ORIGINAL RESEARCH ARTICLE

The History of Physical Thought in the Process of Special Relativity

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ABSTRACT

This paper briefly reviews the history of the theory of special relativity, from the concept to the thinking, from the theory and methods, as well as the application to understand the induction and innovation, discusses the special theory of relativity is Einstein set before the scientific achievements of many scientists. The expression of the theory of special relativity is a good example of scientific inheritance.

KEYWORDS: Einstein's innovation of special relativity

1. Introduction

Einstein published the Electromodynamics of the body in Germany in June 1905, the two principles of the theoretical basis were the principle of mechanical relativity and the invariance of the speed of light, Marking Einstein created a special theory of relativity, so that the electromagnetic field theory and classical mechanics have been unified, creating a new era of physics.

The study of the history of modern physics, deep sense of the theory of relativity is Einstein scientific innovation of the fine specimens. But look at the history of special sense of relativity found, it is not difficult to find it is set before the great scientists for the results of the Dacheng above. The discovery of special relativity is undoubtedly the innovation of Einstein, but its innovation is inheritance, so in this process must reflect the Maxwell, Galileo, Lorenz and other great scientists. This is also respect for the inheritance of scientific research. This paper reviews the discovery process of special relativity, and shows that the innovation of special relativity is a good example of scientific inheritance. Of course, scientific research also requires another kind of new innovation, Einstein's general theory of relativity as a good example, later described slightly.

2. Einstein before the special theory of relativity

At the end of the 19th century physicist Thomson at an international conference, 'the physics building has been completed, after the work is only the internal decoration and painting.' However, he said: 'The building is also floating over two 'dark clouds', McKesson - Morey test results and black body radiation UV disaster.' It is in order to solve the above two problems, the physics of a The profound revolution led to the birth of relativity and quantum mechanics.

As early as the date of the establishment of the Maxwell equation of the electrodynamics, it was found that it did not involve the reference system. It is found that the Maxwell equation and its derived equations (such as Helmholtz, D'Alembert and other equations) are different in different inertial systems under the Galilean transformation, and this phenomenon should be discussed by using the classical mechanics theory of space-time theory. After decades of exploration, in 1905, Einstein finally created a special theory of relativity.

Relativity is a theory of time and space, to understand the special theory of space-time theory of space-time theory to understand the contents of the classic space-time theory. So to seriously look at the following content, is conducive to the understanding of relativity.

2.1. 'Ether' concept and absolute reference system

2.1.1 'Ether' concept

After Michael's prediction of electromagnetic waves, most scientists believe that the propagation of electromagnetic waves requires media (media). This medium is called 'ether' (classic ether). 'Ether' should have the following basic attributes:

(1) Full of the universe, transparent and very small density (electromagnetic dispersion space, all-pervasive);

(2) High elasticity. Can be in the horizontal position for vibration, especially electromagnetic waves are generally shear waves, the ether should be a solid (G is the shear modulus ρ is the dielectric density);

(3) The ether is only in Newton's absolute space-time stationary, that is, in the special frame of reference.

The objects that are still in the ether are absolutely static, and the absolute movement of the object relative to the ether is absolute movement. After the introduction of 'ether', it is assumed that the Maxwell equation is only established for the absolute frame of reference to the 'ether', then the absolute velocity of an inertial system relative to the ether can be determined experimentally. It is generally believed that the earth is not an absolute frame of reference. It can be assumed that the ether is connected with the sun, so that it should be experimented on the earth to determine the absolute velocity of the earth itself relative to the ether, that is, the velocity of the earth relative to the sun. To this end, people designed a lot of accurate experiments (including Einstein has also designed this experiment), one of the most famous and most meaningful experiment is the Michelson - Morey experiment (1887).

2.1.2 Light trip phenomenon

The light line was first reported by J. Bradley in 1727.

A) The earth is relatively stationary with the star.

B) Earth relative to the star with constant rate movement.

C) The sun is still relative to the ether

Bledley's observation of the Galaxy Ray γ for a year has come to the conclusion that the ether is stationary relative to the stars or that the ether is not dragged by the earth altogether.

