# A New Approach for Einstein's Theory of Relativity in the View of Absolute Theory

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## Abstract

This paper introduces a new dimension in discussing Einstein's theory of relativity from the viewpoint of absolute theory. The physical concepts of absolute theory are diametrically opposite to those of Einstein's theory of relativity. Einstein's theory introduces the principles of relativity and the constancy of the speed of light. However, these two principles appear to be mutually contradictory. In contrast, absolute theory is consistent with the principle of the constancy of the speed of light.

In absolute theory, the principle of the constancy of the speed of light is introduced to construct three-dimensional coordinates in a moving inertial reference frame that obeys the relation $L = Ct$ ($L$: length, $t$: time, $C$: speed of light). The experimental result of Michelson and Morley are explained in terms of this modified concept and an absolute theory is constructed. In the discussion, the absolute rest frame is employed as the basic reference frame for inertial frames.

**Key Words**: Special relativity, General relativity, Einstein, relative velocity, absolute theory, absolute velocity, absolute time, absolute stationary field

### 1. Introduction

Einstein's theory of relativity, which originated with the special theory of relativity in 1905, is currently (over a century since its conception) universally accepted. Its concepts could now be considered to be general knowledge. When we reflect on the past and consider how those with doubts about the theory have all but disappeared, there seem to be several points that we should learn from this.

Consequently, for the author to propose a theory that is the diametrically opposite to Einstein's theory surely raises a certain level of alarm. However, the more the author studied Einstein's theory, the more he found that together with a deep respect for Einstein's ideas he began to have doubts about whether it was truly appropriate. This is the reason for him daring to state an argument here.

In the special theory of relativity, Einstein introduced two principles: the principle of relativity and the principle of the constancy of the speed of light. These two principles are mutually contradictory: one is based on relativity, whereas the other one contradicts it by introducing an absolute constant. Einstein himself noted this contradiction.

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Einstein's general theory of relativity indicates that all energy and momentum (such as inertial force and gravity) manifests itself as a curvature (or warping) of space; this is expressed by Riemannian geometry. To the author, this seems to indicate that momentums, gravities, and electromagnetic forces are projected onto a single space, and that there, all the forces are discussed in a unified manner. Thus, it seems to imply the existence of an absolute space that functions as a unified field.

This paper considers the theory of relativity from the perspective of an absolute theory. In other words, it considers a concept that Einstein clearly regarded as being superfluous to physics, namely an absolute rest frame as a unified field for force and motion. We demonstrate that all forces and motion can be discussed in a unified manner on the absolute rest frame.

An article was recently posted on the Internet with the title "Physicists' Finding Raises Relatively Huge Question: Was Einstein Wrong?" (September 7, 2010). This shocking article reported that an Australian team (University of New South Wales) had discovered that the fine-structure constant, which had hitherto been considered to be a universal quantity, varied with spatial location and time. It questions whether Einstein's general theory of relativity is wrong.

Meanwhile, after many years of debate regarding Einstein's special theory of relativity, Koshun Suto states that there are

cases that disagree with the predictions of special relativity in *Violation of the Special Theory of Relativity as Proven by Synchronization of Clocks* (*Physics Essays* 23, 3, 2010).

In that paper, Suto stated that for two coordinate systems that are moving relative to each other, the relative velocity is not the only velocity that is important, but that it is also necessary to account for the involvement of an unknown velocity vector, which Einstein denied existed. He insists that to preserve the principle of relativity it is necessary to consider an unknown velocity vector and simultaneously introduce the concept of a deep stationary system (which Suto refers to as an unknown stationary system).

The absolute theory considered in this paper introduces the principle of the constancy of the speed of light. Einstein's special theory of relativity also introduces this principle, but it seems to contradict the principle of relativity. In contrast, the principle of the constancy of the speed of light and the absolute theory appear to be consistent with each other.

In this paper, we first simply state the differences between the conventional theory of relativity and the absolute theory proposed here. We then reconsider the Michelson–Morley experiment. Next, we define an absolute rest frame and the method of setting the space and time in an inertial reference frame based on the principle of the constancy of the speed of light. We then consider the results of the Michelson–Morley experiment. Following that, we discuss the rules for converting from an inertial reference frame to an absolute rest frame. We incorporate acceleration and gravity and consider proper time. Finally, we summarize the conclusions of the discussion.

**2. Einstein's theory of relativity and the flow of time**

Einstein's special theory of relativity stipulates the principle of relativity in the following manner: if two observers on two inertial reference frames moving relative to each other interchange places with one another, then both of them will observe exactly the same phenomena as previously.

Newtonian mechanics is based on the fact that even if observers interchange the reference frames in which they stand, the dynamics will remain completely the same as before.

In the absolute theory presented in this paper, it is not permitted to interchange observers. That is, the direction of observation is fixed. We discuss this point below using a simple example.

