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A Re-understanding of the Zero Result of the Michelson-Morley Experiment

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Abstract

As well-known that in order to explain the zero result of the Michelson-Morley experiments (M-M experiments), Lorentz proposed the Lorentz formula of coordinate transformation and led to the birth of Einstein's special relativity. The authors carefully re-examine the M-M experiment and find a serious problem. The premise of the M-M experimental calculations was that the light source was fixed on the absolutely stationary reference frame of the universe (or the ether stationary reference frame). However, in the actual experiments, the light source was fixed on the earth motion reference frame, moving and rotating with the interferometers, which lead to the invalid calculation result of the M-M experiment. In this paper, the correct calculation method is used to prove that the zero result of the M-M experiment can be well explained by using the Galilean relativity principle and the Galilean velocity addition rule. Therefore, the most important experimental foundation of special relativity does not exist. The Lorentz coordinate transformation formulas become unnecessary, and the principles of special relativity and the invariant speed of light are unnecessary too. The experimental tests of special relativity are also discussed briefly. It points out that these experiments are either wrong or have other explanations, and the explanations of special relativity are not unique ones. Physics should give up the Lorentz transformation formula and the Einstein's special relativity completely, introduce the cosmic absolute stationary reference frame, and establish the kinetic theory based on the mass-velocity formula which should be considered as an empirical formula, to solve the fundamental problems in astrophysics and cosmology thoroughly.

Keywords: Michelson-Morley experiment, special relativity, Lorentz coordinate transformation, Galilean velocity addition rule, Ether absolutely stationary reference frame

1. Introduction

The purpose of the Michelson-Morley experiment (M-M experiment) was to measure the absolute motion of the earth in the absolute stationary reference frame of the universe (the cosmic reference frame), or the so-called ether reference frame. However, the result of experiments was that no shift of interference fringes was observed, indicating that the absolute motion of the earth could not be measured.

This was the first of two famous dark clouds in the history of physics, the second was the ultraviolet catastrophe of light’s blackbody radiation. To solve these two problems, physicists proposed special relativity and quantum mechanics, leading to the birth of modern physics.

In order to explain the zero result of the M-M experiment, Lorentz proposed the Lorentz formula of coordinate transformations in 1895. According to the Lorentz's understanding, the arm length of Michelson interferometer contracted in the direction of the earth's motion, so that the interference pattern would not change.

In 1905, Einstein put forward the principle of special relativity and the principle of invariant speed of light, deduced the Lorentz transform formula and made the relativity explanation to this formula, and thus established special relativity. According to special relativity, the inertial motion of reference was relative, absolute motion did not exist, time and space were relative, the speed of light in a vacuum was unchanged, which leads to a fundamental change in the concepts of time and space of human beings.

In this paper, it is pointed out that there are two serious problems in the calculation of the M-M experiment, which lead to the wrong understanding of the M-M experimental results. According to the correct calculation,

the zero result of the M-M experiment is natural, so that the M-M experiment becomes an invalid one to measure the motion of the earth.

The first problem involved the fixed position of the light source. In the M-M experiments, Michelson assumed that the light source was fixed in the ether reference frame or the absolutely stationary reference frame of the universe. But this was not true. In the actual experiments, the light sources were always fixed on the earth motion reference frame moving and rotating with the interferometers. Therefore, the calculation of the M-M experiment was invalid.

The second problem was the confusion of the reference frames. The observation data of the cosmic reference frame was used to calculate the experiment in the earth reference frame. In fact, according to the Galileo's principle of relativity, if the earth laboratory was regarded as a closed chamber, the experimenters in the closed chamber could not judge whether the chamber was moving or stationary. Therefore, the M-M experiments could not detect the absolute velocity of the earth in principle. The zero result was not surprising.

Based on the Galileo relativity principle and the Galileo velocity addition rule, according to the correct method of calculation, it is proved in this paper that no shift of interference fringes can be produced in the M-M experiment whether observed in the earth reference frame or in the cosmic reference frame.