2.1.3 Micrel Sun - Morey Experiment

Purpose

Find the absolute reference system established by the law of electrodynamics, that is, with the etheric reference system. Experimental hypothesis: 1. Assume that the electromagnetic field equation is strictly established in the absolute inertial system (which is considered to be approximately established on Earth). 2. In the 'ether', the speed of light is the same, and is equal to C, and in other frame of reference, the speed of light is not homosexual (from Galileo transformation) (3) assume that the sun and the ether fixed, the earth relative to the ether speed Is the speed of the earth's movement around the sun.

Experimental results

The upper limit of the interference fringe movement is 0.01, so that the relative velocity of the earth is about zero. After doing a lot of experiments, the results are the same. It can be said that the stripes are not moving, that is, the earth is relatively static. (Later many times similar to the experiment, the accuracy is getting higher and higher. This result caused a great sensation.

Therefore, the light line difference phenomenon and Michael Sun - Morey experiments show that the speed of light has nothing to do with the movement of the reference system. So deny the ether hypothesis.

2.2. From the Copernicus to the 'boat do not feel' Galileo relativity

Copernicus said in the mid-16th century. Although it is perfect compared to the extremely tedious Ptolemy heart

Simple, both in line with the thought of Bihadlas's uniform circular motion and Aristotle's theory of cosmic geology, and trying to prove God's existence in harmony with the heart, but Copernicus thinks that the sun is the center of the universe, violating the Bible and touching God Authority, still regarded as heresy. At the beginning of the 17th century,

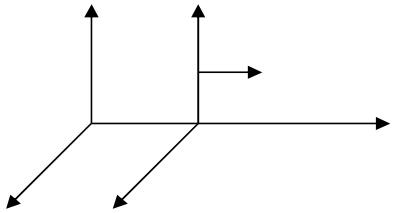
the Catholic Church declared a ban. Bruno supports Copernicus, and does not think that the sun is the center, advocating the universe infinite, there is no center, 1600 was burned alive. The Galileo, who agreed with the Copernican theory, was also severely persecuted. Aristotle-Ptolemy system of defenders struggling to academically oppose the heart said that an important reason is: if the earth at high speed, why people do not feel?

Galileo has responded to this, Galileo has created a combination of experimental and rational thinking of modern physics research methods, get many important results in the famous on the Ptolemy and Copernicus two world system dialogue (1632) and ((In the first dialogue, Galileo wrote: 'Keep you and your friends in a master cabin under a large ship deck.' After careful observation of these things, and then make the boat at any speed forward, as long as the movement is uniform, do not swing around, you will find that the entire above phenomenon did not change. You cannot from any one of the phenomena to determine the ship is in motion, or even the boat was so fast ... 'He argued the most important thing: from the smooth boat in the ship occurred in any' things ', cannot determine whether the ship is in a smooth uniform motion or still. In the second dialogue, Galileo described another important result. Along the slope of AB objects, at the point B to get the speed of its Moving forward along the slope BC, the object is not affected by the BC tilt will still reach the same height as the point A, but the time required is different; when the second slope is neither rising nor falling, the object will Has been moving at a rate that is always moving forward, and Galileo has made a big step forward, recognizing that it is not subject to other objects, that the body can move more than it is very close to the law of inertia.

2.2.1 Galileo Relativity Principle

Physics has a relativity principle of direction, then whether there is relative relativity of reference space relative motion. Ie whether there is a reference space that is physically equivalent and relative to each other (inertial motion).

1, Galileo relativity principle: for different inertial system, the law of mechanics is exactly the same. Galileo Boat Thought Experiment.



Galileo transformation:

$$\begin{cases} x' = x - vt \\ y' = y \\ z' = z \\ t' = t \end{cases}$$

Newton's law of motion is covariant under Galilean transformation. But this transformation implies two basic assumptions.

2, The absolute view of time and space

1) Time is absolute: in the classical physics, the time of an event is so determined,

Its establishment conditions:

First, there is an instantaneous propagation signal;

Second, the clock movement does not affect his speed.

The only way to measure the same event in different inertial systems is the same. (Assuming that the clocks in the different inertial systems have been synchronized)

2) The length is absolute: for a given inertia in the length of the foot has a length, relative to the inertial system for uniform linear motion in the coordinate system, the ruler has the same length.