We consider two moving inertial reference frames (frames A and B) that have a relative velocity of $v$. According to Einstein's theory of relativity, when we observe one frame of reference (B) from the other (A), the time in frame B will be observed as later than the time in frame A. We take this to be consideration 1. Conversely, when we observe the time in frame A from frame B, frame A's clock will appear later than frame B's clock. This is consideration 2.

This interpretation can be considered to express the meaning of Einstein's principle of relativity. Considerations 1 and 2 initially appear to be correct. However, by interchanging the frames of reference of the observers, these considerations permit time to run backwards.

In Newtonian mechanics, time is defined as flowing universally so that it is the same in any frame of reference. Consequently, even if the observers are exchanged between the two frames of reference, they should observe exactly the same phenomena.

However, Einstein's special theory of relativity ensures that the time in the frame with relative velocity is observed as being late by the observers. Therefore, when observers are exchanged between frames A and B, time will appear to go backwards to the observer who was in frame A prior to moving to B.

While it is possible to assume that two velocities go in the opposite directions, we cannot allow time to go backwards since the flow of time is unidirectional. Thus, the considerations presented here lead to the inference that the principle of relativity does not hold true in Einstein's special theory of relativity.

**3. Differences between the theory of relativity and absolute theory**

Einstein's special theory of relativity completely discards the concept of an absolute rest frame and it emphasizes that all movement between inertial reference frames should be discussed only in terms of the relative velocity between them.

In contrast, the absolute theory proposed in this paper takes the existence of an absolute rest frame as foundational for discussing physical phenomena in a universal manner. It emphasizes the fact that all movement must be discussed in terms of its relationship to absolute velocity and absolute time.

For example, when acceleration and gravity are not considered, and there are two inertial reference frames with a relative velocity of $v$, the movement between them is thought to be determined by $v$ alone. This may be considered to be the physical world view of Einstein's special theory of relativity.

In contrast, the absolute theory proposed in this paper emphasizes that all inertial reference frames have proper time and space determined by their respective absolute velocities and that all physical phenomena related to motion and force (such

as the mass of an object) is determined by the proper time and space within that frame.

According to the absolute theory, all objects in the inertial reference frame have mechanical properties with a unique identity that depends on the absolute velocities they possess. This implies that there is no such thing as a universal physical constant that is common to motion and mechanics in all inertial reference frames. Viewed another way, this means that it is only possible to accurately compare physical phenomena in an absolute rest frame; it is not possible to do so from an inertial reference frame.

For example, according to the absolute theory, the relationship between the time on a rocket launched from Earth and the time on the surface of the planet is not determined by their relative velocities. Rather, it insists that this relationship depends on the absolute velocities they both possess. This eliminates the factors that give rise to the twin paradox.

The absolute theory proposed in this paper and the theory of relativity have completely different physical world views, even if we apply the same relational expressions derived by Einstein.

**4. Reconsidering the Michelson–Morley experiment**

The Michelson–Morley experiment found that there are no significant parameters that alter the speed of light on Earth.

To explain this, the experimental equipment used was initially considered to be deficient, but these concerns have been excluded. Of the many theories proposed, contraction of time and space by Lorentz is the most popular one.

Einstein established the principle of the constancy of the speed of light based on experimental results and predictions based on a thought experiment about Maxwell's theory of electromagnetism. He used it to formulate his special theory of relativity.

Einstein's special theory of relativity explains Lorentz' contraction, which asserts contraction of time and space. Consequently, it can explain the results of the Michelson–Morley experiment.

Einstein concluded that concepts such as absolute rest frame and absolute velocity, which people had previously been seeking, were physically unnecessary and that all the mechanics in an inertial reference frame that does not consider acceleration could be explained by the principle of relativity.

The Lorentz's explanation of the Michelson–Morley experiment stated "if it is like this, it can be explained", but it did not explain "why it is like this". Einstein's explanation was said that "if we introduce the principle of the constancy of the speed of light, then we can explain why it is like that." However, one problem with this approach is that the objective becomes the method.

Hence, the explanations used to explain the Michelson–Morley experiment do not appear to describe "why is it like this?" Therefore, we are forced to infer that the Michelson–Morley experiment has not yet been adequately explained.

**5. Formulation of the absolute theory**

A formulation of the absolute theory is given below. However, to simplify the explanation, we initially assume a special case in which acceleration and gravity do not operate. However, this restriction is later lifted and the explanation is generalized.

**5.1 Definition of absolute rest frame**

We first define an absolute rest frame.

Electromagnetic waves such as light propagate through space. At this point, it is not clear whether space is filled with a substance like the ether that **p**ermits electromagnetic waves to propagate. However, the fact is that light is able to propagate through space.

In the following argument, space is assumed to perform no other action besides allowing electromagnetic waves such as light to propagate. Next, we assume that there are stationary observers located at arbitrary points in this space.

