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A Re-evaluation of Conceptual Constants in Special Relativity: An Analytical Study of Structural Contradictions Between Lorentz Transformations and the Constancy of the Speed of Light

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Abstract

This study presents a critical and analytical review of the conceptual and mathematical foundations of the Special Theory of Relativity. The research problem focuses on deconstructing Einstein's postulate regarding the constancy of the speed of light (c) for all observers, including the emitting source, and contrasting it with the established physical principle that the speed of light is independent of the source's velocity. The study examines the mathematical implications of inserting the constant (c) into the equations of relativity and Lorentz transformations, and how this has led to conclusions about the dimensions of space, time, mass, and energy that may not accurately reflect physical reality.

Derived from a comprehensive seven years in the study of relativity, analytical investigation, the research reveals a fundamental internal contradiction within the theory's framework. It demonstrates how Lorentz transformations—premised on the Fitzgerald contraction under the ether hypothesis—coexist within the same theoretical framework as Einstein's time dilation equations, which reject the ether, despite their mutually exclusive philosophical assumptions. Concluding the analysis, the paper highlights two structural dilemmas: first, the conflict between relativistic postulates and the strict conditions of motion within inertial frames of reference; and second, the epistemological contradiction arising from asserting the invariance of physical laws for all observers regardless of their relative velocities.

All that caused this was a misinterpretation of the Michaelson-Morley experiment, which was the result of an error in its design despite the genius of its idea. Through my own efforts, I designed the correct experiment to measure the Earth's absolute speed, and I am waiting for a scientific institution to cooperate with me to implement the experiment to document its success.

Keywords: Relativity, Electromagnetic Wave, Lorentz Transformations, Michelson-Morley Experiment, Speed of Light

Introduction

After Maxwell's electromagnetic theory, to determine the speed of light relative to a moving observer, Michelson conducted an experiment to measure the Earth's speed through the ether. Although the experiment did not achieve its intended goals, it remains one of the most remarkable experiments in physics. Despite the brilliance of its concept, its execution did not fully align with its theoretical design. Nevertheless, wave interference should have appeared in the experiment—not due to a difference in the speed of the two beams but because of the wavelength difference between them caused by the Doppler effect. Yet, no heterogeneous interference between the beams was observed, as the light source, the beams reflected from the mirrors, the observation apparatus, and the observer were all in the same frame of reference (Earth).

Following the unexpected results, scientists concluded that the speed of light is independent of the source's speed and direction. This necessitated new transformations to replace the Galilean transformations, enabling a moving observer to apply the laws of electromagnetic theory. The best among these were the Lorentz transformations, but it relied on a flawed interpretation of the experiment's results. Matters did not stop there; Einstein founded his theory of relativity based on the Lorentz transformations, the constancy of the speed of light for all observers equally, and the failure of the ether hypothesis—without realizing that his theory's equations implied that light depends on the source's speed. This introduced a mathematical inconsistency in its results, which persists to this day, with no one able to determine its cause or refute the theory entirely.

In his book **Brief Answers to the Big Questions**, Stephen Hawking noted: "If someone applied for a grant to study time travel, they would be immediately rejected. Research into the possibility-or impossibility-of time travel is far too dangerous to be addressed scientifically, as any scientific proof of its impossibility would, in fact, dismantle the theory of relativity, which is a cornerstone of modern physics.

After relentless effort and seven years of in-depth study of the Michelson-Morley experiment and relativity, I designed an experiment modelled after Michelson-Morley's, through which we can determine absolute speed of the Earth. This experiment is intended to be the most definitive confirmation of everything presented in this research. To achieve this, I need the collaboration of a scientific institution to conduct the experiment in a physics laboratory, document its success, and establish it as the most conclusive evidence validating the research.

A Re-evaluation of Conceptual Constants in Special Relativity

Research Objectives and Significance

After Einstein launched his theory of relativity in 1905, it became the central concern not only for scientists and physicists but also for all intellectuals and physics enthusiasts, due to its strangeness regarding time travel, length contraction of objects, mass increase, and many other thought experiments that are impossible to implement and verify or refute. The objective of this research is to ascertain the truth of the theory of relativity through an extensive and in-depth study, given its immense importance in the trajectory of modern physics. The research presents a unique perspective on relativity, based on new, advanced ideas, relying on studied analysis, and opening new horizons for scientific thinking.

Research Problem

The failure of the Michelson-Morley experiment to determine the Earth's speed through the aether, caused a problem in determining the motion and speed of light in a vacuum, relative to an observer moving with the Earth in its orbit around the Sun. This prompted scientists of that era to search for new transformations to replace Galileo's transformations, the best of which were the Lorentz transformations. However, the derivation of the Lorentz transformations came on the assumption that the speed of light depends on the source's speed. After Einstein studied the experiment and transformations, he launched his theory of relativity, with equations that are far from logical and unrealistic when we approach the speed of light, while scientists agreed that the speed of light is not related to the speed of the source.

One of the most prominent problems that have emerged in relativity is the intersection of its equations with each other. The contraction equation, for example, was built on the assumption that the ether exists, while the time deceleration equation was built on the assumption that the ether does not exist.

Research Methodology and Tools

The research relies on the scientific analysis of established theories and laws, as well as on practical scientific experiments and realistic thought experiments. After identifying the research problem, the researcher began by posing questions to those interested in this field, asking about the extent of their conviction regarding the strange, dubious, and bizarre results demonstrated by the theory of relativity. and the researcher formed a general view of the reason for the prominence of Einstein's theory and the method of formulating its equations. The study of the motion, speed, and behaviour of light was the key to the research, as it is the fundamental reason for deriving the special theory of relativity.

Previous Studies

Ziefle, in a 2019 study, reported that the special and general theories of relativity are illogical in many aspects. However, the mathematical structure of Einstein's theory of relativity, which was founded on illogical assumptions of time dilation, his definition of relativity, the four-dimensional spacetime continuum, and the mathematical structure of geodesics, has no relation to physical phenomena [1].

Einstein used an amazingly simple assumption: that the speed of light is constant for all observers equally because they must be equal. This aligns with human bias and was accepted uncritically. The simple foundation of Einstein's theory of relativity—the constancy of the speed of light for all observers—is not real. Rather, the theoretical construction using this unrealistic foundation, and its greater complexity within the context of the theory of relativity, leads to mathematical results of the theory being realigned with reality. We must realize that natural laws do not depend on observers but on physical phenomena. In our case, it means the speed of light depends on gravity. Nevertheless, Einstein's energy tensor calculations for an imaginary four-dimensional spacetime enable us to obtain useful quantitative results about the behaviour of light beams.

A 2019 study by Blackie confirmed that Einstein's special theory of relativity is not a complete theory of reality. The theory used non-uniform experiments, and thus its final conclusions are inconsistent with each other. The most obvious of these factors is the prediction of a positive correlation between mass and speed, i.e., an increase in mass, which allows for the increase of both kinetic and potential energies of a system in motion simultaneously, as the system gains mass and thus potential energy. In this massive context, the study proposed a new theory or a correction to Einstein's theory. It then used these corrections to clarify that entangled particles exist in nature because of relative motion, alongside the fact that matter and wave are dual entities of each other. Finally, due to the law of energy conservation, the expansion of space is a correct result of relative motion, just as time dilation is a correct result of relativity [2].

Pandey, in a 2015 study, reported that many mathematicians and physicists seek a unified theory for relativity. However, most of them ignore Einstein's viewpoint in the first step of their theories. The article provides a brief non-mathematical introduction to this topic. Also, based on Koga's theory, he pointed out two reasons that hindered Einstein from obtaining a unified theory of relativity [3].

Theoretical Framework

Principles of Relativity

Sir Isaac Newton was the pioneer who established the fundamental principles of Classical Relativity. According to the Newtonian worldview, space, time, and mass are regarded as absolute and invariant quantities; they remain constant regardless of the observer's velocity or state of motion. To formalize this perspective, a set of mathematical equations was developed to facilitate the transformation of coordinates between a stationary observer (Rest Frame) and a moving observer (Inertial Frame) across the primary physical dimensions: velocity, time, and displacement.

These equations are famously known as the Galilean Transformations. In their simplest mathematical form, they are expressed as follows:

Distance = Velocity \times Time

$$x = vt$$

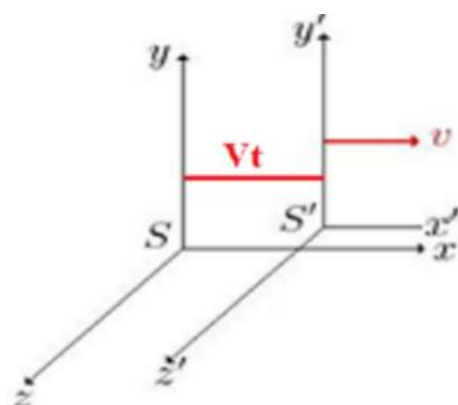
$$x = x' + vt' \dots \dots \dots (1)$$

$$x' = x - vt \dots \dots \dots (2)$$

The Principle of Relativity posits a profound symmetry: all physical laws utilized by an observer in a stationary frame must remain mathematically invariant—preserving their exact form and functional integrity—when applied by an observer moving within an inertial frame of reference. From this bedrock principle, we derive the ability to translate measurements between observers; since they are governed by the same universal laws, a bridge of transformation must exist.

- **Equation (1):** This formula calculates the distance between the stationary observer and a specific event. It posits that the total distance is the sum of two components: the distance already covered by the moving observer (traveling at a constant velocity v over time t) and the remaining distance between that moving observer and the event itself.
- **Equation (2):** This formula defines the relative position of the event from the perspective of the moving observer. It states that the distance remaining to the event is equal to the total distance from the origin (as measured by the stationary frame) minus the displacement covered by the moving observer during the interval of motion.

The drawing below shows the axes of the static and dynamic frames:



Where:

- S: Represents the stationary frame (Inertial frame).
- x: Represents the total distance.
- x': Represents the remaining distance (relative distance).
- S': Represents the moving frame.
- v: The velocity of the moving frame.
- t: Time.

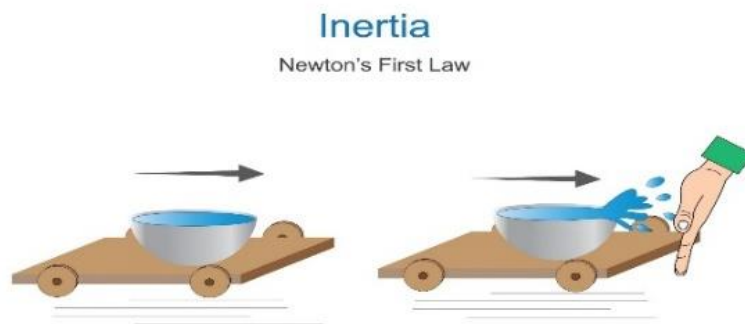
Scientific Context Expansion

In Newtonian mechanics, these transformations rely on the postulate of Absolute Time, where ($t = t'$). This implies that a second elapsed for the stationary observer is identical to a second for the moving one, a concept that remained unchallenged until the advent of Einstein's Special Relativity, which introduced the Lorentz transformations to account for high-velocity phenomena.