Absolute time and space view in Newton's 'Mathematical Principles of Natural Philosophy' is to say: 'absolute real mathematical time, in essence, is a kind of unrelated to the outside world with a uniform flow'

'Absolute space, in essence, has nothing to do with the outside world, is the same and static, immobile'

2.2.2 Newton's relativity principle:

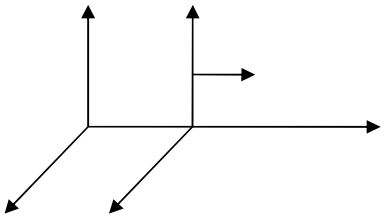
Newtonian mechanics is the first branch of physics that has developed systematically as an experimental science. The main content comes down to Newton's three laws, and the reference system established by Newton's law of inertia is inertial system. Coordinate Newtonian mechanics is the first branch of physics that has developed systematically as an experimental science. The main content comes down to Newton's three laws, and the reference system established by Newton's inertia law is the inertial system. The coordinate transformation and the Galileo of transformation.

2.2.3 Classic electromagnetic problems encountered

For Galilean transformations, the Maxwell equations are not covariant. So people think that Maxwell electromagnetic theory does not meet the principle of relativity.

It implies that the Galilean transformation is equated with the relativistic principle.

Example:



$$c' = c - v$$

In the system $\sum'$, the electromagnetic phenomenon is no longer subject to Maxwell's electrodynamics, so that Maxwell's electrodynamics is not absolute; it is only in a particular inertia system established. Before the 20th century, physicists believed that electromagnetic waves propagated in the ether, in the absolute static ether in the vacuum speed is equal to C; so the absolute static ether to act as a special inertial system (absolute static reference system) role.

Two Important Problems of Classical Electromagnetics

1.Is there ether, absolute static reference system?

2.Maxwell's electrodynamics is absolute.

2.3. Physicists to solve the contradictions of the scientific exploration

2.3.1 Lorenz hypothesis

The above contradiction makes the physicists realize that only in theory, bold departure from the traditional concept of classical physics, hope to make a successful explanation. Irish physicist Fitzgera, the Dutch physicist Lorentz studied the theory of Electromagnetism, that the transmission of light medium - the ether is there. And has proposed the length of the contraction assumption (known as the Lorentz-Fitzgerald shrink hypothesis), that the movement of objects in the ether along the direction of its movement will shrink a certain number of times (its shrinkage ratio and later Einstein derived Shrink the same). Therefore, in the Michael Sun-Morei interferometer, the 'arm' along the direction of the earth will shrink, so the interferometer turns 90 degrees, of course, will not cause interference fringes move. Lorentz also believes that all the objects relative to the ether movement, along the movement of the contraction of the material will lead to the deformation of the atomic structure is true

The physical effect, in order to make the law of electromagnetic field to satisfy the Galileo relativity principle, in 1904, Lorenz was modified by the etheric hypothesis, modified Galileo transform, and introduced a new transformation relation-Lorentz transformation. For the physical meaning of the time formula in the Lorentz transformation, Lorenz explains with the concept of 'local time' that it is not real time. In order to explain the relationship between electron mass and its velocity increase, Lorentz assumes that the mass of electrons originates from electromagnetic, and the relationship between the electron mass and its velocity is derived by the contraction of the electrons along the direction of motion Later Einstein launched the same form of electronic mass formula).

2.3.2 Attempts of Ramo and Mach

British physicist Lama in 1900 or so also launched the Lorenz transformation, found the time to slow the formula, and proposed to abandon the etheric mechanical concept. Austrian physicist Mach in the book 'the development of mechanics' put forward, there is no absolute space and absolute movement, all movements are relative. Ramo and Mach have seen the inner contradictions of the Newtonian mechanics theory system, but they have not broken the traditional idea of the shackles, failed to build a new theory.

2.3.3 Pangkal's contribution

French mathematical physicist Pangkale in 1905 years ago has been close to the principle of relativity and the principle of the same speed of light. He introduced the concept of four-dimensional space-time, put forward the laws of physics for the Lorentz transformation should have a constant form, it is speculated that the speed of light in the vacuum is constant, and may be the limit speed. In 1904, he wrote in the St. Louis meeting: 'There should be a completely new dynamics, where inertia grows with speed, so that the speed of light becomes an insurmountable limit.' Lorentz and Pangkal and other physicists have done a lot of work, but also has come to the edge of the special theory of relativity, but the concept failed to achieve a breakthrough.