We also assume that the observers perform no other action than observing physical phenomena in space. The observers are able to define coordinates to measure the width of space at any point in the space that they are in. We define time as the time indicated by their watches.

In space of this kind, time can be universally set to the times of the observers. Einstein's method is used to confirm synchronism.

We assume that there are no celestial bodies of any kind in this space; we assume that only the above-mentioned electromagnetic waves such as light propagate at constant velocity. This kind of space differs from the concept of an absolute rest frame required by Newtonian mechanics, but such a space is defined as an *absolute rest frame* in this paper.

We define the velocity measured by stationary observers located at arbitrary locations in this space as the *absolute velocity*. Furthermore, we define the time indicated by the watches of those observers as the *absolute time*.

Naturally, Maxwell's theory of electromagnetism holds in an absolute rest frame.

**5.2 Introducing the principle of the constancy of the speed of light and setting space and time within an inertial reference frame**

In the absolute rest frame defined above, we can assume an inertial reference frame that moves with a certain absolute velocity. At the same time, we assume a stationary observer in that inertial reference frame.

Just as people on the Earth's surface usually do, the observers in moving frames perceive themselves to be in an absolute rest frame. They can define coordinates centered on their position and they can define time using the times indicated by their watches.

However, just as we normally do on Earth, when defining the coordinates to indicate the width of space, the observers can use electromagnetic waves such as light and mark symbols on the coordinate axes based on their own time. When doing so, the velocity of light is implicitly assumed to be constant in all directions.

In this way, a stationary observer in a certain inertial reference frame will perceive themselves as being in an absolute rest frame and based on their time, they can define space by assuming the speed of light to be isotropic and constant. This is defined as *the principle of the constancy of the speed of light*.

Einstein also introduced the principle of the constancy of the speed of light when formulating the special theory of relativity. Even though it gives the same results, he appears to introduce it for different reasons than us.

Based on the principle of the constancy of the speed of light, an observer in an inertial reference frame can independently define space and time in each frame. To such an observer, it is an implicit fact that the frame that they are in is at absolute rest. Hence, such an observer will naturally believe that Maxwell's theory of electromagnetism holds in the space that they define. Conversely, this fact is also a cause for thinking that the velocity of light is fixed.

**5.3 Objective of the Michelson–Morley experiment**

Located on the surface of the Earth (which is assumed to be a single inertial reference frame moving with an absolute velocity), we implicitly think of the space enveloping us and time as being defined based on the principle of the constancy of the speed of light.

At this time, a stationary observer in an absolute rest frame would perceive the Earth as not being at rest; rather they perceive it as moving with an absolute velocity. Accordingly, as long as an observer on Earth considers himself to be at rest, then the velocity of light must be observed at a relative velocity to the absolute velocity of the Earth.

To people on Earth for whom the constancy of the speed of light has been implicit until now, a change in the speed of light would undermine the foundations of space and time and the foundation to Maxwell's theory of electromagnetism. This is because the Galilean transformation cannot correctly transform Maxwell's theory of electromagnetism.

Is it possible for a stationary observer on Earth to observe changes in the speed of light? That is to say, is it possible for us to observe the absolute velocity of the Earth? We use the Michelson–Morley experiment to answer this question.

In the Michelson–Morley experiment, it is assumed that if we measure the length of a rigid rod with its axis aligned in the direction of travel of the Earth and an orthogonally aligned rigid rod with the same length, then a difference in the speed of light will manifest itself as a time difference in the measurement.

**5.4 Space and time of a stationary observer on Earth**

Observers on Earth can define their own space and time based on the principle of the constancy of the speed of light. Consequently, when the isotropic speed of light is taken to be $C$, then the relationship between the length of the rigid rod that characterizes the space they are in $L$ and the time required to measure it $t$ is expressed by the following expression for any direction.

$$t = \frac{L}{C} \tag{1}$$

**5.5 Measurement of the length of a rigid rod with its axis orthogonal to the direction of the absolute velocity of Earth**

We first consider the situation shown in Fig. 1. In other words, we consider an inertial reference frame that moves at an absolute velocity $v$, as shown in the ellipse in Fig. 1. The upper diagram in the ellipse represents the light path observed by an observer who perceives themselves to be at absolute rest in that inertial reference frame. In contrast, the diagram in the lower part of the ellipse shows the light path described by an observer in an absolute stationary system.

Meanwhile, the observer outside the ellipse represents a stationary observer in an absolute rest frame. In contrast, a moving inertial reference frame consists of the observer and the

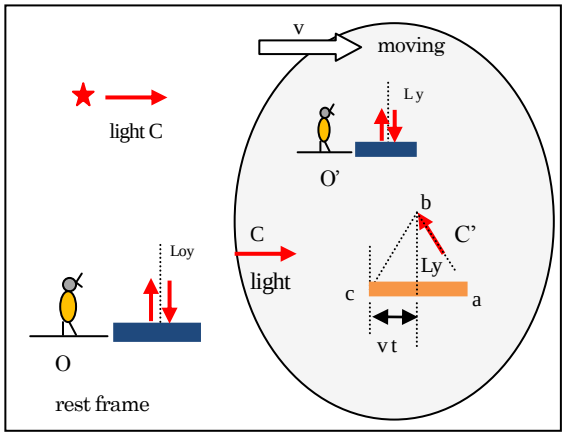

Figure 1: Observation in the direction orthogonal to the direction of the absolute velocity of the Earth

rod in the frame. Therefore, in all space with these removed light propagates at a constant velocity of $C$.