Inertial Frames and Newton's First Law

One of the fundamental axioms in the relative relationship between two frames of reference is that Galilean transformations are strictly applicable only to bodies that obey Newton's First Law of Motion. This is the Law of Inertia, which postulates that an object at rest remains at rest, and an object in motion remains in motion at a constant velocity and in a straight line, unless acted upon by an external net force.

This condition of "uniform motion" is crucial argues, this foundational requirement is sufficient to invalidate the relativistic theory of Time Dilation. Under these constraints, we can simplify our mathematical model by disregarding the auxiliary axes (y, y' and z, z'), This is because anybody moving in more than one dimension or changing its direction on the same axis (counter-propagation), violates the strict conditions of an Inertial Frame and thus falls outside the scope of basic relativity transformations.



The Invariance of Physical Laws

The Principle of Relativity asserts that the laws of physics remain invariant—meaning their mathematical form is identical—whether they are measured by an observer in a stationary frame or an observer in a frame moving at a constant velocity.

The Practical Experiment: The Train Analogy

To illustrate this principle, consider an observer standing on a station platform holding a ball. To determine the acceleration due to gravity (g), the observer tosses the ball upward to a height of one meter. The ball returns vertically to their hand, consistently exhibiting an acceleration of (9.8 m/s^2).

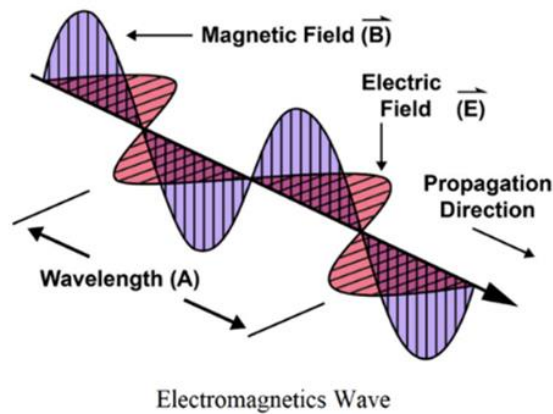
When the observer repeats this experiment inside a train moving at a constant velocity, the results are identical. The ball rises and falls at the same time, with the same speed and acceleration as it did on the platform. To the observer inside, the physical outcome is indistinguishable from being at still status.

This demonstrates the principle of the invariance of physical laws across all different inertial frames of reference; the mathematical outcome remains fixed regardless of whether the velocity is relative or absolute. Based on this principle, from the perspective of an observer inside the train, the train is stationary while the Earth is in motion. Conversely, for an observer standing on the ground, they perceive themselves as stationary and the train as the moving entity.

Electromagnetic Theory

Between 1861 and 1862, the British scientist James Clerk Maxwell published his research on electromagnetic theory. This work consisted of four partial differential equations that describe the behaviour and fluctuations of electric and magnetic fields, their transformation into other forms of energy, and their unification into a single entity: The Electromagnetic Wave.

In the following illustration, the shape of the electromagnetic wave:



In his fourth equation, Maxwell brilliantly determined the velocity of electromagnetic waves based on two physical constants: Electric Permittivity (ϵ_0) and Magnetic Permeability (μ_0). According to this equation, the wave speed is a fundamental constant in a vacuum, defined as the inverse of the square root of the product of these two constants:

$$\text{Constant} = \frac{1}{\sqrt{\mu_0 \epsilon_0}}$$

It is crucial to note that the speed of electromagnetic waves, denoted by the Latin letter (c), represents the speed of light relative to an absolute frame of rest in a vacuum. This speed is constant in a vacuum, with a value of 299,792,458 m/s.

The speed of the wave decreases depending on the medium through which it propagates—whether air, glass, or any other material. Light remains the fastest entity in the universe; nothing can surpass it, nor even reach its velocity.

Maxwell's Interpretation of Light

Since the speed of the electromagnetic wave derived by Maxwell was equal to the experimentally measured speed of light, Maxwell concluded that light itself is an electromagnetic wave. He described light in the following manner:

"If you move toward light, the speed of light relative to you is the sum of the two velocities—your velocity plus the speed of light. However, since the speed of light is immense compared to your negligible speed, the addition of your velocity to the speed of light will be imperceptible, and its mathematical value will be nearly zero."

This is a precise and accurate description. Furthermore, if the light source is moving toward a stationary observer, the relative speed remains exactly (c), regardless of the source's speed or direction. This is because the speed of light is constant and independent of the source's motion; the only variable that changes is the wavelength, depending on the source's speed and direction.

Postulate of the Ether

Scientists of that era wondered how electromagnetic waves could propagate through a vacuum. They were certain that sound waves required a material medium and could not travel through a vacuum, so they assumed electromagnetic waves must follow the same principle. To resolve this, Maxwell proposed the existence of the "Aether"—a substance that fills the void of space, serving as the physical medium for electromagnetic waves, much like air serves sound.

Electromagnetic waves can propagate through any phase of matter—gas, liquid, or solid. The velocity in any medium can be calculated by dividing the vacuum speed by the square root of the medium's dielectric constant (relative permittivity), as shown in the following equation:

$$V = \frac{c}{\sqrt{\epsilon_r}}$$

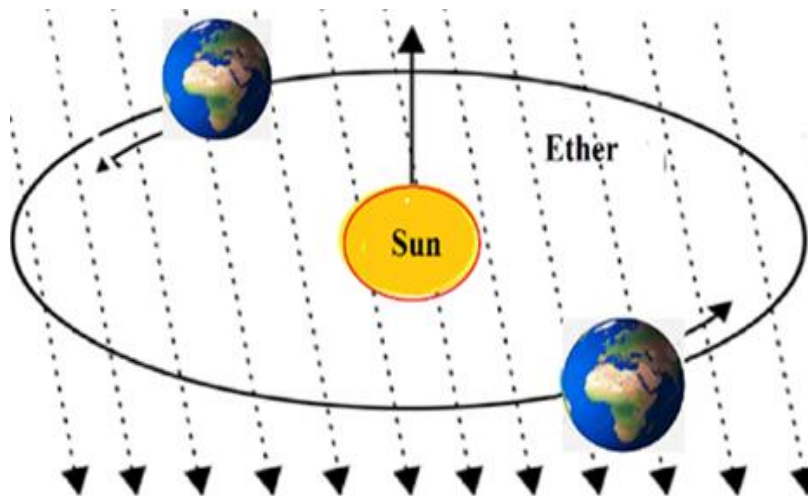
The Earth's Motion and the Aether

Since the speed of light in a vacuum was measured relative to the Aether (the absolute frame of rest), an observer on Earth was in a moving frame. When applying Maxwell's fourth equation, scientists noticed that the mathematical form of the law did not remain invariant for a moving observer, which contradicted the principles of relativity.

To correct this, it became necessary to mathematically determine the Earth's velocity through the Aether. Astronomically, we know the Earth orbits the Sun at approximately 30 km/s, but scientists needed to measure this "Aether wind"

experimentally to satisfy the equations. This led to several attempts, the most famous of which was the experiment by Albert Michelson and his assistant Edward Morley. The drawing below shows the Earth's movement around the Sun, through the ether:

The drawing below shows the Earth's movement around the Sun, through the ether.



The Michelson-Morley experiment is the most famous experiment in physics—widely known yet understood by few. To this day, few have exerted the exceptional effort required to study it deeply. In the following sections, we will analyse it with the precision and depth its importance demands in the evolution of modern physics.

Secrets of the Michelson-Morley Experiment

In 1887, Albert Michelson designed a device to Measuring the speed of the Earth in ether. At the time, the concept that the speed of light is independent of the source's motion had not yet taken hold. Michelson designed the experiment on the classical assumption that light behaves like any other object—its speed being additive to the speed of its source.

The Interferometer Design

The apparatus consisted of a square wooden frame mounted on a rotating base. In its center, a half-silvered mirror (beam splitter) divided a single light beam into two perpendicular paths:

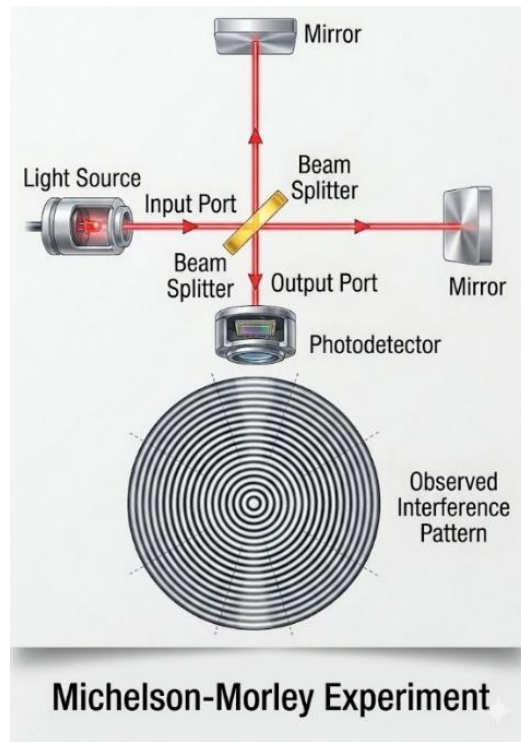
- **Parallel Beam:** One beam travelled in the direction of Earth's orbital motion.
- **Perpendicular Beam:** The second beam travelled at a right angle to the Earth's motion through the Aether.

Michelson reasoned that the beam traveling parallel to Earth's motion would be affected by the Aether wind, creating a speed difference between the two beams. When recombined at the detector, this difference would result in an Interference Pattern of bright and dark fringes. By counting these shifting fringes, Michelson expected to calculate the Earth's absolute velocity through the Aether, finally allowing the application of Galilean Transformations to Maxwell's equations.