The resulting consequences are discussed in this paper. Since the zero result of the M-M experiment can be explained by the Galilean relativity principle and the Galilean velocity addition formula, the Lorentz coordinate transformation becomes unnecessary. The principle of relativity and the invariance principle of light's speed are also unnecessary.

In the last part of this paper, the author also briefly discusses the problem of experimental tests of special relativity. It is pointed out that these experiments are either wrong or have other explanations. The explanations of special relativity are unique ones.

In the following paper, the author will further prove that it is impossible to derive the mass-velocity formula and mass-energy relationship from the Lorentz velocity transformation. All derivations of mass-velocity formula in special relativity are wrong, so the mass-energy relation cannot be derived from the Lorentz transformation too. In fact, mass-velocity formula has been put forward before Einstein published special relativity. It should be regarded as an empirical formula, having nothing to do with special relativity and cannot be deduced in theory.

Therefore, physics should give up Einstein's special relativity completely, introduce the absolutely stationary reference frame of the universe, and establish the absolute kinetic theory based on the mass-velocity formula, to complete a new physical revolution and to solve so many fundamental problems existing in modern astrophysics and cosmology thoroughly.

2. The Existing Problems in the Calculations of M-M Experiments

2.1 The Design and the Calculation of the M-M Experiment

On closer inspection, the calculation of the M-M experiment assumed that the light source S is fixed on the cosmic reference frame (or the ether reference frame). The speed of light observed in the cosmic reference frame is c. The earth reference frame is moving toward the right side with velocity V along the $x-$ axis. The speed of light observed on the earth reference frame is c'. According to common textbooks of special relativity (Guo Shuohong, 1979; Cao Canqi, 1979), the relation among them is written as

$$c^2 = c'^2 + 2c'V\cos\theta + V^2 \tag{1}$$

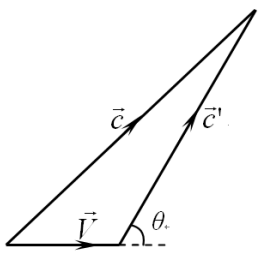

Figure 1. The light's velocities on the cosmic and the earth reference frames

As shown in Figure 1, θ is the angle between the light's velocity c' observed on the earth reference frame and the relative moving velocity V of the earth reference frame. (Please note that according to Figure 1, the outer angle θ in the formula (1) should be changed to the inner angle $\pi-\theta$, though the final calculation result is not affected.) It can be obtained from Eq.(1) with

$$c' = \sqrt{c^2 - V^2 \sin^2\theta} - V\cos\theta \tag{2}$$

The interferometer is fixed on the earth reference frame and two arms of interferometer have the same length L. The light path diagram is shown in Figure 2. At the initial moment, the light is emitted from the midpoint O of the spectroscope. Then the light reaches the mirror M_1 at time t. At this time the mirror M_1 reaches the point M_1' and the midpoint of the spectroscope reaches the point O'. The light is then reflected by the mirror M_1 and returns to the midpoint of the spectroscope at time $2t$. At this time the midpoint of the spectroscope reaches the point O'', the mirror reaches the point M_1'', as shown in Figure 3.