An observer on Earth measures the length of the rod that is vertical in front of them to be $L_y$. Since we observe the length of such a rod using the speed of light $C$, we take the measurement time to be $t_y$. This is the same as calibrating the coordinate axis.

To define these conditions, an observer on Earth shines a light beam vertically upward from the Earth's surface to measure the length of the rod that is vertically upright in front of them. This time is taken to be $t_A$. The time for the light to reach the mirror at the end of the pole and to be reflected back is taken to be $t_B$. The time when the light reaches the Earth again is taken to be $t_{AA}$.

At this time, the time required by the light when measuring the rod is given by:

$$t_1 = t_B - t_A \tag{2}$$

The time required for its return is given by:

$$t_2 = t_{AA} - t_B \tag{3}$$

Einstein assumed that when the light travel times in opposite directions between two different points are equal, then the times displayed by clocks located at those points will also be the same. The following expression is a necessary and sufficient condition for ensuring their synchronism:

$$t_1 = t_2 \tag{4}$$

or,

$$\frac{t_{AA} - t_A}{2} = t_B \tag{5}$$

This measurement ensures synchronism.

At such a time, a stationary observer in an absolute rest frame would inform us that the observer on Earth is not in an absolute rest frame but is moving at an absolute velocity $v$. Furthermore, the observer on Earth did not actually measure the height of the rod in the vertical direction. Using light with a speed $C'$, the observer measured the length $L'_y$ in a diagonal direction (the direction **ab** in Fig. 1).

The observer on Earth is concerned whether, in such a situation, their prior physical world view (that had been formulated based on the implicit establishment of the speed of light as $C$) has been destroyed. We consider this issue below.

According to the explanation of the stationary observer in an absolute rest frame, the relationships between the values on the triangle **abc** (which forms the right-angled triangles in Fig. 1) gives us the following relational expressions:

$$L_y{}^2 + (vt_y)^2 = (L'_y)^2 \tag{6}$$

$$C' = \sqrt{C^2 + v^2} \tag{7}$$

$$L_y = C t_y \tag{8}$$

At this time, the light travel times in both directions for measuring the rod are equal, confirming synchronism.

Accordingly, using the light path length, the speed of light, and the absolute velocity of the earth given by the stationary observer in the absolute stationary system, the observer on Earth recalculates the time required to measure the lengths in the vertical direction $L_y$, as:

$$t'_y = \frac{L'_y}{\sqrt{C^2 + v^2}} = \frac{L_y}{C} \tag{9}$$

Therefore, the following relation is obtained:

$$\frac{L'_y}{t'_y} = \frac{L_y}{t_y} = C \tag{10}$$

The results indicated by Eqs. (9) and (10) show that the speed of light is ultimately the same regardless of whether it is the speed of light in the space that the observer on Earth has defined (having perceived themselves as being in an absolute stationary system) or the speed of light measured with the Earth moving at an absolute velocity.

However, this conclusion is true only for the direction orthogonal to the direction of the absolute velocity of Earth. We refer to this conclusion below as *Conclusion 1*.

### 5.6 Consideration of the velocity of light propagating in the direction of the absolute velocity of Earth

We next discuss the measurement of a rod that is aligned in the direction of travel of the Earth.

When stationary on the surface of the Earth, which we regard as an inertial reference frame moving at a constant velocity $v$, observers who perceive themselves as being in an absolute

stationary system think that light in the space enveloping them is propagating isotropically at a speed $C$.

At this time, the relationship between time and space that is considered to be correct by the stationary observer on the Earth's surface is expressed as:

$$t_x = t_y = \frac{L_x}{C} = \frac{L_y}{C} \tag{11}$$

An observer who looks from an absolute stationary system at an observer on Earth and perceives themselves as being in a state of absolute rest thinks that Earth is moving at a constant velocity. They thus think that if the observer on Earth perceives that they are in a state of absolute rest, then the speed of light will appear as a relative velocity to the absolute velocity of the Earth, so that the speed of light must be $C+v$ or $C-v$.