By counting these shifting fringes, Michelson expected to calculate the Earth's absolute velocity through the Aether, where he differences in the speed of the two beams leads to the generation of interference between the two waves, equal to one-third of the wavelength of the light used, which creates a visible displacement in the interference phase. finally allowing the application of Galilean Transformations to Maxwell's equations [4].

$$\Delta t = \text{sec } (3 \times 10^{-17})$$

The diagram below shows how the experiment works:

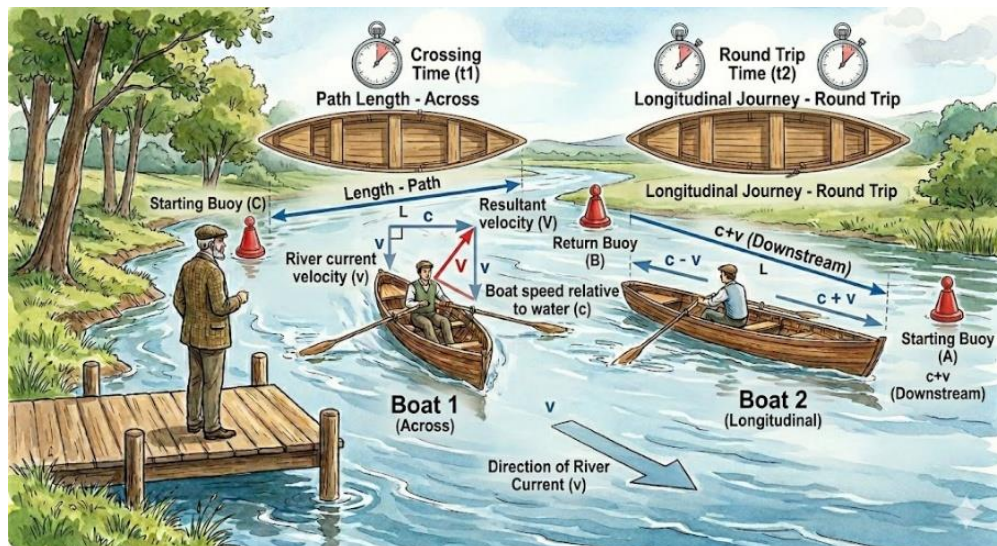


The Analogy: Two Boats in a River

Scientists likened this experiment to two boats traveling at identical speeds in a flowing river:

- **Boat 1:** Crosses the river to the opposite bank and back.
- **Boat 2:** Travels upstream and back the same distance.

According to the classical laws of velocity, the two boats cannot return at the same time. The boat crossing the width of the river (perpendicular to the current) will always return sooner than the boat traveling parallel to the current. Michelson and his contemporaries believed light in the Aether would behave exactly like these boats in the river. The drawing below shows the experience of the two boats:



Despite the extreme sensitivity of the device, it recorded no difference between the speeds of the two beams. The expected shift in the interference fringes simply did not appear.

Some scientists indicated the possibility that the time of the experiment was consistent with the movement of the Earth around the sun, with the direction of the movement of the ether, so some of them suggested conducting the experiment after six months.

Michelson conducted dozens of trials over a decade, yet the results consistently failed to match the boat analogy. The two beams arrived simultaneously, showing no difference in speed. This "null result" implied one of two things: either

the Earth does not revolve around the Sun—which was scientifically unacceptable—or the concept of the Ether was flawed. However, scientists of that era insisted on the Ether's existence, asking: If the Ether does not exist, how can light travel?

The simultaneous arrival of the beams proved that their speeds were identical despite the motion of the Earth. Consequently, a scientific consensus emerged that the speed of light is independent of the motion of the source. Regarding the Ether, two primary explanations remained:

- **The Fitzgerald Contraction:** Proposed by George FitzGerald, suggesting that physical objects contract in the direction of motion due to pressure from the "Ether wind."
- **Time Dilation:** Proposed later by Albert Einstein, suggesting that time itself expands to keep the speed of light constant.

These remained the only two viable interpretations of the Michelson-Morley results.

Michelson and Morley's experiment were at stake, and scientists began searching for an explanation for why the speed of light is constant in all directions, and making suggestions, for the purpose of arriving at a solution, and at that time there was nothing better than Fitzgerald's principle.

A Critical Comparison: River vs. Laboratory

In a comparative study between the two experiments, we find that in the two-boat experiment, the distance moved by the boat in the direction parallel to the river's movement is longer than the distance moved by the boat moving between the two banks of the river, because the two boats are actually moving in the river's water moving relative to the ground, so the difference in arrival time is caused by the difference in the distance travelled by the two boats.

However, in the Michelson-Morley experiment, the beams move through air that is stationary relative to the Earth. They cover the exact same distance. Michelson may have overlooked the fact that the experiment behaved more like boats in a still pond rather than a flowing river. He expected a shift of one-third of a wavelength based [4].

The Aftermath

Michelson concluded that the experiment failed its primary objective. It appeared impossible to measure the absolute velocity of any object in the universe; we could only measure Relative Velocity between two frames.

The Michelson-Morley experiment put the scientific world at a crossroads. As physicists scrambled for an explanation for the constancy of light speed in all directions, the most prominent solution emerged from the FitzGerald Principle.

The FitzGerald Principle: Saving the Aether

To preserve the concept of the Ether, the Irish physicist George FitzGerald proposed a radical idea: the physical contraction of objects in the direction of their motion through the Ether.

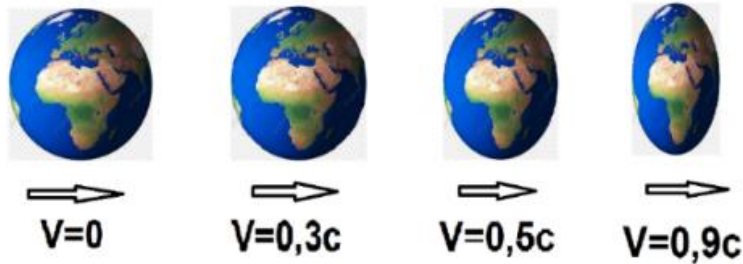
The First Option

FitzGerald attempted to rescue the notion of the Ether and provide an explanation for the unexpected results of the Michelson-Morley experiment. For the experiment to align with the "two-boat analogy," FitzGerald posited that the beam facing the Ether current covers a shorter distance than anticipated due to the contraction of the Earth in the direction of its motion against the Ether. Consequently, the path travelled by the beam moving parallel to the Ether flow becomes consistent with the movement of the boat traveling along the river's current.

FitzGerald was surprised to observe that the value of this contraction was exactly equal to the discrepancy in the travel time of the beam in the parallel direction. Because the beam covers a shorter distance than the one traveling perpendicular to the Ether's motion, both beams arrive at the same time. The renowned scientist Hendrik Lorentz adopted.

The great scientist Lorentz adopted FitzGerald's principle and tried to explain the result within the framework of traditional physics, and the most important thing stated in the analysis is that a spherical shape flattens when it moves somewhat in the direction of its movement, and the faster it is, the more it flattens.

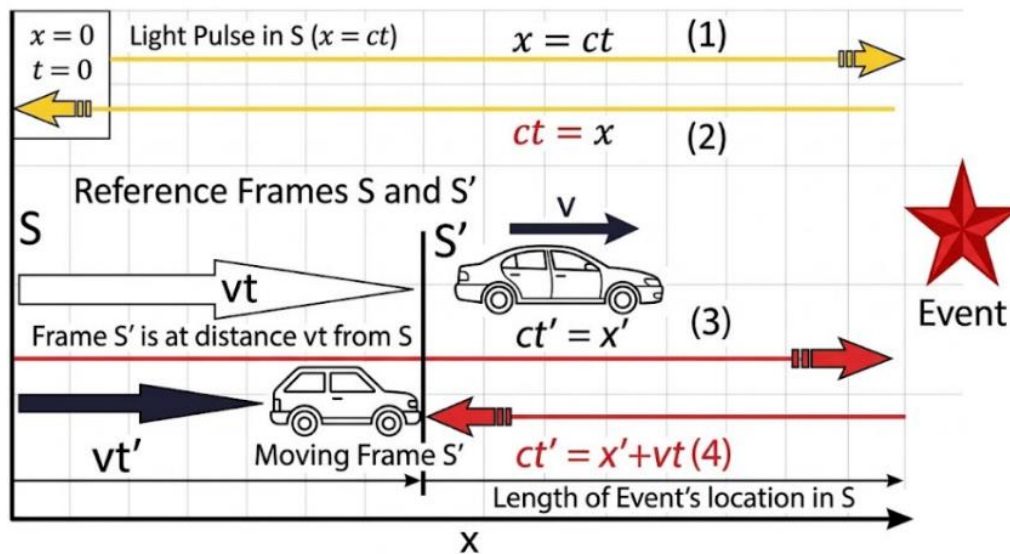
FitzGerald utilized this interpretation to explain the Michelson-Morley results, reaffirming the existence of the Ether and its role in distance contraction. He argued that the distance shrinks by precisely the correct amount required to cancel out the effect produced by the Ether wind acting on the Earth due to its orbital velocity. Through the collaboration between Lorentz and FitzGerald, the equation describing Length Contraction was derived. The following figure illustrates the effect of velocity on a spherical shape as described by FitzGerald [5].



Lorentz Transformations

The scientist Lorentz adopted Fitzgerald's principle and derived new transformations, adding a (correction factor) to Galileo's transformations, in their application to the motion of light. Lorentz considered that light was emitted from two sources, one static and the other moving.

The figure below shows the motion of light rays and the motion of the moving frame in deriving transformations.



Where:

S - Location of the static frame.

S' - Moving frame access location.

X - Distance from static frame to event.

X' - the distance between the moving frame and the event.

t - static frame time.

t' - time of moving frame.

ct - the distance travelled by light from a stationary frame.

ct' - the distance travelled by the light coming from the moving frame.

ct - the distance light travels from the event to the static frame.

ct' - the distance the light travels from the event to the moving frame.

