absoluteness of the speed of light in the special theory of relativity is not suitable when the existence of the ether(dark matter), the medium of light, is revealed.

Let's look at the example in FIG. 8 below.

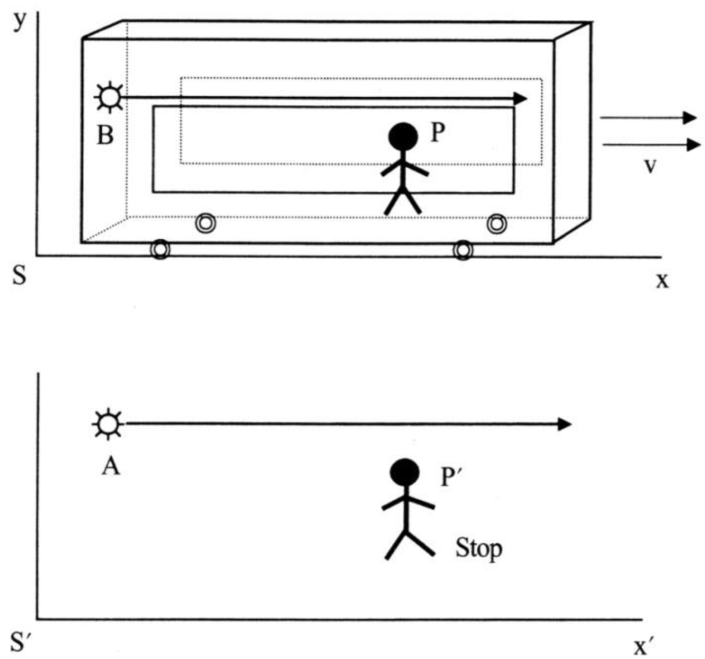

FIG. 8. **The speed of light observed by a stationary observer P' and an observer P in the train. The light source B of S system in train and light source A of S' system that are stationary are propagating in the same direction at the speed of light c. Both light sources started at the same time. Observer P of S system is observing light source A, and light source B can also be seen through the glass window. A stationary observer P' of the S' system is also observing the light from sources A and B.**

There is an observer P and a light source B in the moving train of the S system, and there is an observer P' and a light source A in the stationary S' system. The observer P of the S system and the observer P' of the S' system will measure the velocities of light sources B and A as the speed of light c, respectively. If the moving speed v of the S-series train is 0.1c, the observer P' will not see the speed of the light source B only at the speed of light c. Depending on the speed of the train, observer P' would have measured the speed of light source B as 1.1c. This is because observer P always measures the speed of light as c in the train. If the ether(dark matter), the medium of light, exists, Einstein's assumption that the speed of light is always constant regardless of the motion of the observer or the motion of the light source is incorrect.

There is an atmosphere above the surface of the Earth where we live, and humans live by breathing air in the lower atmosphere. Above the earth's surface, where there is no atmosphere necessary for life on Earth to survive, is said to be outside the atmosphere. Stars that exist in outer space, which are mostly empty in a vacuum state, transmit their own energy and characteristics to the outside through wave energy and elementary particles such as light and electromagnetic waves. In what ways do those energy forms travel and reach us? When we talk to each other, we use the energy of sound waves to convey our intentions. We have lived more than tens of thousands of years without knowing the concept of the speed of sound. Currently, humans have supersonic airplanes that can exceed the speed of sound, and they also have early-stage spacecraft capable of traveling in close space. There was no such thing as light in the universe and Earth, and if we were not aware of it, we would not have thought of the speed of light c, which Einstein regarded as absolute. From the point of view of light and electromagnetic waves existing in the universe, the ether(dark matter) is simply a means to transmit their characteristic energy. The medium of sound waves is air, and just as water is the medium of waves, the ether(dark matter) is the medium of light. In other words, the light and the ether(dark matter) are only a part of the universe.

In 2011, the European Institute of Particle Physics (CERN) announced the discovery of a neutrino faster than the speed of light. It is said that it was an observation method in which two protons collide to generate a neutrino and detect it in a particle accelerator in Geneva. However, in 2012, the international joint research team re-measured and concluded that it was a measurement error [11,12]. We hope to hear the good news that sooner or later we have discovered a particle faster than light.

Conclusions

We have shown that the ether(dark matter), which mediates the propagation of light, has an infinitely small mass. If the ether(dark matter) is a medium of light affected by gravity, the absoluteness of the speed of light is deconstructed and the following two conclusions can be assumed.

- There can be particles(objects) or waves faster than the speed of light in the universe
- We who exist in an expanding universe of continuous time, cannot time travel to the past or the future

REFERENCES

1. Dark Matter, https://terms.naver.com/entry.naver?docId=3475019&%20&cid=58439&categoryId=58439. 2022.
2. Sciama DW. The physical foundations of general relativity. 1969:chap.7.
3. Paul A. Tipler. Modern Physics. Fifth Edition. 2008:4.
4. J. Bernstein. Secrets of the old one : Einstein, 1905. 2006.
5. Paul A. Tipler. Modern Physics. Fifth Edition. 2008:5-8.
6. Robert Martin Eisberg, Quantum Physics of Atoms, Molecules, Solids, Nuclei, and Particles. 1985:chap.3.
7. Keith R. Symon, Mechanics, 1971.
8. Robert R, Walker J, Halliday D. Fundamentals of Physics. 1993.
9. Paul A. Tipler. Modern Physics. Fifth Edition. 2008:10-12.
10. Ulrich E. Schröder. Special Relativity. 1990.
11. Neutrino, https://www.donga.com/news/article/all/20120224/44288108/1. 2012.
12. Neutrino, https://surpriser.tistory.com/804. 2022.