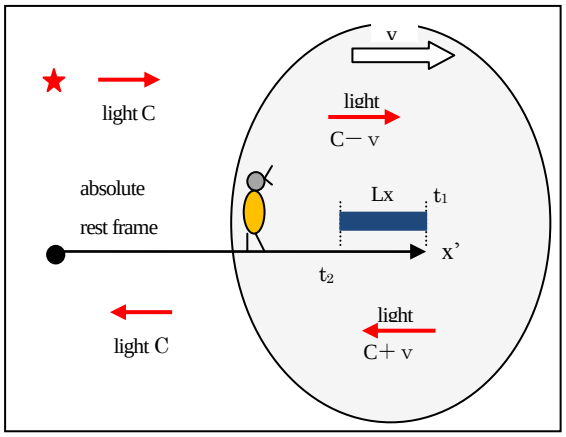


Figure 2: Observation in the direction of absolute velocity of the Earth

When the stationary observer on Earth uses the speed of light described by the stationary observer in an absolute rest frame and remeasures the length of a stationary object in front of them in the same direction as the movement of the Earth, then the time required for light to propagate when measuring from one end of that item (the left) to the other end (the right) is given by (see Figure 2):

$$t_1 = \frac{L_x}{C-v} \tag{12}$$

Conversely, the time required for light reflected from the right end to reach the left is given by:

$$t_2 = \frac{L_x}{C+v} \tag{13}$$

Comparing these two observation times, we can confirm that synchronism at the two points does not hold. Consequently, the same time will not be shown at two separated points on Earth.

At this time, the observer on Earth must adjust the time to follow Einstein and ensure synchronism at the two points.

First, the mean times required for go and return are given by:

$$\bar{t} = \frac{(t_1+t_2)}{2} = \frac{CL_x}{C^2-v^2} \tag{14}$$

Hence, the difference between the time required to go $t_1$ and the mean time $\bar{t}$ is given by:

$$\Delta t = \frac{L_x}{C-v} - \frac{CL_x}{C^2-v^2} = \frac{vL_x}{C^2-v^2} \tag{15}$$

Based on these results, the observed value for the time required for light to travel from the left end to the right end is revised to be:

$$t'_1 = t_1 - \Delta t = t_1 - \frac{vL_x}{C^2-v^2} \tag{16}$$

Hence, we obtain.

$$t'_1 = \frac{L_x}{C-v} - \frac{vL_x}{C^2-v^2} = \frac{CL_x}{C^2-v^2} \tag{17}$$

We can confirm that this time is equal to the mean go and return time, as shown previously. It confirms the synchronism of the two points.

The time that has been revised to show synchronism may have changed somewhat more than the original time due to the revision, and the length may have also changed. In fact, in Eq. (16), time adjustment is only applied to the time when measuring the moment that the light reached the right end of the rod. By doing this, it is assumed that the original time of the observer $t$ and the time after adjustment $t'$ are related by:

$$at' = t \tag{18}$$

where $a$ is a proportionality coefficient.

If we tentatively define the speed of light observed when the observer is moving at an absolute velocity $C'$, then the relationship between the length $l'$ determined using the adjusted time and the length $l$ determined using the correct time prior to adjustment is given by:

$$l = C't \tag{19}$$

$$l' = C't' = C'\frac{t}{a} \tag{20}$$

Therefore,

$$al' = l \tag{21}$$

Based on these relational expressions, expression (17) can be transformed as:

$$\sqrt{1-\frac{v^2}{C^2}}\,t'_1 = \frac{L_x}{\sqrt{1-\frac{v^2}{C^2}}}\frac{1}{C} \tag{22}$$

That is to say,

$$\sqrt{1-\frac{v^2}{C^2}}\,t'_1 = t \tag{23}$$

$$\sqrt{1-\frac{v^2}{C^2}}L'_1 = L \tag{24}$$

From the above, the speed of light when it is assumed that the effect of Earth moving at an absolute velocity alters the speed of light is given by:

$$C' = \frac{L'_1}{t'_1} = \frac{L}{t} = C \tag{25}$$

This result shows that even when the Earth is assumed to have an absolute velocity, the speed of light in the direction that Earth is travelling is ultimately constant. In addition, the time required for the light to measure the length of the rod is shown to be exactly the same as the time measured by the observer who perceives the Earth as being at absolute rest. We refer to this as *conclusion 2*.

From *conclusions 1* and *2*, we conclude that no time difference should occur in the Michelson–Morley experiment.

Based on the argument presented here, in any inertial reference frame in which a stationary observer in that frame perceives that they are at rest, the space and time that they define by taking the speed of light to be constant and expressed in three-dimensional Cartesian coordinates in that the relationship $L = Ct$ is satisfied. In such a space, Maxwell's theory of electromagnetism is shown to be hold, irrespective of the absolute velocities of the frames.

Consequently, it appears that there was a problem in the preconditions of the Michelson–Morley experiment, in the context of accomplishing of its objective. Conversely, we can experimentally demonstrate that the time and space defined in each frame based on the principle of the constancy of the speed of light causes Maxwell's theory of electromagnetism to hold within the frame.

It should be noted that the principle of the constancy of the speed of light is not being used as an explanation.