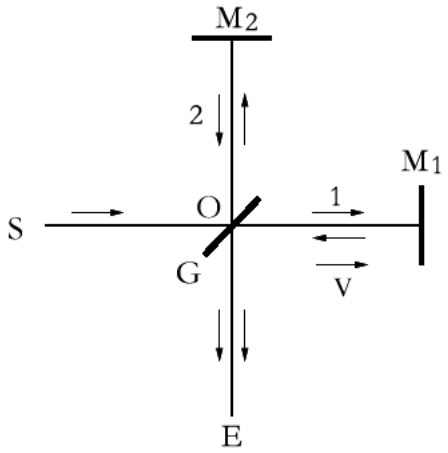

Figure 2. Schematic diagram of M-M experiment

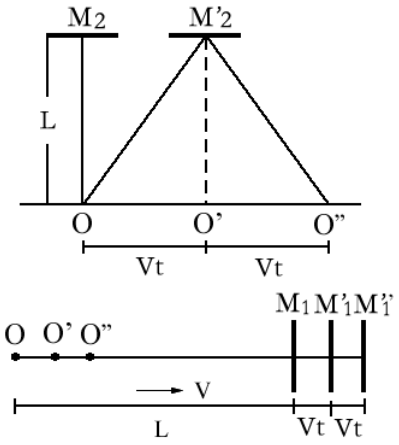

Figure 3. Calculation diagram of M-M experiment

Assume that the propagating direction of light 1 is along the $x-$axis. When the light 1 arrives at M_1' from O, there is a relation $ct_1 = L + Vt_1$, we get

$$t_1 = \frac{L}{c-V} \tag{3}$$

When the light 1 returns to O from M_1', there is a relation $ct_2 = L - Vt_2$, we get

$$t_2 = \frac{L}{c+V} \tag{4}$$

According to the Galilean addition rule of velocities, it means that the velocity of light from O to M_1 is $c-V$, and the velocity from M_1 to O is $c+V$, or taking $\theta = 0, \pi$ in Eq.(2). So the total time for light 1 to take in the process is

$$\Delta t_1 = t_1 + t_2 = \frac{L}{c+V} + \frac{L}{c-V} = \frac{2L}{c(1-V^2/c^2)} \tag{5}$$

There are two methods to calculate the propagation of light 2 along the $y-$axis at present. According to the first method, since the interferometer moves toward the right side, light 2 moves along the oblique direction shown in Figure 3, and the speed of light is still equal to c, so we have relation (Textbook Compilation Group,1979)

$$ct_2 = \sqrt{L^2 + V^2 t_2^2} \tag{6}$$

Form Eq.(6) we get

$$t_2 = \frac{L}{c\sqrt{1-V^2/c^2}} \tag{7}$$

So the time that light 2 takes from $O \sim M_2' \sim O''$ is

$$\Delta t_2 = 2t_2 = \frac{2L}{c}\frac{1}{\sqrt{1-V^2/c^2}} \tag{8}$$

According to the second method, when light 2 propagates along the vertical arm, taking $\theta = \pi/2$ in Eq.(2) , we get

$$c' = \sqrt{c^2 - V^2} = c\sqrt{1-V^2/c^2} \tag{9}$$

Because the practical distance light 2 propagates is just the arm length L , so the total time for the round-trip of light 2 is

$$\Delta t_2 = \frac{2L}{c'} = \frac{2L}{c\sqrt{1-V^2/c^2}} \tag{10}$$

The result is completely the same with the first method shown in Eq.(8). Because of $V/c = \beta << 1$, according to Eqs.(5) and (10), the time difference for the lights 1 and 2 propagating from O to O'' is

$$\Delta t = \Delta t_2 - \Delta t_1 = \frac{2L}{c}\left[\frac{1}{1-V^2/c^2} - \frac{1}{\sqrt{1-V^2/c^2}}\right] = \frac{L\beta^2}{c} \tag{11}$$

In the experiment, the interferometer is rotated 90^0, the time difference generated by the light propagating along the two arms is $\Delta t' = -\Delta t$. Thus, the total time difference is $2\Delta t$ in the whole process. Let the wavelength of light be λ and the period be T . In principle, the shift number of interference fringes which can be observed is

$$n = \frac{2\Delta t}{T} = \frac{2L\beta^2}{cT} = \frac{2L\beta^2}{\lambda} \tag{12}$$

Assume that Earth's speed moving around the sun is $V = 30Km/s$, taking $\lambda = 5.9\times10^{-7}s$, $L = 11m$, substituting them in Eq.(12), the result is $n = 0.44$. This is a quantity that can be observed by the naked eye. If the earth has a velocity in the ether reference frame, the change of interference fringe should be observed.