Lorentz's derivation resulted from multiplying the right side of Galileo's transformation equations by the length correction factor (gamma) established by Lorentz, then from multiplying the two equations together, then compensating the reciprocal of the speed of light coming from the event with the reciprocal of the speed of light that was released from the two frames into the event. (We made the event ray equation in red to differentiate it from the static frame ray and the moving frame ray), so the equations were derived as follows:

Equation of motion of a static frame beam, to the event.

$$x = \gamma (x' + vt') = ct \dots \dots \dots (1)$$

$$c = x/t \longrightarrow 1/c = t/x$$

Equation of motion of the event beam, to the static frame.

$$ct = x \longrightarrow c = x/t$$

$$1/c = t/x \dots\dots\dots(2)$$

Equation of motion of a moving frame beam to an event.

$$x' = \gamma (x - vt) = ct' \dots\dots\dots (3)$$

$$c = x'/t' \longrightarrow 1/c = t'/x'$$

Equation of the motion of the event beam to the moving frame.

$$x' = ct' \longrightarrow c = x'/t'$$

$$1/c = t'/x' \dots\dots\dots (4)$$

By multiplying equations 1 and 3 together, as stated in Lorentz's derivation, we obtain the following equation:

$$xx' = \gamma^2 (xx' - x'.vt + x.vt' - v^2tt')$$

After dividing both sides of the equation by xx' , we find:

$$1 = \gamma^2 (1 - v \cdot t/x + v \cdot t'/x' - v^2 \cdot t/x \cdot t'/x')$$

When substituting into the equation, by limiting equations (2) and (4) the reciprocal of the speed of light from the event beam equations, the result becomes as follows:

$$1 = \gamma^2 (1 - v \cdot 1/c + v \cdot 1/c - v^2 \cdot 1/c \cdot 1/c)$$

$$1 = \gamma^2 (1 - v/c + v/c - v^2/c^2)$$

$$1 = \gamma^2 (1 - v^2/c^2)$$

$$\gamma^2 = 1/(1 - v^2/c^2)$$

Thus, we obtain the Lorentz coefficient in the mathematical form in which the speed of light becomes related to the speed of the source, as a result of replacing the beam of the two frames with the beam of the event, since the beam of the event is related to the speed of the moving frame, and thus the transformations become inconsistent with reality.

$$\gamma = \frac{1}{\sqrt{1 - v^2/c^2}}$$

When the Lorentz coefficient is multiplied by the Galileo transformations, it results in equations that are assumed to express the transformation between the coordinates of the two frames, static and mobile [6].

$$x = \frac{x' + vt'}{\sqrt{1 - v^2/c^2}} \quad x' = \frac{x - vt}{\sqrt{1 - v^2/c^2}}$$

The Lorentz transformation equations, derived by applying the Lorentz factor to Galilean transformations, describe the distance traversed by a moving body in any direction. According to these formulas, as velocity increases, the measured distance contracts; theoretically, if an object reaches the speed of light, this distance shrinks to zero.

The idea of contraction meant shrinking the length of a moving body facing the ether wind. Therefore, it was necessary to derive an equation explaining the relationship between an object's length and its "Etheric velocity" rather than its relative velocity. This means that relative velocity will not necessarily lead to contraction. Through the collaboration between FitzGerald and Lorentz, the Length Contraction Law was derived as follows:

Length Contraction Law

$$L = L_o \times \sqrt{1 - \frac{v^2}{c^2}}$$

According to Lorentz transformations, the length of a stationary object is determined by measuring the distance between its two endpoints relative to an observer; in this state, the timing of the measurement is irrelevant. For a moving object, however, the positions of both endpoints must be recorded at the exact same instant. By subtracting the distance of the near end from the distance of the far end, the resulting difference represents the length of the moving object. It thus follows that the length of a moving object is equal to its rest length divided by the Lorentz factor (resulting in a contracted value).

The Einsteinian Principle: Time Dilation

When Einstein learned about the Lorentz transformations, studied the equation for length contraction, read it carefully, and studied the two-boat experiment deeply, he realized that it did not match the Michaelson-Morley experiment, because the variable in two experiments was time, not distance, and that the idea of contraction was not the appropriate solution to explain the results of the Michaelson-Morley experiment as long as the speed of light was constant and the distance travelled was identical in both directions. This means that there is no ether that causes contraction.

Einstein concluded that Time, not distance, must be the variable. He declared that the speed of light is constant for all observers, regardless of their motion.

The Second Option

After spending a few years studying and analysing experiments, Einstein declared that light has a constant speed for all observers equally. This announcement gives an indication that the speed of light travels at its constant speed relative to the source, even if it is moving at any speed.

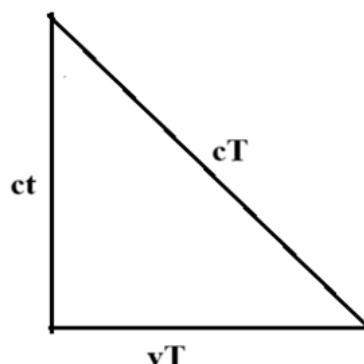
Einstein subsequently rejected the existence of the Ether, asserting that the speed of light is constant for all observers, regardless of their relative velocities. Upon deep analysis of the Michelson-Morley experiment, he realizes that it matches the experience of the two boats in distance and speed coordinates, but it does not match time coordinates. The beam traveling in the direction of motion covered the distance in less time than expected. Given that the speed of light is invariant, Einstein concluded that time must be the variable factor, undergoing "dilation" relative to velocity. Einstein discovered that the value of Time Dilation in the Michelson-Morley experiment exactly matched the time discrepancy found in the boat analogy.

Einstein formulated his theory of relativity based on the thought experiment of a ball tossed inside a train carriage. To an observer inside the carriage, the ball is thrown vertically and falls back to the same spot. However, to a stationary observer outside the train, the ball is influenced by two forces: the vertical toss and the horizontal velocity of the train. The outside observer sees the ball following a diagonal, zigzag path (the resultant of the two velocities).

If a mirror were placed in the ceiling of the railway carriage to reflect a light beam, the light would behave similarly. The diagonal path perceived by the outside observer is longer than the vertical path seen by the inside observer. Because the speed of light is constant, the longer diagonal path must require more time. On this principle, Einstein based his theory of relativity after stating that the ether does not exist as matter or as a reference for absolute rest. Einstein's theory posits that time within the moving train passes more slowly than time for the observer standing on the platform [7].

The triangle below represents the coordinates of Einstein's thought experiment:

The path of the light beams relative to the train's velocity forms a Pythagorean triangle, allowing us to calculate the time difference between the stationary observer and the moving frame.



Where:

- **ct**: The path of the beam as seen by the observer inside the carriage.
- **cT**: The path of the beam as seen by the observer outside the carriage.
- **vT**: The horizontal distance travelled by the train carriage.

By applying the Pythagorean theorem, we derive the equation for the moving frame's time, known as the Time Dilation Equation:

$$(cT)^2 = (ct)^2 + (vT)^2$$

$$T = t \cdot \frac{1}{\sqrt{1 - \frac{v^2}{c^2}}}$$

The time of a moving frame is equal to the product of the time of a stationary frame multiplied by the Lorentz coefficient.

Einstein continued to derive the laws, as he considered that mass is also affected by increasing speed, and he derived an equation for it, which is the product of mass multiplied by the Lorentz coefficient:

$$M = m \frac{1}{\sqrt{1 - \frac{v^2}{c^2}}}$$

From the equation of mass and kinetic energy, Einstein derived the energy equation when a body moves at the speed of light. The energy equation is as follows:

$$E=mc^2$$

Then the law of adding velocities was derived from adding the velocity of two objects, using Lorentz transformations, given that velocity is equal to dividing distance by time. The equation came in the following mathematical form:

$$V = \frac{u1 + u2}{1 + (u1 \cdot u2)/c^2}$$

Research Results and Discussed

Michaelson-Morley Experiment Fails

Although the experiment did not achieve its intended purpose, which was to determine the Earth's absolute velocity in the ether, it was one of the most wonderful experiments in physics. Thanks to it, we were able to measure the value of wave interference, and from it came the derivation of the Lorentz transformations and the theory of relativity. It was the dividing line between classical Newtonian physics and modern physics, which was founded by Einstein. The idea of the experiment is genius by all scientific and mathematical standards, but the flaw that Michaelson did not take into consideration was the speed of light in a vacuum, which was still an unclear idea and difficult for scientists to comprehend, and Maxwell was forced to assume the existence of the ether to be the light-transmitting medium.

Given the critical importance of a successful experiment in this context, I designed an experiment similar to the Michaelson-Morley experiment, but with new conditions: we obtain the Earth's absolute speed, and even its direction of motion in space.

Comparison of Principles

Fitzgerald

Fitzgerald's principle referred only to the contraction of the moving Earth in the direction opposite to the ether, and not in any other direction. Contraction is a function of the speed of the Earth, not of the speed of an object or light beam moving on it. It is the Earth that contracts because of its own movement. Even if the object is stationary on it, there is no relationship between the contraction of the moving Earth and the objects on its surface, whether they are stationary or moving. However, it could be argued that while a moving object's length contracts according to the principle of contraction, the Earth beneath it also contracts due to its own orbital motion, not because of the object's movement. Consequently, we find that the Lorentz transformations do not fully align with the FitzGerald principle, nor do they harmonize with the "two-boat analogy," the Michelson-Morley experiment, or a direct description of coordinate events.

FitzGerald's Principle posited that the Earth undergoes contraction specifically in the direction of its motion. According to this view, if a light beam travels in a direction perpendicular to the Earth's motion, the Earth is not supposed to

be subject to distance contraction, and this is a definite flaw in the law of contraction, because the law expresses the contraction of the distance that an object moves in any direction, while the principle refers to the contraction of the Earth regardless of the movement of objects or the movement of light from above it

Einstein

Einstein has the right to deny the existence of the ether, because the beam of light in the experiment did not actually travel through the ether, but he did not realize that the two boats travelled two different distances in the running (moving) river water relative to the Earth, while the two beams travelled two equal distances through the still air relative to the experimental device that static on Earth.

Moreover, Einstein's principle was also imprecise. In the two-boat experiment, the boat arrived late because it covered a longer course as it moved through the flowing river water, which caused a difference in arrival time. In contrast, the two light beams travelled equal distances through the air near the Earth's surface, because the air is stationary relative to the Earth, whereas river water is in motion relative to it. Thus, Einstein's principle remains detached from physical reality.

By discovering that Fitzgerald's principle is incorrect, the contraction equation is invalid, Einstein's principle is wrong, and the time dilation equation does not match reality, we had to think about finding a third option.

Perhaps the movement of the two beams in the experiment may resemble the movement of two boats moving in a stagnant river whose water is not running, and this is what Michaelson did not conclude, as he expected that a shift in light waves as a result of the difference in the speed of the two beams in the device is identical to the movement of the two boats. The Michaelson-Morley experiment was conducted on Earth with the beam traveling through geostationary air, so that the two beams covered the same distance. In the two-boat experiment, the river is moving relative to the land, so the two boats cover two different distances.

The Physical Invalidity of the Lorentz Derivation

Lorentz transformations are strictly related to Fitzgerald's principle which describes the contraction of the Earth in the face of the ether.

- Only a ray moving in the same direction shrinks the Earth from beneath it, but transformations describe the contraction of the Earth in whatever direction the ray or any moving object was moving.
- Fitzgerald's principle describes the contraction of the Earth due to its own motion and not due to the motion of a ray, while transformations describe that contraction is caused by the motion of a ray or any moving object.
- Fitzgerald's principle refers to increasing contraction by increasing the speed of the Earth, while contraction in transformations relates to the speed of the moving body and is not related to the speed of the Earth.