**5.7 Conversion of physical quantities observed in an inertial reference frame to an absolute rest frame (unified field)**

Based on the principle of the constancy of the speed of light, observers in each inertial reference frame can independently define space and time. Hence, the various phenomena observed in these frames can be observed independently using light.

In this way, the physical phenomena observed using proper time and space in various inertial reference frames are examined with the proper time and space in each of those frames; when attempting to compare by introducing physical phenomena observed in the respective frames, it is essential to discuss the spaces and times in all the frames of reference in a unified manner.

To discuss the mechanics in the states of absolute rest and inertial motion in a unified manner, it is convenient to transform the mechanics in the state of inertial motion to the absolute stationary system, and discuss them as mechanics in that system. Furthermore, electrodynamics can also be discussed in a unified way in an absolute rest frame.

Consequently, converting the system of motion to an absolute stationary system makes it possible to discuss general mechanics and electrodynamics in a unified manner. We refer to the location at which we can discuss mechanics in a unified manner as a *unified field*. Accordingly, we can also refer to absolute rest frame as a unified field for general mechanics and electrodynamics.

When regarding one of the inertial reference frames as a stationary system, the rule for converting time and space with another inertial reference frame with motion relative into it is given by Einstein's special theory of relativity.

We use that result here. If we regard a stationary system defined by Einstein as being an absolute stationary system and use the relative velocity instead of the absolute velocity, then we can obtain the conversion rules, which is our objective. The logic behind Einstein's theory of relativity and that behind the absolute theory developed here are exact opposites, but it is possible to use completely unchanged relational expressions by altering their interpretation accordingly. However, when deriving the equations, it is not necessary to use the principle of the constancy of the speed of light as a method.

Using Einstein's conversion formula, the rule for converting from an inertial reference frame with an absolute velocity $v$ to an absolute rest frame is given by:

$$L_{ox} = \frac{1}{\sqrt{\left(1-\frac{v^2}{C^2}\right)}} L_x \tag{26}$$

$$L_{oy} = L_y \tag{27}$$

$$L_{oz} = L_z \tag{28}$$

$$t_o = \frac{1}{\sqrt{\left(1-\frac{v^2}{C^2}\right)}}\ t \tag{29}$$

Here, the physical parameters on the right-hand side represent the physical parameters in the moving inertial reference frame and the parameters on the left-hand side represent those in the

absolute rest frame. In this case, the absolute velocity $v$ represents the absolute velocity of the moving inertial reference frame.

Accordingly, even in an inertial reference frame which has any kind of absolute velocity, the speed of light observed by a stationary observer within that system is given by the following expression.

$$C = \frac{L_o}{t_o} = \frac{L}{t} \tag{30}$$

Here,

$$L = L_z = L_y = L_z \tag{31}$$

It is not guaranteed that this is given in absolute terms like this for any inertial reference frame. The observers in inertial reference frames are limited to cases when they define the space and time of their system according to the "principle of the constancy of the speed of light."

When spaces are converted in this way, between an inertial reference frame and the absolute rest frame, the volume undergoes a transformation as per the following expression.

$$V_o = x_o y_o z_o = \frac{1}{\sqrt{\left(1 - \frac{v^2}{C^2}\right)}} V \tag{32}$$

Here, $V$ represents the volume in the moving inertial reference frame.

Accordingly, when the density of a material is isotropic in any frame, the conversion of mass is given by the following relational expression.

$$m_o = \frac{1}{\sqrt{\left(1 - \frac{v^2}{C^2}\right)}} m \tag{33}$$

Energy is converted as per the following expression.

$$m_o C^2 = \frac{1}{\sqrt{\left(1 - \frac{v^2}{C^2}\right)}} mC^2 \tag{34}$$

If, in these relational expressions, we set $v = 0$, we obtain the following.

$$E_o = m_o C^2 \tag{35}$$

This shows that in an absolute stationary system, *the existence of mass is in fact the existence of energy*. This can be assumed as meaning that *mass is equivalent to energy*.

When the absolute velocity of Earth is sufficiently small in comparison to the speed of light, then the space and time observed on Earth can be approximated by absolute rest frame, and furthermore, it is possible to regard an observer on Earth as a stationary observer in that approximate location. It is explained later how, in time like this, an observer on the surface of Earth will observe the physical phenomena of other inertial reference frames.

We can hypothesize an absolute rest frame described by an observer sitting still on Earth, which is regarded as an inertial reference frame. At this time, we can define the origin of the absolute rest frame coordinates at an arbitrary point in that absolute rest frame, in order that it is convenient to observe objects on the planet surface. At a position $x'$, measured in a straight line in the direction that the planet is moving, we have the right end of the rod that is placed on Earth (such that it has its axis along the direction of travel). At this time, the axis extending in the direction of the point $x'$ from the origin in the absolute rest frame is defined as being the $x'$-coordinate in the absolute rest frame. The $x$-axis of the coordinates which represent the space on Earth is define to be parallel to the $x'$-axis of the absolute rest frame, the origin of which is defined as the left end of the rod. The rod, which is on Earth, is parallel to this axis.