To prevent misjudgments caused by vibration, the Michelson interferometer was fixed on a marble slab, which was placed on a mercury surface. However, over the years, Michelson and Morley found that no matter what time of year it was, no matter where the earth was in its orbit around the sun, the shift of stripes could not be observed.

2.2 The Problems Existing in the Calculation of the M-M Experiment

I) Using wrong addition formula of light's velocity

The most fatal problem is that the calculation of the M-M experiment assumes that the light source is fixed on the cosmic reference frame, and the speed of light meets Eq.(2), which is completely inconsistent with the actual situation. In practical experiments, the light source, together with the interferometer, are stationary on the earth's reference frame. It is impossible for physicists to fix a light source on the cosmic reference frame. This is unthinkable.

Therefore, the velocity addition rule of Eq.(2) does not hold, and Eq.(12) is also invalid. The M-M experiment has to be recalculated.

II) The problem of the confusion of reference frames

The calculation of M-M experiment suffers from the confusion of the reference frame. It never made it clear based on what reference frame the calculation was carried out. Because the experimenter moves with the earth reference frame, according to the point view of relative motion, the experimenter on the earth would think that themself do not move. On the contrary, the cosmic reference frame moves along the direction of $-V$.

So, the relationships $ct_1 = L \pm Vt_1$ does not exist for the experimenters on the earth reference frame. The formulas (3) and (4) are based on the judgement of observers on the cosmic reference frame, rather than the practical experimenters on the earth reference frame. This problem is left for further discussion in Chapter 3.

According to Eq.(8), light 2 travels along the oblique line, the propagating distance is $\sqrt{L+V^2t_2^2}$ and the speed of light is c, which are obviously the viewpoint of an observer in the cosmic reference frame.

However, according to Eq.(10), the light travels along the longitudinal arm, rather than the oblique line, the propagating distance is L, and the speed of light is c'. All of them are obviously the viewpoint of an observer on the earth reference frame. These two calculation methods have the problem of reference frame confusion, although the calculation results are the same.

3. Using the Galilean Relativity Principle and the Galilean Velocity Addition Rule to Calculate the M-M Experiment

3.1 The Galilean Relativity Principle

The motion relativity principle of Galileo declared that no mechanical experiment carried out in an inertial frame can find out whether the inertial frame was at rest or moved in a straight line with uniform velocity. As early as 1632, Galileo observed the phenomenon in the closed chamber of a ship moving at a constant speed and came to the following conclusion.

As long as the ship moves at a uniform speed, you observed no change in any phenomena. Nor could you tell by any sign whether the ship was moving or stationary, you do not jump to the stern any further than you jump to the bow. A drop of water hanging from the ceiling will fall vertically on the floor. Not a single drop of water fell to the stern, though the ship was moving forward while a drop of water was still in the air. The fly will continue its flight, in all respects the same, without the slightest accumulation of flies on the stern side.

If the ship does not move at a constant speed, but changes speed and direction at a very slow rate with very small accelerations, the relativistic phenomena of motion observed by Galileo still exist, at least to be considered beyond the range of actual measurements.

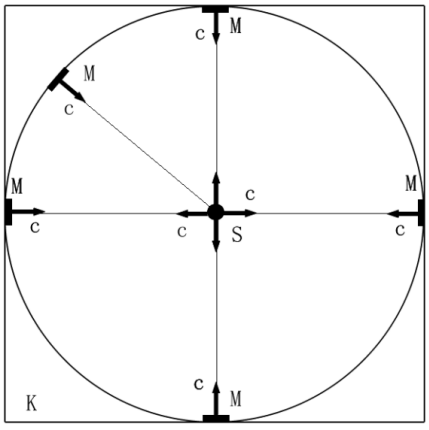

Figure 4. The motion of light observed in a closed chamber moving at constant speed

According to the Galilean principle of relativity, if the motions of people and water droplets in a closed chamber are replaced by the motion of light, it leads to the following conclusion. As shown in Figure 4, assuming that the ground reference frame is stationary, the closed chamber moves at a constant velocity along the right side relative to the ground reference frame. There is a fixed light source in the center of the closed chamber, which emits lights in all directions.