The Mathematical Description of Transformations is as Follows

The core of the error is the assumption that the reciprocal of the speed of light ($1/c$) in one context is identical to ($1/c$) in another, despite the physical distances being distinct. Specifically:

The distance (x') representing the path of the ray coming from the event is not physically equivalent to the distance (x) representing the path of the ray emitted by the moving frame.

The introduction of the Lorentz factor radically altered the nature of the contraction principle. Under this modification, the distance travelled began to contract in all directions of motion, eliminating the necessity of confronting the "ether." The resulting equations led to the contraction of the traversed distance whether the motion was parallel or perpendicular to the Earth's velocity. Consequently, contraction was no longer viewed as a phenomenon strictly tied to the Earth's passage through the ether; rather, it became an inherent property of the moving object, or the motion of the light beam itself. However, with this change, the transformations lost their alignment with the physical logic demonstrated in the "two-boats experiment."

There existed a third alternative for interpreting the results of the Michelson-Morley experiment, one that escaped Lorentz, Einstein, and even Michelson himself. This possibility, which went unaddressed by these eminent scientists, is the Principle of Stationarity (or Rest).

Principle of Stillness

In the Michaelson-Morley experiment, the interferometer mirror is the source of the two rays heading to the monitoring screen, so there will be no difference in their speed, because they are from one source and move in one frame, including the monitoring screen. Experience has proven the validity of the principle of relativity, which asserts that the laws of physics are equally constant in all frames of reference, and do not change with the speed of the frame, including the laws of electromagnetism.

Third Choice

The Earth is considered a still frame with respect to light just as it is a still frame with respect to sound or any other object on its surface or even in its surroundings that is affected by it and its space. The two rays in Michaelson and

Morley's experiment were moving through the Earth's transport medium (air), which moves with the Earth at the same speed and in the same direction. This is our choice and the correct choice, and its interpretation does not require complexity. Neither the Earth shrinks nor time slows down, and we need no justification to cover up why the two rays arrive at the same time. Because they must arrive at the same time.

However, despite the simultaneous arrival of the two beams, heterogeneous wave interference should have appeared on the observation screen due to the difference in relative velocity between the two beams and the detector. Given the assumption that the screen moves toward the incoming light from the direction of the ether, a shift in the wavelength of the two beams should occur due to the Doppler effect. Why, then, did this heterogeneous interference fail to appear on the monitoring screen?

The Doppler Effect Phenomenon

It is well-established that light, like sound, is subject to the phenomenon discovered by the Austrian scientist Christian Doppler in 1842. Doppler determined that the period of a single oscillation (T) is the reciprocal of the frequency (f), where frequency equals the wave velocity (v) divided by the wavelength (λ):

$$f = v / \lambda$$

Consequently, one of the two beams in the Michelson-Morley experiment should have exhibited a blueshift. Had the ether existed, it would have supported FitzGerald's principle; its absence, however, is used to support Einstein's interpretation.

Contradictions

The Doppler effect phenomenon stands in contradiction to Einstein's interpretation. Einstein posited that the speed of light is constant for all observers equally. However, while the relative velocity between the source and the observer does not change the speed of light relative to the observer, it does change its wavelength. In this scenario, the speed of light is constant relative to the observer because they share the same reference frame, but it differs relative to the source because they occupy two different frames, and because the speed of light is independent of the source's velocity or direction.

Accordingly, if an object approaches an observer at the speed of light, the observer would be unable to see the object before its arrival. The light emitted from the object cannot precede the object itself because the first ray of light would have traversed zero relative to the frame from which it was emitted, rendering the wavelength equal to zero. This is precisely analogous to how we cannot hear the roar of a jet engine exceeding the speed of sound until after it has passed us, then we hear the sound in the form of an explosion in one wave.

All the above confirms that the speed of light is not a universal constant for all observers equally. This is because the speed of light is independent of the source's velocity but remains dependent on the medium through which the light beam propagates; its velocity is contingent upon the nature of the transmitting medium, whereas the speed of light is constant only in a vacuum. If you move toward a light source, you enter a new reference frame distinct from the one in which the light is traveling. Consequently, the speed of light relative to you becomes the sum of your own velocity and the velocity of light. This is precisely what Maxwell asserted, regardless of the existence or non-existence of the ether. Know that you will not see sunlight if you are moving away from it at the speed of light, and it is different if the sun is moving away from you at the speed of light. This leads us to the pivotal question: Does the ether exist according to FitzGerald's principle, or is it non-existent according to Einstein's principle?

Does the Ether Exist or not?

Light propagates in a vacuum at a constant speed of 299,792,458 m/s. If the ether exists as a physical medium that transmits light, it will support FitzGerald's principle and validate the Length Contraction Law. Conversely, if the ether does not exist, it would support Einstein's concept and the Time Dilation Law. This implies that one of these two principles must fundamentally be erroneous.

If I were granted the opportunity to meet Einstein, I would ask him: "Does the ether exist or not?" His answer would undoubtedly be that the ether has no existence. However, Special Relativity contains two contradictory equations: the first is the length contraction equation, which was constructed on the assumption that the ether does exist; the second is the time dilation equation, built on the assumption of its absence. This contradiction renders one of the two equations incorrect. Which would you Favor? As for me, I hold a different view:

I contend that both equations are incorrect, because in both cases, the speed of light is incorrectly tied to the velocity of the source.

Light Propagation in a Vacuum

The electromagnetic wave appears to travel in a vacuum, including light, and the ether does not exist.

The constant speed of light is related to the absolute rest attribution reference, which we can call "ether", not as a physical medium that transmits light waves, but only as the absolute rest attribution frame reference, as light moves in a vacuum at its constant speed relative to it. However, light travels through matter and is affected by its speed and direction. This is a blow to the law of Contraction.

The Fizeau Experiment

Supporting this description is the optical experiment conducted by the French scientist Hippolyte Fizeau in 1851. Fizeau utilized a specialized system to measure the effect of a moving medium on the speed and direction of light. He discovered that the speed of light in water is less than its speed in air and that moving water drags light along its direction of motion.

It was later shown that the electromagnetic wave, including light, travels in a vacuum and does not travel through matter like sound, as the atoms that make up matter are 0.999999, of vacuum, and the nucleus occupies the middle of the atom, the size of which is not worth mentioning, so if the size of the atom is the size of a football field by comparison, the nucleus is the size of a tennis ball in the middle of the field. Electrons are a foggy cloud that circulates outside the stadium stands, while the rest of the stadium is a vacuum that does not contain any matter. However, we find that light travels with the movement of air atoms, with which the vacuum inside them moves at the same speed and direction.

Light's Dependency on the Propagating Medium

In the Michaelson-Morley experiment, light did not travel in the ether or in a vacuum, but rather it travelled through the light-transmitting medium (air), and was affected by its density, speed, and direction.

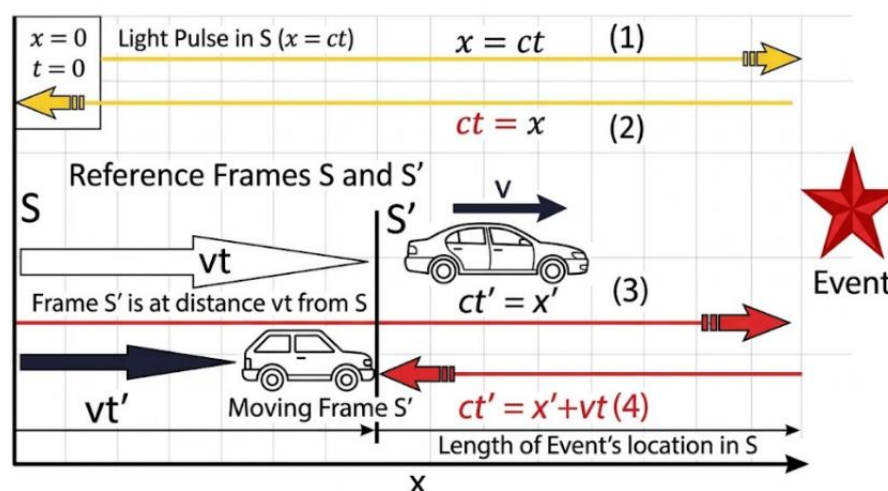
To experimentally evaluate the link between light propagation and the carrier medium, one could design an experiment, where two opposing light pulses are emitted from a sole source toward two detectors placed at equal distances. By introducing a high-speed airflow in one direction, the light pulse traveling with the airflow would reach its detector faster than the pulse traveling in the opposite direction. This is because the velocity of light is influenced by the motion of the medium through which it passes.

The fundamental objective of the Michelson-Morley experiment was to detect a shift in wave interference resulting from a difference in the velocities of the two beams—an outcome that was never realized. While this might suggest that the beams did not travel through a material "ether," it does not negate the motion of light through a vacuum [8].

The Strangeness of Lorentz Transformations

Given that the speed of light is constant and independent of the source's velocity, both the light beam in the moving frame and the beam in the stationary frame—as conceptualized in the Lorentz derivation—must arrive simultaneously. This implies that the temporal coordinates are identical, such that ($t' = t$).

Furthermore, the distance traversed by the beam emitted from the stationary frame to the event, as described in Equation (1), is equal to the distance traversed by the beam from the event back to the observer in Equation (2). This equality arises because they both occupy a single, unified reference frame. Consequently, there is no discernible discrepancy in either the distances traversed by the two beams or their respective arrival times. Based on this physical symmetry, one may be substituted for the other, as demonstrated in the equations below:



$$x = \gamma (x' + vt') = ct \dots \dots \dots (1)$$

$$c = x/t \dots \dots 1/c = t/x$$

$$ct = x \dots\dots\dots c = t/x$$

$$1/c = t/x \dots\dots\dots(2)$$

$$1/c = t/x = 1/c = t/x$$

As for the equations below: (3 and 4), the frame ray in equation (3), travelled the distance (ct'), and its velocity is not related to the frame velocity, which is the same distance travelled by the ray (ct).

In contrast, the "event beam" in Equation (4) traverses a distance (ct'), where the distance covered is directly dependent on the velocity of the moving frame. Consequently, as the frame's velocity increases, the distance (vt') likewise increases; this results in a reduction of the value of (ct'), meaning the event beam would require less time to reach the moving frame.