For this situation, the following relation holds:

$$x_o = vt + x \tag{36}$$

Accordingly, the length of the rod $L$ is given by:

$$L = x_o - vt \tag{37}$$

By combining Eqs. (26) to (29) with Eqs. (36) and (37), we obtain:

$$t_o = \frac{1}{\sqrt{1 - \frac{v^2}{C^2}}}\left(t + \frac{vx}{C^2}\right) \tag{38}$$

$$x_o = \frac{1}{\sqrt{\left(1 - \frac{v^2}{C^2}\right)}}(x + vt) \tag{39}$$

The Earth, which we assume to be an inertial reference frame, is related to the absolute rest frame by these relational expressions. Consequently, any kind of celestial body does not simply travel in the Universe; rather it is firmly connected with an absolute rest frame.

The above relational expressions show that the time, space and even the masses of all celestial bodies depend on the respective absolute velocities of those celestial bodies and that they exist as unique physical quantities that characterize each of them. Accordingly, it is inferred that there are no universal physical quantities common to the motion and forces of all celestial

bodies.

Expressed another way, establishing universal physical quantities common to all systems is only possible in an absolute rest frame.

**5.8 Time dilation effects and proper time**

From the discussion of the previous section, the following *time dilation effects* can be predicted. When we regard the Earth's surface as approximating an absolute rest frame, then an astronaut in a rocket launched from the surface of the planet is in a temporal environment in which time runs slower than that for an observer on Earth, which is regarded as approximating an absolute stationary system. If they meet again after a long period, the astronaut will see that many years have passed for the Earth-bound observer but not for him. This is referred to as a *time dilation effect*.

The twin paradox, which occurs in Einstein's theory of relativity, cannot occur with the time dilation effect considered here. In this instance, the rocket cannot return to Earth without turning around through 180°. This turn is explained in terms of the absolute theory that considers acceleration. Here, the acceleration and deceleration of the rocket are not taken into account and the scenario should be considered with caution since it is limited to the special condition of constant velocity.

The relationship between the absolute and proper times in an inertial reference frame is given by:

$$t_0 = \frac{1}{\sqrt{\left(1-\frac{v^2}{C^2}\right)}}t \tag{40}$$

Therefore, when $v = 0$, time flows equally. In contrast to this absolute rest frame, time that depends on the velocity of each respective inertial reference frame is defined as *proper time*.

Consequently, all the celestial bodies drifting through the Universe have proper time determined by their respective absolute velocities. Furthermore, the objects within these systems are governed by their proper time and the mechanical properties that the objects possess are also assumed to differ.

**5.9 Conversion of all forces to absolute rest frame (unified field)**

The discussion has thus far been based on the special case that does not consider acceleration or gravity. Einstein introduced the equivalence principle and the general principle of relativity, which consider inertial mass and gravitational mass to be the same, and this completed his general theory of relativity.

we use the Einstein tensor, warping of space described by Riemannian geometry is expressed by:

$$G_{\mu\nu} = -\kappa T_{\mu\nu} \tag{41}$$

Here, $G_{\mu\nu}$ is the Einstein tensor and $T_{\mu\nu}$ is the energy–momentum tensor.

In Einstein's general theory of relativity, the coefficient $\kappa$ is taken to be a constant. For a weak gravitational field, it is given by:

$$\kappa = \frac{8\pi G}{C^4} \tag{42}$$

where $G$ is the universal gravitational constant.

However, according to the above discussion, in a pair of inertial reference frames that have different absolute velocities, the frames may show individual gravitational constants depending on each of the absolute velocities.

The effects of the absolute velocity of inertial reference frames that do not consider the effects of acceleration (which we have discussed above) are all manifest by stretching of a four-dimensional absolute rest frame (including the time axis). In contrast, systems that have acceleration (such as a gravitational field) exhibit warping of space–time, which is expressed using four-dimensional Riemannian geometry. Accordingly, fields for discussing the fields associated with general mechanics, electromagnetic force, and gravity in a unified manner are inferred to be in a four-dimensional absolute rest frame, which is expressed by Riemannian geometry.

**5.10 Approximation field for absolute rest frame**

When the absolute velocity of Earth is sufficiently small compared to the speed of light (i.e., when $v^2/C^2 \ll 1$), then it is possible to assume in approximate terms, space and time defined by a stationary observer on Earth as an absolute rest frame and an absolute time. For this case, physical phenomenon in a moving inertial reference frame observed from Earth surface appear as contractions of space and time in four-dimensional Cartesian coordinates (including the time axis). Physical phenomena associated with acceleration are all observed as curvature of space–time, which is expressed in four-dimensional Riemannian geometry.