According to the Galilean principle of relativity, light travels at the same speed c in all directions to an observer

in the closed chamber. Therefore, the light from the source hits a spherical surface in the chamber at the same time. If mirrors are placed all over the surface of the sphere, the speed of the reflected light is still c, and the reflected light is still concentrated at the center point. Despite the motion velocity of the closed chamber relative to the ground, an observer inside the closed chamber cannot find any change of light's speed in any direction.

If the closed chamber rotates slowly in any direction at any angle with minimal angular velocity. After the rotation stops, the light's speed remains the same in any direction observed in the chamber. Of course, in the rotating process, the speed of light may change due to acceleration. The change may be so small as to be beyond measure. This change is not caused by the speed of closed chamber, but by the acceleration, and its presence does not mean that the velocity of closed chamber can be observed.

3.2 Using the Galilean Relativity Principle and the Galilean Velocity Addition Rule to Explain M-M Experiment

I) Observations on the earth reference frame

Based on the result shown in Figure 4, we immediately see why it is impossible to observe the absolute motion of the earth in the M-M experiments on the earth reference frame. The zero result of the M-M experiments is not surprising at all.

The Michelson interferometer is at rest in the earth laboratory, the light's source is also fixed in the laboratory on the earth which is equivalent to make the M-M experiment in a closed chamber. According to the Galilean relativity principle, if an experimenter observes in this chamber, light travels at the same speed in any direction. When the closed chamber turns 90^0 at a slow angular velocity, the light still travels at the same speed in all directions, and it is impossible to observe the shift of interference fringe.

II) Observations and calculations on the cosmic reference frame

Therefore, what we need to discuss are the observation and the calculation from the viewpoint of the cosmic reference frame. Although it is impossible for an observer who is at rest in the cosmic reference frame to observe the shifts of interference fringes which occurs in the earth laboratory, because the shift of interference fringes is an absolute event, the observation results in any reference frame should be the same according to logic judgment.

When observed in the cosmic reference frame, suppose that at the initial time with $t_0 = 0$, the light 1 starts from the point O on the spectrometer, moves along the transverse arm of interferometer, and reaches the mirror at time t_1. During this time $\Delta t_1 = t_1 - t_0 = t_1$, the interferometer has moved a distance Vt_1 toward the right side along the $x-$ axis. The distance the light has traveled during this time is

$$L_1 = Vt_1 + L \tag{13}$$

Because the light source is fixed on the earth reference frame which moves in a speed V, light's speed is c' observed on the earth. Relative to the cosmic reference frame, light's speed is c. According to the Galilean velocity addition rule, we have $c = c' + V$ and get

$$L_1 = Vt_1 + L = ct_1 = (c' + V)t_1 \tag{14}$$

From Eq.(14), we get

$$t_1 = \frac{L}{c'} \tag{15}$$

When the light 1 hits the reflector M_1, it is reflected and then returns to the point O of spectroscope after time $\Delta t_2 = t_2$. During this time, the interferometer moves another distance Vt_2 along the $x-$ axis toward the right side. The distance the light 1 travels during this time is

$$L_2 = -Vt_2 + L \tag{16}$$

According to the Galilean velocity addition rule, relative to the cosmic reference frame, light's velocity becomes $c = c' - V$ in this case, so we have

$$L_2 = -Vt_2 + L = ct_2 = (c' - V)t_2 \tag{17}$$

We get the same result from Eq.(17)

$$t_2 = \frac{L}{c'} \tag{18}$$

So the total time for the light to go back and forth is

$$\Delta\tau_1 = t_1 + t_2 = \frac{2L}{c'} \tag{19}$$

The result is different from Eq.(5). The reason is that the calculation of Eq.(3) is based on that the light source is fixed on the cosmic reference frame, which is inconsistent with actual experiment processes.