This implies that in the Lorentz derivation, the coordinates of a beam whose velocity is independent of the source were erroneously substituted with the coordinates of a beam whose velocity is dependent on the source. This represents a fundamental error committed by Lorentz and serves as definitive evidence of the invalidity of the Lorentz Transformations. We substantiate this conclusion through the following equations:

$$x' = \gamma (x - vt) = ct' \dots\dots\dots(3)$$

$$c = x'/t' \dots\dots 1/c = t'/x'$$

$$ct' = x' \dots\dots c = t'/x'$$

$$1/c = t'/x' \dots\dots\dots(4)$$

Where:
 $X' \neq X$

Because the moving frame beam is not related to the source speed:

$$ct' = X = ct$$

$$X' \neq ct'$$

$$X' = ct'$$

$$ct' \neq ct'$$

$$c = c$$

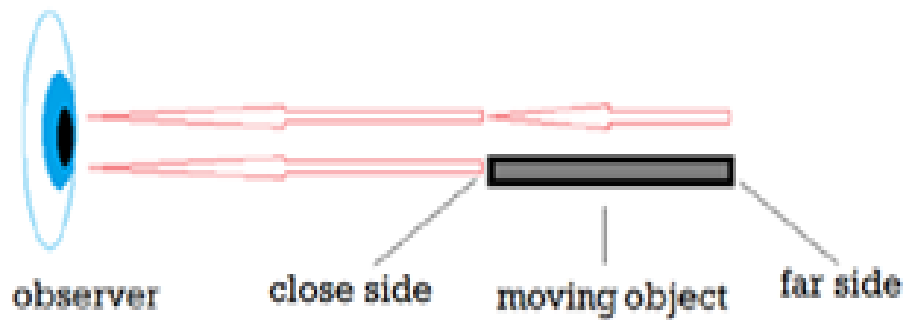
$$t' \neq t'$$

Analysis of Length Contraction Derivation

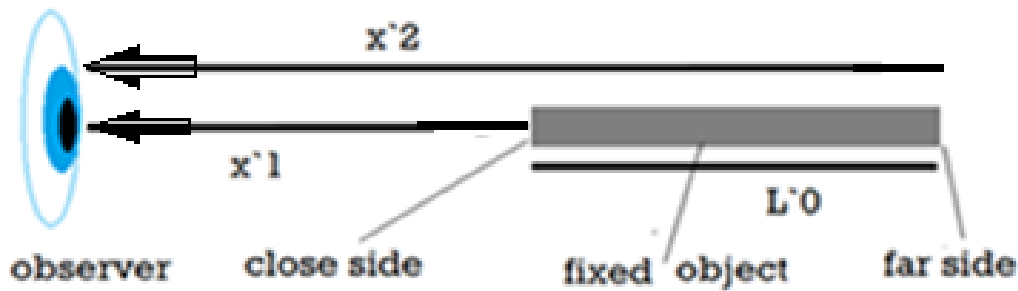
In the derivation of the Length Contraction Law, the timing of observing the two ends of a stationary object posed no significant issue. However, for a moving object, the observation of both ends must occur simultaneously. Since distance is defined as velocity multiplied by time ($d = v t$), the observation time for the distal (far) end of the object must inherently be longer than that of the proximal (near) end, as the former is at a greater distance from the observer [9].

Despite this physical axiom, Lorentz assumed that the observation time for the near end is equal to that of the far end. For both ends to be observed at the same moment, the light beam from the far end must first reach the near end, and then both beams must propagate together toward the observer.

We illustrate this in the drawing below.



The following illustration represents the Lorentzian derivation for a moving object of length (L), where Lorentz assumed that the time taken by beam (x_1) is equal to the time taken by beam (x_2).



Mathematical Description of the Real Length

To find the correct equation that describes the true length of a moving object for all observers, we can describe it as follows: We know the value of the distance light travels per second, we call it (light second), so we assume an object that is one light second long is moving at the speed of light on a ruler, through which we can determine the location of the front of the moving object, as the object begins to move from the beginning of the ruler from the zero point. We have chosen the speed of (C) to simplify the calculation and clarify the state.

If an observer is positioned at the start of the ruler (point zero), after one second, the observer will see the front of the object at number 50 cm (0,5 ls) mark. The object would have taken (0.5) seconds to reach that mark, and the light beam from the front would require another (0.5) seconds to reach the observer. During this latter half-second, the front would have continued to the end of the ruler at number (100 cm. one ls). At that exact moment, the observer sees the rear of the object at the zero mark. Here, the condition of simultaneity is met; the observer sees both ends at once and perceives the length as 50 cm.

However, if a second observer were placed at the end of the ruler (mark one hundred), they would see the front of the object one second after its departure. Given that distance equals velocity times time and applying the same observation moment as the first observer, we find that the intrinsic length of the object remains identical to its length at rest. It is neither what the contraction equation describes nor merely what a single observer perceives.

Consequently, the length of an object remains invariant, regardless of whether it is stationary, moving, receding, or approaching. This confirms the constancy of physical laws even at the speed of light. Thus, the Length Contraction Equation becomes redundant, as its basis is unrealistic and its derivation lacks logical consistency.

The mathematical description of the object's length in the experiment is as follows: The total length after one second is the sum of the distance covered in the first 0.5 seconds plus the distance covered during the time it took for the light beam to reach the observer:

$$0.5 + 0.5 = 1 \text{ m}$$

The table below compares Galilean Transformations with Lorentz Transformations at various velocities, highlighting the anomalous results produced by the Lorentzian framework.

Time	C	Dis	Velocity	change	Galileo	Galileo	gama	Contraction	Lorenz x	Lorenz x'
Sc	1c	d=x	vc	vt	$x'+vt'$	$x-vt$	$1/\sqrt{(1-v^2/c^2)}$	$1/\gamma$	$(x'+vt')*\gamma$	$(x-vt)*\gamma$
t	C	d	V	D	x	x'	γ	vt'	x	x'
1	1	1	0,000001	0,000001	1,000000	0,999999	1,000000	1,000000	1,000000	0,999999
1	1	1	0,000928	0,000928	1,000000	0,999072	1,000000	1,000000	1,000000	0,999072
1	1	1	0,100000	0,100000	1,000000	0,900000	1,005038	0,994987	1,005038	0,904534
1	1	1	0,200000	0,200000	1,000000	0,800000	1,020621	0,979796	1,020621	0,816497
1	1	1	0,250000	0,250000	1,000000	0,750000	1,032796	0,968246	1,032796	0,774597
1	1	1	0,300000	0,300000	1,000000	0,700000	1,048285	0,953939	1,048285	0,733799
1	1	1	0,366025	0,366025	1,000000	0,633975	1,074570	0,930605	1,074570	0,681250
1	1	1	0,450000	0,450000	1,000000	0,550000	1,119785	0,893029	1,119785	0,615882
1	1	1	0,500000	0,500000	1,000000	0,500000	1,154701	0,866025	1,154701	0,577350
1	1	1	0,600000	0,600000	1,000000	0,400000	1,250000	0,800000	1,250000	0,500000
1	1	1	0,618034	0,618034	1,000000	0,381966	1,272020	0,786151	1,272020	0,485868
1	1	1	0,650000	0,650000	1,000000	0,350000	1,315903	0,759934	1,315903	0,460566
1	1	1	0,707107	0,707107	1,000000	0,292893	1,414214	0,707107	1,414214	0,414214
1	1	1	0,750000	0,750000	1,000000	0,250000	1,511858	0,661438	1,511858	0,377964
1	1	1	0,800000	0,800000	1,000000	0,200000	1,666667	0,600000	1,666667	0,333333
1	1	1	0,866025	0,866025	1,000000	0,133975	2,000000	0,500000	2,000000	0,267949
1	1	1	0,900000	0,900000	1,000000	0,100000	2,294157	0,435890	2,294157	0,229416
1	1	1	0,990000	0,990000	1,000000	0,010000	7,088812	0,141067	7,088812	0,070888
1	1	1	0,999900	0,999900	1,000000	0,000100	70,712446	0,014142	70,712446	0,007071
1	1	1	0,999990	0,999990	1,000000	0,000010	223,60736	0,004472	223,60736	0,002236
1	1	1	0,999999	0,999999	1,000000	0,000001	707,10696	0,001414	707,10696	0,000707
1	1	1	1,000000	1,000000	1,0000	0,000000	∞	0,000000	∞	0,000000

Following the discovery of the fundamental errors within the Lorentz transformations and the invalidity of the length contraction equation, it has become imperative to seek new transformations applicable to all physical laws, including Maxwell's equations. Our approach derives these transformations by applying Galilean transformations to the light beam traveling from the event to the observers, rather than the inverse.

New Relativity Transformations

To derive transformations that accurately reflect the intrinsic distance between a primary observer (considered stationary), a secondary observer (defined as moving), and an event (stationary relative to the stationary observer), we must account for the fact that observation occurs the moment light from the event reaches each observer. This is determined by the observer's position and their distance from the event now of measurement.

Crucially, the moment of measurement is independent of time and, by extension, independent of velocity; it depends solely on distance. The essential factor is defining the moment of measurement relative to a third observer who monitors the events at close range, capturing a "snapshot" of each event at its specific location and time of occurrence. This third observer's record serves as the definitive evidence of the event's actual coordinates. To illustrate this, we propose the following thought experiment:

Consequently, the observer on the rocket is the first to witness the solar flares, six minutes after their occurrence (this represents the second image; the first image being the actual occurrence of the flares six minutes prior, coincident with the rocket's launch). Meanwhile, the observer on Earth will receive the image of the flares eight minutes after the event (the third image).

Diagram illustrating the relativity of simultaneity. A vertical black line on the left represents the rest frame. A horizontal blue line represents the moving frame. A red star labeled "Event" is on the right. A red line labeled "Event Beam" connects the blue line to the star. A black line labeled "Moving frame" connects the black line to the blue line. A black line labeled vt' is below the black line. A red line labeled ct' is below the red line.

- F - Location of the static frame.
- F`1 - The first location of the moving frame's arrival.
- F`2 - The second location of the moving frame's arrival.
- R - Event (explosion).
- x` - the distance between the moving frame and the event.
- x - the distance between the static frame and the event.
- S - the distance travelled by the moving frame during the time the frame image arrives at the stationary observer.
- c - speed of light.
- v - the relative speed between the two frames.
- t` - time of moving frame.
- t - static frame time.
- t`` - light time for the distance from the moving frame to the stationary one.

Sequence of Events and Derivation of Equations

Based on the chronological order of events, the first event is the explosion occurring at the source. At that precise moment, an observer in a moving frame departs from the point of coincidence with the stationary observer, heading toward the explosion. We contend that the light beam emitted from the frames toward the event—as used in the Lorentz derivation—serves no functional purpose in this context.