For example, the reason why muons generated by cosmic rays showering down on the Earth are observed is explained by Einstein's theory of relativity as being due to contraction of proper time and distance of the muons, which are greater than those on the Earth's surface.

However, the absolute theory gives an alternative explanation, which is the opposite to the above explanation. That is, the

muon as a moving system, when examined uniformly in an approximate absolute stationary system viewed by an observer on the Earth's surface, appears as stretching of Earth time and is observed by the subsequent stretch of distance. At this time, a stationary observer on the muon, which is a moving frame, will observe an extremely short half-life, which indicates that the muon has been generated on the Earth's surface. The observed moving distance is short.

**5.11 Composite and absolute velocities**

The absolute velocity of a certain inertial reference frame is taken to be $v$. For a stationary observer in that inertial reference frame, the constant velocity of a distant object in the direction of movement of the inertial reference frame is taken to be $v'$. The absolute velocity when a stationary observer in an absolute rest frame observes the distant object at a fixed speed to the inertial reference frame is taken to be $u$. In this case, Einstein's velocity combination rules are given by:

$$v' = \frac{u - v}{1 - uv / C^2} \tag{43}$$

Consequently, Einstein's special theory of relativity states that physical phenomena are governed only by the relative velocity $v'$ given above.

In contrast, from the perspective of absolute theory, to uniformly consider physical phenomena observed in a state of zero absolute velocity and in a moving inertial reference frame, an absolute rest frame and an absolute argument are essential. However, the absolute theory has the major problem that no absolute velocity has been determined that can be classified as a fundamental physical quantity.

To avoid this problem, it is thought that Einstein stated that it is not necessary to introduce the concept of an absolute rest frame into the physical world. However, as has been argued above, an absolute rest frame is essential to discuss movement and forces in a unified manner. This inference seems to be a point that Suto insists upon, as mentioned above.

In the expression for the composite velocity in Eq. (43), the two absolute velocities $u$ and $v$ appear as unknown quantities. In contrast, the time difference and relative velocity $v'$ are measurable quantities. From their relationship, we can assume it is possible in theory to determine the absolute velocity.

It may be possible to measure the absolute velocity from the variable quantity of energy given by Eq. (34) and the electromagnetic waves that are generated.

**6. Conclusions**

In this paper, Einstein's special theory of relativity which has thus far been interpreted as a principle of relativity under the principle of the constancy of the speed of light was considered from the perspective of an absolute principle that is based on the principle of the constancy of the speed of light. Thus, its development provides us with a physical world view that is completely opposite to the one that Einstein gave us.

Einstein's theory of relativity consists of the principle of relativity and the principle of the constancy of the speed of light, which appear to be mutually contradictory. Thus, the theory appears to contain self-contradictions. In contrast, the absolute theory appears to be consistent with the principle of the constancy of the speed of light.

This paper reconsiders Einstein's theory of relativity from a completely opposite perspective to his theory (namely, it is an absolute theory). In Einstein's general theory of relativity the energy and momentum of a moving system appear as curvature in Riemannian geometry via conversion.

In the absolute theory proposed here, a field that has neither momentum nor mass is an absolute rest frame that is expressed by Euclidian geometry. Any mass in that field appears as energy. In addition, when we try converting a moving inertial reference frame into an absolute rest frame, the presence of absolute velocity manifests itself in the absolute rest frame as elongation of space and delay of time. It is also evidenced in the form of increased mass and energy.

Einstein's general theory of relativity expresses acceleration and gravitation as curvature of space and changes in time.

In its natural form, absolute theory is incorporated in Einstein's general theory of relativity. Consequently, space constructed in Riemannian geometry by Einstein's general theory of relativity is established in an absolute rest frame. Therefore, it is inferred that a unified field for motion and mechanics may be in an absolute rest frame.

In this paper, we developed Einstein's theory of relativity using a completely opposite theory. Even if this concept were completely wrong, the use of the principle of the constancy of the speed of light as a rule for defining space and time in a moving inertial reference frame and the application of an independent explanation for the results of the Michelson–Morley experiment may assist in understanding Einstein's theory of relativity.

we have frequently said that mistakes in expressions and textbook entries can be revised using just an eraser and a pencil, that there is no fear of failure, that it is important to challenge at all times, and that to do nothing is the best way to avoid failing.

However, the author feels that these attitudes have allowed me to ponder again the greatness of Einstein's concepts expressed by his theory of relativity.

## References

[1] A. A. Michelson and E. W. Morley: On the Relative Motion of Earth and the Aluminiferous Ether, American Journal of Science, Third Series, Vol. 34, No. 203 (Nov), 1887.

[2] K. Suto: Violation of the Special Theory of Relativity as Proven by Synchronization, Physics Essays 23, 3, pp. 511–519, 2010.

[3]http://www.aolnews.com/surge-desk/article/physicists-finding-raises-relatively-huge-question-was-einstei/19623415 ] (Sep. 7, 2010).