For the case of light 2 propagating along the longitudinal arm of interferometer, assuming that at the initial moment $t_0' = 0$, the light starts from the point O of spectrometer and reaches the position M_2' of mirror at time t_1'. To the observer in the cosmic reference frame, the light travels along the oblique line $O \to M_2'$ with the distance L_l as shown in Figure 2. There is a relation

$$L_l^2 = V^2 t_1'^2 + L^2 \tag{20}$$

There is a velocity relation for the light 2 moving along the oblique line observed by the observer in the cosmic reference frame

$$c^2 = c'^2 + V^2 \tag{21}$$

From Eqs.(20) and (21), we have

$$t_1'^2 = \frac{L_l^2}{c^2} = \frac{V^2 t_1'^2 + L^2}{c'^2 + V^2} \tag{22}$$

It can get from Eq.(22)

$$t_1' = \frac{L}{c'} \tag{23}$$

Then the light 2 is reflected by the mirror in the position M_2', and takes the same time $t_2' = t_1' = L/c'$, it returns to the position O'' of the spectroscope. To an observer in the cosmic reference frame, when the light 2 travels along an oblique line $O \to M' \to O''$, the total time is

$$\Delta\tau_2 = t_1' + t_2' = \frac{2L}{c'} \tag{24}$$

Therefore, when the two lights moving along the transverse and the longitudinal arms return to the initial starting point of spectrometer, the time difference is zero with

$$\Delta\tau_1 - \Delta\tau_2 = \frac{2L}{c'} - \frac{2L}{c'} = 0 \tag{25}$$

It indicates that there is no interference fringe (If two arms of interferometer have exactly the same length). After interferometer is rotated 90^0, there will be no shift of interference fringes. Therefore, it is impossible to observe the shifts of interference fringes in the M-M experiments no matter in the earth moving reference frame or the absolutely stationary reference frame of the universe.

4. The Resulting Consequences

4.1 The Lorentzian Coordinate Transformation Becomes Unnecessary

The Lorentz coordinate transform formula was proposed by Lorentz in order to explain the zero result of the M-M experiment. In fact, if Michelson had fixed the light source on the earth moving reference frame in his original calculation, there would have no such problem that the zero result of the experiment could not be explained, and there would have no the Lorentz transformation formula and the Einstein's special theory of relativity!

Lorentz believed that the length of interferometer's arms would contract along the direction of the earth's motion, which made it impossible to observe the change of interference fringes. Based on the Lorentz transformation formula, Einstein proposed the concepts of length contraction and time delay caused by motion velocity.

Because the velocity of motion was considered to have only relative significance, length contraction and time delay were also considered relative. Einstein's theory led to the great change of human's understanding on time and space and caused countless logical paradoxes. Einstein's special relativity has long been criticized and considered impossible by many famous physicists, including Michelson and Lorentz.

Since the zero result of the M-M experiment can be explained by the Galilean velocity transformation, the Lorentz coordinate transformation formula becomes unnecessary. It means that the most important experimental basis for special relativity does not exist. Einstein's special relativity is just a historical misunderstanding, the so-called special relativity principle and the invariant principle of light's speed are also no longer exist.

In 2015 Mei Xiaochun published a book (Mei Xiaochun, 2015), in which it is proved that the classical electromagnetic field equation had no the invariability of the Lorentz transformation actually. In order to prove that Maxwell's equation set of electromagnetic fields was unchanged under the Lorentz transformation, Einstein introduced a so-called relativistic transformation of electromagnetic fields themself in his paper in 1905. However, this relativistic transformation of the electromagnetic fields was completely different from the Lorentz transformations of electromagnetic field itself. The contradiction was caused so that the Einstein's proof was wrong.