The second event occurs when the moving observer reaches position (F_1), having traversed (vt'). Now of arrival, the observer perceives the image of the explosion, which has traversed (ct'). Here, we find that the time of the light beam equals the time of the moving frame, allowing for the substitution of one for the other as follows:

The distance covered by the moving frame during the interval in which the light beam travels from the moving frame to the stationary observer (to facilitate the third event, the stationary observation) is expressed by the following equations:

$$\begin{aligned}vt' &= ct'' & t'' &= vt'/c \\ S &= vt'' & S &= v \cdot vt'/c \\ S &= v^2t'/c\end{aligned}$$

When the stationary observer perceives the explosion, they simultaneously observe the moving frame at its first position, (F_1). However, by that time, the moving frame has already reached its second position, (F_2). Thus, the actual total distance between the two observers now of observation is the distance traversed by the moving frame (vt'), plus the additional distance covered during the time required for the image to reach the stationary observer (S):

$$\begin{aligned}vt &= vt' + S \\ vt &= vt' + v^2t'/c \\ vt &= vt' (1 + v/c) \\ vt' &= vt \frac{1}{1 + v/c}\end{aligned}$$

The Correction Factor

Consequently, the Correction Factor for the transformations between the readings of the two observers is defined as follows:

$$\hat{n} = \frac{1}{1 + v/c}$$

By incorporating this “unseen distance” into the Galilean transformations, the new transformations—after multiplying the distances by the correction factor—take the following form:

$$x' = x - \frac{(vt + \frac{v^2t}{c})}{1 + v/c}$$

As for the total distance now, the stationary observer perceives the moving frame, we find that it converges to the Galilean transformations through the following equation:

$$x = x' + \frac{(vt' + v^2t'/c)}{1 + v/c}$$

Evaluating the New Transformations

To validate these three transformations, we conduct a thought experiment in which a moving frame travels toward the event at half the speed of light ($0.5c$). We analyse the results by applying the experiment to the three transformations, assuming the distance between the stationary frame and the event is one light meter, which light traverses in one second.

Galileo Transformations

$$x' = x - vt$$

An observer watching the experiment from his observatory on Mars can use Galileo transformations, because the beam of light emanating from the static, moving, and event frame is all in one frame and is at the same distance from it, so the results are as follows:

$$x' = 1 - 0,5 \cdot 1 = 0,5 \text{ m}_c$$

Lorentz Transformations

$$x' = \frac{x - vt'}{\sqrt{1 - v^2/c^2}} \quad x' = \frac{1 - (0,5 \cdot 1)}{\sqrt{1 - 0,5^2/1^2}}$$

$$x' = 0,577367 \text{ m}_c$$

It is not possible to find a description that expresses the number resulting from the equation, as it is neither the actual distance travelled nor the distance seen in relation to the moving observer, nor the distance expected by the stationary observer.

New Transfers

$$x' = x - \frac{vt + v^2t/c}{1 + v/c}$$

$$x' = 1 - \frac{0,5 + 0,25}{1 + \frac{0,5}{1}}$$

This result is consistent with the measurements of all observers at different speeds.

When discussing motion at velocities approaching the speed of light, we are talking about the actual locations of events, not as we see them. Observing a distant event requires a finite interval for the image (light) to reach the observer. During this interval, the moving frame will have advanced toward the event, or the event itself will have shifted to a new location if it is in motion.

For instance, when we observe the Moon, the image we see is (1.27) seconds old—the time required for the lunar light beam to reach us. During this brief period, the Moon has travelled approximately (1,030) meters westward relative to an observer on Earth. Consequently, the Moon's actual position differs from its observed position because the image we perceive is a signal from the past. Regardless of an object's proximity—even if it is only one meter away—we are observing an image that is (1/299,792,458) of a second old.

The table below details the distances calculated for various velocities according to these (new transformation).

Time	Light	Distance	Velocity	change	Galilyeo	Galilyeo	C.Vactor	Sadik	Sadik	Sadik
t	l _c	d = x	vc	vt	x' + vt'	x - vt	1/(1+v/c)	vt.h	v ² t/c.h	x - vt' - s
t	C	d	V	vt	x	x'	h	vt'	S	x'
1	1	1	0,000001	0,00000	1,00000	1,00000	1,00000	0,000001	0,000000	0,999999
1	1	1	0,000928	0,00093	1,00000	0,99907	0,99907	0,000927	0,000001	0,999072
1	1	1	0,100000	0,10000	1,00000	0,90000	0,90909	0,090909	0,009091	0,900000
1	1	1	0,200000	0,20000	1,00000	0,80000	0,83333	0,166667	0,033333	0,800000
1	1	1	0,250000	0,25000	1,00000	0,75000	0,80000	0,200000	0,050000	0,750000
1	1	1	0,300000	0,30000	1,00000	0,70000	0,76923	0,230769	0,069231	0,700000
1	1	1	0,366025	0,36603	1,00000	0,63397	0,73205	0,267949	0,098076	0,633975
1	1	1	0,450000	0,45000	1,00000	0,55000	0,68966	0,310345	0,139655	0,550000

1	1	1	0,500000	0,50000	1,00000	0,50000	0,66667	0,333333	0,166667	0,500000
1	1	1	0,600000	0,60000	1,00000	0,40000	0,62500	0,375000	0,225000	0,400000
1	1	1	0,618034	0,61803	1,00000	0,38197	0,61803	0,381966	0,236068	0,381966
1	1	1	0,650000	0,65000	1,00000	0,35000	0,60606	0,393939	0,256061	0,350000
1	1	1	0,707107	0,70711	1,00000	0,29289	0,58579	0,414214	0,292893	0,292893
1	1	1	0,750000	0,75000	1,00000	0,25000	0,57143	0,428571	0,321429	0,250000
1	1	1	0,800000	0,80000	1,00000	0,20000	0,55556	0,444444	0,355556	0,200000
1	1	1	0,866025	0,86603	1,00000	0,13397	0,53590	0,464102	0,401924	0,133975
1	1	1	0,900000	0,90000	1,00000	0,10000	0,52632	0,473684	0,426316	0,100000
1	1	1	0,990000	0,99000	1,00000	0,01000	0,50251	0,497487	0,492513	0,010000
1	1	1	0,999900	0,99990	1,00000	0,00010	0,50003	0,499975	0,499925	0,000100
1	1	1	0,999990	0,99999	1,00000	0,00001	0,50000	0,499997	0,499993	0,000010
1	1	1	0,999999	1,00000	1,00000	0,00000	0,50000	0,500000	0,499999	0,000001
1	1	1	1,000000	1,00000	1,00000	0,00000	0,50000	0,500000	0,500000	0,000000

The description of moving bodies and the determination of their actual positions within these new transformations align perfectly with the Principle of Relativity, which asserts the invariance of physical laws. These laws remain unchanged when applied by any observer, regardless of their velocity. Consequently, we find that transformations themselves lose their necessity if every observer can employ all physical laws by defining their own frame as stationary. Thus, Galilean transformations prove sufficient for all velocities, provided we account for the distance traversed by the moving frame during the interval required for observation.

It is an established axiom that the relative relationship between two frames applies only to objects governed by Newton's First Law of Motion—the Law of Inertia. Under these fundamental conditions, we can dispense with the spatial coordinates that relativistic conditions do not permit, namely (y, y', z, z') , and even the (x') in the opposite direction coordinate, as the laws of relativistic transformations do not apply to bodies moving in more than one axis.

The Principle of Relativity emphasizes that all physical laws used by a stationary observer remain invariant when used by an observer in a moving frame that satisfies relativistic conditions. Based on this principle, we can convert between the readings of two observers because they are utilizing the same law. Since the relationship is relative—where both frames are in motion, and we are the ones who assumed that one of them is stationary with respect to the second frame—we, as a third observer, cannot determine the velocity of any frame relative to an absolute rest reference in the universe (which we might call "Etheric Velocity"), for we ourselves occupy a moving frame.

The Michelson-Morley experiment demonstrated that light travels at the same speed in all directions on Earth's surface despite the Earth's motion, building on the invariance of physical laws for all observers, there is nothing to prevent any observer from using all physical laws in their original mathematical form, including Maxwell's equations of electromagnetism. This confirms that laws do not change with velocity. What applies to the Earth—moving around the Sun at (30 km/s)—applies to any frame regardless of its relative or "etheric" velocity.

Every frame in the universe is moving within another moving frame, and any matter within a frame's influence acquires that frame's velocity.

As for sound and light, they are massless waves that move with the frame and are influenced by the moving medium. Once they exit the frame, they are no longer tied to its velocity and take on different values for various observers based on their respective speeds and directions.

Therefore, all transformations become devoid of value or meaning if each observer can utilize the same law without the need for conversion. The link between the coordinates of two observers in different frames concerns only the distance and the relative velocity between the two frames—nothing more.

In conclusion, the Michelson-Morley experiment paved the way for the derivation of a Unified Theory of Relativity. This theory explains the invariance of physical laws across all reference frames without the need for transformations between observers' readings. Consequently, the need for all previous relativistic theories—including the new transformations

proposed herein—is effectively superseded.

Postulates of the Unified Theory of Relativity

- **Scope of Relativity:** The relativistic relationship regarding velocity, time, and distance between two frames applies exclusively to the motion of bodies governed by the Law of Inertia.
- **Invariance of Physical Laws:** All physical laws employed by any observer remain invariant; their outcomes do not change based on the velocity of the observer's reference frame.
- **Impossibility of Consensus:** It is impossible for two observers in different reference frames to reach an agreement on the velocity and direction of a third frame.
- **Constancy of Light Speed:** The speed of light is constant relative to the frame in which it propagates and is independent of the velocity or direction of the source emitting it.
- **Universal Motion and Subjective Rest:** Every frame in the universe is in motion; nevertheless, every observer has the right to claim they are in a stationary frame, which entitles them to utilize all physical laws, including those of electromagnetism.

By employing these five postulates, we can dispense with all transformation equations and replace them with a single equation that applies to all observers equally.

Stationarity is either absolute or non-existent; we cannot categorize a body as stationary while it is in motion. However, any observer is uniquely entitled to claim a stationary frame for the purpose of applying physical laws.

To derive a universal equation, we merely need to adjust terminology and integrate Galilean transformations into a single expression. Consequently, the physical laws used by one observer become identical to those used by another without needing conversion. The only difference lies in the direction of motion, which does not affect the mathematical output of the following equation:

$$X = X' + vt$$

This equation applies even to light or any object moving at any velocity within a single frame. It expresses actual positions, where light is always the dynamic entity and the observer is the stationary one—the reverse is not permissible.

Through this theory, we explain the constancy of the speed of light in all directions relative to the Earth in the Michelson-Morley experiment, provided that the observer, the apparatus, and the light share a single reference frame: The Earth. The nature of the observation varies only when the observer belongs to a different frame.