Mei Xiaochun also provided that the invariability of the Lorentz transform does not exist in the motion equations of quantum mechanics and quantum field theory, as well as the calculation formula of transition probabilities, and the renormalization processes of higher-order perturbations of quantum field theory (Mei Xiaohcun, 2014). Since relativity does not exist in micro-physical processes, Einstein's principle of relativity was meaningless.

4.2 The Brief Discussions of Experimental Problems of Special Relativity

In fact, not long after Einstein proposed special relativity, French physicist Sagnac proposed the famous Sagnac experiment in 1913, which proved that the invariability principle of light's speed did not hold. Up to now, this experiment cannot be explained by Einstein's special relativity, so that it was not mentioned in common special relativity textbooks (Huan Deming, 2011). Some physicists thought that Sagnac effect could be explained by general relativity. However, this explanation still used the Galilean coordinate transformation and contained many flaws so that it was completely impossible to hold (Fei Baojun, 2007). We'll discuss this problem in detail in a subsequent paper.

To the problem of length contraction of special relativity, physical experiments had never found the existence of length contraction of moving objects. As for the time delay problem of motion reference frame, physicists believed that the lifetime of μ meson moving at high speed was longer than that of μ meson at rest, which proved the existence of special relativity effects (Zhang Yuanzhong, 1994).

However, this was actually a misunderstanding. In fact, physics had never measured the lifetime of μ muon at rest in vacuum, as special relativity demanded. What was actually measured was that a high velocity μ muon was injected into a dense solid matter, and μ muon collided violently with the nuclei of other matter, causing μ meson to decay prematurely. It is like bombarding a uranium nucleus with neutrons, to cause it split. There was actually no true that a μ meson moving at a higher speed has longer life than a μ meson at rest in vacuum. We will also discuss this problem in detail in a subsequent paper.

4.3 The Mass-velocity Formula and the Mass-energy Relation

The kinetic part of special relativity involves the action of forces, and since the action of forces is absolute, there is no contradiction in this part. The main content of dynamics part in special relativity is the mass-velocity formula and the mass-energy relation, both of which have been tested experimentally.

However, in 1881~1900, before Einstein proposed special relativity, Thomson, Wien, Fitzgerald, Heviside, Abraham, Kaufman and others had discovered and proposed the mass-velocity formula, and Lebedeve and others also proposed the mass-energy relation (Zhang Yongli, 1980). They were independent of special relativity and the Lorentz transform actually.

In subsequent papers, the authors will further demonstrate that it is impossible to derive the mass-velocity formula and the mass-energy relationship for a particle with static mass from the Lorentz velocity transformation formula. All the derivations of mass-velocity formula from the Lorentz velocity transformation formula in

special relativity are wrong. The mass-velocity formula should be regarded as an empirical formula, which cannot be derived from theory and has nothing to do with special relativity.

4.4 The Existence of Absolutely Stationary Reference Frame

Whether according to the Galilean or Einstein's principle of relativity, the speed of motion is considered relative, so the absolutely stationary reference frames are considered to be nonexistent. However, the observations of modern cosmology indicates that the absolutely stationary reference frame exists, and the principle of special relativity is contradictory with contemporary cosmological observation.

The cosmic microwave background radiation (CMB) was discovered in the 1960s (A. A. Penzias, R. W. Wilson, 1965). After that the deviation from the black-body radiation spectrum was found in 1978 (G. F. Smoot, 1992). Because the CMB is measured in the earth's reference frame, based on deviations from the black-body spectrum, physicists have calculated that the reference frames of the sun and the earth are moving in the direction of right longitude $1^h.5 \pm 0^h.4$ and declination $0.^0 2 \pm 7^0$ in the celestial reference frame at a velocity about $390 Km/s$ (Tang Shusheng, 2007). This velocity can be regarded as the absolute motion velocity of the solar and the earth reference frames relative to the absolutely stationary reference frame of the universe.