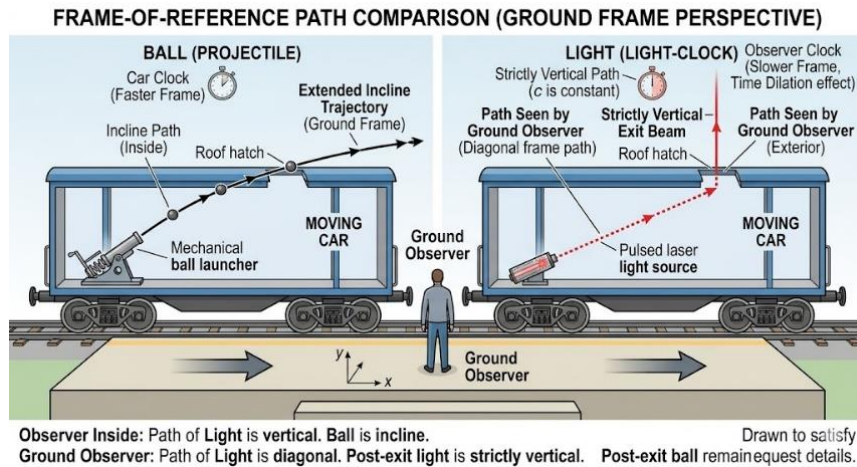
The Train Thought Experiment: A Critique

Consider an observer inside a train watching a child play with a ball. When the child throws the ball upward, it returns directly to their hand. However, the perceived motion of the ball changes if that same observer stands on the station platform watching the train pass. Although the ball's motion remains constant, the observational frame has changed. Thus, observation does not alter the trajectory, nor does it express the actual reality of the event, its true direction, or its actual velocity. Each observer describes the event based on their relative velocity and specific direction.

Considering these postulates, Special Relativity and its equations become unrealistic and devoid of physical or mathematical value, as physical laws are invariant and do not fluctuate with velocity.

Einstein's interpretation of the Michelson-Morley experiment was further removed from reality than FitzGerald's, introducing illogical equations that are impossible to validate. He described motion in the "two-boats" analogy as traversing terrestrial distance rather than the distance through the water. Einstein failed to realize that the speed of light in his derived equations incorrectly implies a dependency on the source's velocity—a contradiction to established scientific consensus.

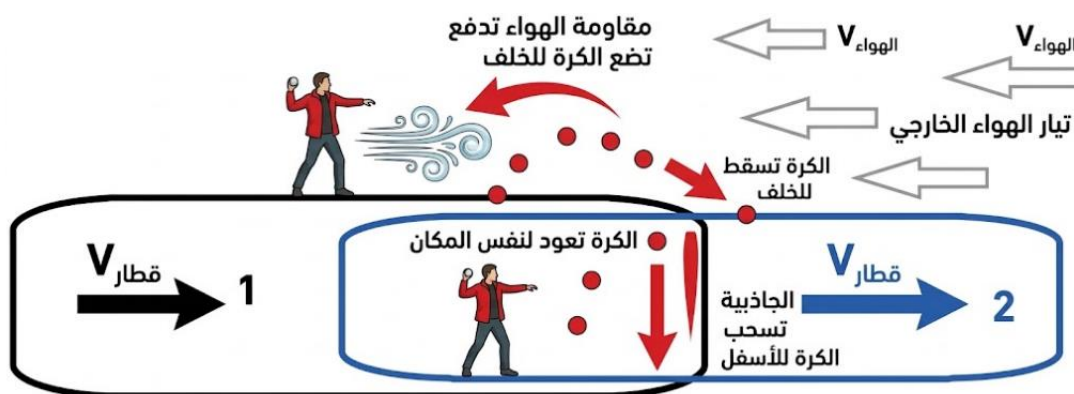
While the motion of light might align with the motion of a ball inside a train carriage (as they share a frame), this alignment vanishes once they exit the train carriage. If there were an opening in the roof, a platform observer would see light moving independently of the train's motion, whereas the ball would retain the train's horizontal velocity due to its mass. Light, being massless, does not acquire this horizontal momentum. We illustrate this distinction in the diagram below:



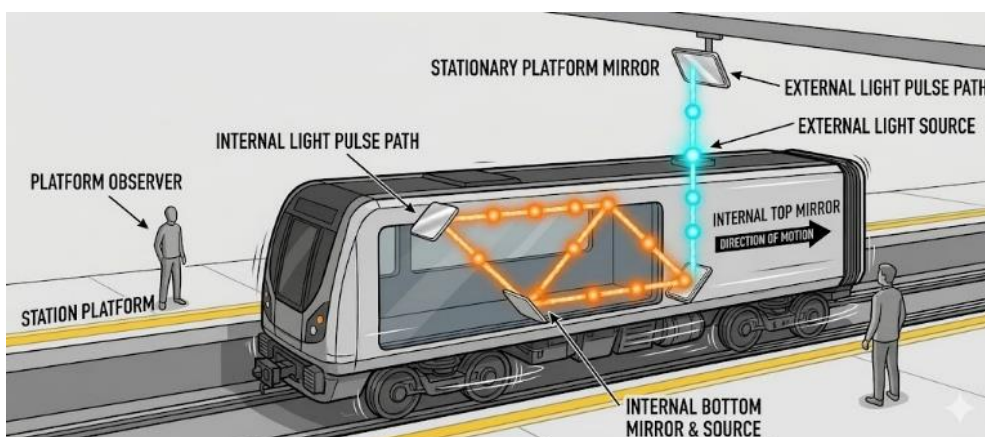
Empirical Verification and the Air Resistance Paradox

To substantiate this, we propose the following thought experiment: consider a train carriage moving at 100(km/h carrying two observers, the first observer, inside the carriage, throws a ball upward to a height of one meter; after 2 seconds, the ball returns to their hand at the exact point of departure. The second observer, standing on the roof of the carriage, performs the same action. After 2 seconds, however, he finds that the ball lands at a distance) L (behind the starting point, as a result of the force of air thrust, which is inversely proportional to the mass and directly proportional to the size of the surface area facing the air, and when mass approaches zero, an object loses all horizontal velocity, and its motion becomes entirely dependent on the external medium (air). Conversely, inside the carriage, the ball's motion is tied to the carriage's velocity and direction, regardless of mass. This same principle applies to light.

The following drawing represents the above description:

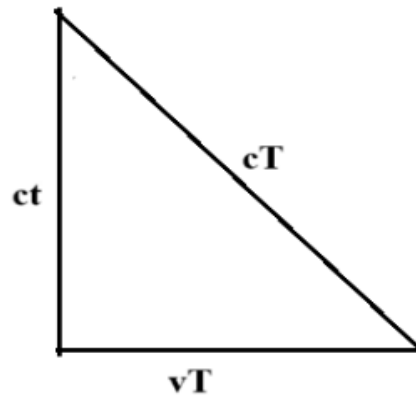


The trajectory of a light pulse emitted from the roof of the carriage would be strictly vertical, not diagonal as it appears inside the carriage. This is because the light pulse is independent of the carriage's motion but dependent on the transmitting medium moving with the Earth. To an external observer, it would appear as shown below, even if the train moved at the speed of light. This experiment confirms that the movement of light is related to the frame in which it is located.



Critique of Time Dilation and the Pythagorean Derivation

Einstein's Time Dilation equation fails to align not only with the motion of a light beam but even with the motion of the ball Inside the train carriage. If the train were moving at the speed of light ($v = c$), the equation implies the ball would never reach the ceiling nor return; instead, it would move in a purely horizontal line [10]. This contradicts physical reality. If the train moves at (c), the distance it covers in one second equals the distance light covers from the floor to the ceiling in one second. Thus, the train's time would equal the observer's time, and the Pythagorean triangle used to derive time dilation would fail to match the equation's own output. The Pythagorean triangle from which the equation for the deceleration of time is derived becomes as follows:



When a train moves at the speed of light, the equations become as follows:

$$\begin{aligned}v &= c \\ct &= vT \\t &= T\end{aligned}$$

Furthermore, although the Length Contraction Law contradicts the premise of Time Dilation, Einstein retained it out of professional deference to Lorentz. Einstein should have incorporated the train carriage's length contraction into his time dilation derivation to ensure the coordinates matched what a platform observer sees in full detail. It is illogical for an observer to perceive the diagonal light path inside the carriage without also perceiving the carriage's contraction; this oversight fundamentally alters the validity of his thought experiments.

Proof of Temporal Invariance

To confirm the invariance of time across stationary and moving frames, consider this: light travels one meter in one second. In a train carriage one meter long, a light beam travels from the rear to the front. To an internal observer, light covers this distance in one second, regardless of the carriage's velocity. However, if the carriage moves at ($0.5c$), the Contraction Law dictates its length becomes (0.866) m, while Time Dilation suggests time expands to (1.154734) seconds.

Applying these simultaneously reveals that light still traverses the carriage's length in exactly one second for all observers:

$$1/1.154734 = 0.866 / T$$

$$T = 1 \text{ sec}$$

This confirms that the laws of contraction and dilation are mutually exclusive; the application of one nullifies the other. Moreover, the relativistic assertion that the platform observer could be viewed as the "moving" one leads to an illogical paradox in time dilation.

Conclusion: Light and the Doppler Effect

The principles governing material bodies do not apply to light. Light is a wave subject to the Doppler Effect, which confirms that light moves independently of its source. As an object approaches an observer at the speed of light, the observer cannot see it until it arrives; the light cannot precede the object because the first emitted ray covers a relative distance of zero, rendering the wavelength zero. This is exactly analogous to the sonic boom of a supersonic jet [11].

The speed of light (c) is not a universal constant relative to all observers equally. While the wave speed is constant, the source moves relative to the wave—a fact substantiated by the Doppler effect. The Doppler effect does not change the wave's intrinsic speed, but it changes the wavelength and the relative separation velocity. If you move toward light, you enter a new reference frame where the observed velocity is the sum of your velocity and the speed of light, as originally posited by Maxwell.

Conclusion and Recommendations

Einstein constructed his Theory of Relativity upon the results of the Michelson-Morley experiment, specifically relying on the Lorentz transformations, which were themselves predicated on the unexpected outcomes and subsequent misinterpretation of that experiment.

Numerous physicists and scholars have authored extensive works and research papers attempting to refute the Theory of Relativity due to its counterintuitive nature. Many prominent researchers have contributed to a body of work that presents Einstein's relativity as detached from reality, casting doubt on its validity; however, they have done so without identifying or explaining the fundamental reasons behind the theory's failure.

I am fully aware that convincing established physics professors—despite the comprehensive evidence, mathematical derivations, and realistic scientific experiments I have presented—is no simple task. But our basic recommendation is a call for the attention of a scientific institution in conducting a successful experiment I developed to determine the Earth's absolute speed. This endeavor also aims to provide an empirical reinforcement of the findings detailed in this research.

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