Therefore, the existence of absolutely stationary reference frame is consistent with the requirements of modern cosmology and the results of astronomical observations. Because special relativity is unnecessary and impossible, physics should simply abandon the idea that the universe has no center since the Copernican time and return to the idea that the center of the universe exists.

4.5 The Re-construction of the Newtonian Equations of Motion in the Absolutely Stationary Reference Frame

Therefore, abandoning the formula of Lorentzian coordinate transformation and Einstein's special relativity does not mean to abandon the mass-velocity formula and the mass-energy formula. In fact, based on the cosmic absolutely stationary reference frame of the universe and the mass-velocity formula, the Newton's second law of motion can be written as (Mei Xiaochun, 2014)

$$\vec{F} = \frac{d}{dt}\frac{m_0 \vec{u}}{\sqrt{1-u^2/c^2}} \tag{26}$$

Where m_0 is the static mass of an object, $\vec{u}$ is the absolute velocity of an object relative to the absolutely stationary reference frame of the universe. By considering relation $d\vec{x}/dt = \vec{u}$, multiplying both sides of Eq.(26) with $d\vec{x}$ and taking the integral, the mass-energy formula can be obtained, which means that the mass-energy relation is not independent.

Using the Galilean velocity addition formula to transform the velocities of light and object to another reference frame with velocity $\vec{V}$ relative to the cosmic reference frame, the motion equations in other reference frames can be obtained. For the earth reference frame, due to $V^2/c^2 \sim 10^{-6} << 1$, Eq.(26) can approximately represent the Newton's second law of motion.

5. Conclusion

The Michelson-Morley experiment, one of the most important experiments in modern physics, tried to find the motion velocity of the earth in the etheric absolutely stationary reference frame, but failed at last. Since the zero result of the M-M experiment could not be explained by the Newton's classical physics, Lorentz put forward the Lorentz transformation formula which significantly influenced whole modern physics up to now. Later, Einstein put forward the principles of the invariant speed of light and the relativity principle, derived the Lorentz transformation formula, leaded to the birth of special relativity, fundamentally changed the concepts of time and space of human.

This paper points out that the Michelson's calculation on the M-M experiment was wrong, resulting in the invalidity of the experiment. Michelson fixed the light source to the etheric stationary reference frame, but in the actual experiments, the light source was fixed to the interferometer and moved with the earth. By the correct calculation method, the Galilean velocity addition formula is taken into account, the zero result of the M-M experiment can be explained well. In this way, the Lorentz transformation formula becomes unnecessary. In fact, if the calculation of Michelson was correct, Lorentz would not propose the Lorentz transformation formula, and there was no Einstein's special relativity.

The experimental tests of special relativity are briefly discussed in this paper. It is revealed that these experiments are either wrong or have other explanations, special relativity is not the only explanation. This paper

also discusses the mass-velocity formula and the mass-energy relation. It is pointed out that these two relations have been proposed before Einstein published his special relativity. The mass-velocity formula can actually be considered as an empirical formula, and from the mass-velocity formula the mass-energy relation can be derived. They are actually independent of special relativity. These problems will be discussed in detail in the following papers.

There are a lot of logical paradoxes in Einstein's special relativity, which have not been properly explained for more than one hundred years. For a basic theory of physics, logical self-consistency is the minimum requirement. There are so many contradictions in special relativity, which is unacceptable to a really reasonable basic science theory. Therefore, physics should completely give up the Lorentz transformation formula and Einstein's special relativity. Based on the observation of modern cosmology, physics should introduce the absolutely stationary reference frame of the universe, establish the absolute kinetic theory by considering the mass-velocity formula, and completely solve the basic problems in astrophysics and cosmology.

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