3. Einstein and Special Relativity

Einstein, by studying the main works of physicists such as Maxwell, Lorenz, Pangkale and Mach, on the basis of previous studies, recognized the key to resolving the contradiction between electromagnetism and Newtonian mechanics. In 1905 June completed the 'theory of electrodynamics' papers, to push forward the courage and wisdom of innovation to solve the electromagnetic field law and Newtonian mechanics theory of contradictions.

3.1. Conceptual innovation - to abandon the light of the hypothesis

At that time, Einstein did not know Michael Sun-Morey experiment, but he thought 'light medium' - ether is not there. In the second natural section of the Analecton's electrodynamics, he made it clear that 'the introduction of light will prove to be superfluous.' Directly abandon the ether hypothesis and the absolute reference system hypothesis, completely broke the light of the need to spread the traditional concept of media, for the creation of special theory of relativity cleared the way.

3.2. Thinking on the innovation of a Newtonian mechanics out of the constraints of absolute space-time

For the Galilean transformation of the Newtonian mechanics, the reason why the Galilean transformation was not established in the theory of electromagnetism, Einstein considered the absolute time of Newton, the absolute space was problematic. Moreover, Einstein believes that the key to solving the problem is to change the definition of time and simultaneity. Thus, in the first part of the paper, Einstein clearly defined the definition of time and simultaneity. Einstein points out that 'by means of some (hypothetical) physical experience, for the rest of the clocks in different places, what is meant to be synchronized, and thus it is also possible to obtain 'at the same time' and 'time' The 'time' of an event is an indication of the same time at which the event occurred at the same time as the event, and the clock is synchronized with a particular stationary clock, and for everything And Einstein also pointed out that 'we cannot give the concept of simultaneity in any absolute sense; two events, from a coordinate system is the same time, and from another coordinate system moving relative to the coordinate system, they can no longer be considered a simultaneous event. 'Einstein's unique innovative ideas, the exact definition of time and simultaneity, Newtonian mechanics absolute space-time concept of the shackles, to the development of physics has brought a qualitative leap, for the creation of special theory of relativity has taken a key step.

3.3. Theoretical innovation - put forward two basic principles

In order to determine the time coordinate in the inertial system (ie, 'public time', that is, the clock), Einstein revolutionary proposed in the vacuum in the transmission speed are equal, that is, the principle of the same speed of light, with the principle of the same speed of light Defining the time coordinates in the inertial system (which is the difference between the special relativity and the Newtonian mechanics), it is certain that the speed of light in the vacuum is constant and does not depend on the choice of the inertial system and is independent of the motion of the light source or the observer. At the same time, Einstein also suggests that the laws of physics in all inertia have the same mathematical expression, that is, the principle of relativity, time and movement are relative to the observer. Einstein also proved that the principle of relativity and the principle of the same speed of light are compatible. These two principles are important bases of special relativity. Using the Lorentz transformation, Einstein found that: (1) the relativity of the

simultaneous: two physical events occurring simultaneously in two different locations in an inertial system, in another inertia relative to the inertial movement It seems that it is no longer happening at the same time. (2) the length of the contraction of moving objects: moving objects along the length of the movement than the length of its shortened. (3) slow the movement of the clock: all occurred in the movement of the inertia of the process, in the static inertia system seems to have slowed down. Einstein came to the above important conclusions, and Lorentz had introduced these formulas, the understanding is different. Einstein, with great innovation, points out that this is a general relativistic view of time and space, which is a universal relativistic kinematic effect. The overthrow of Lorentz's high-speed electrons along the direction of motion contraction is the real physical effect, as well as the local time theory. By Lorentz transformation Einstein also concluded that time is not absolute, is associated with space; time, space and material movement are closely related to the three.

3.4. Two basic principles and Lorentz transformation

(1)The transformation between spatial and temporal coordinates

$$\begin{cases} x' = \dfrac{x - vt}{\sqrt{1-(v/c)^2}} \\ y' = y \\ z' = z \\ t' = \dfrac{t - vx/c^2}{\sqrt{1-(v/c)^2}} \end{cases} \text{ Or } \begin{cases} x = \dfrac{x' + vt'}{\sqrt{1-(v/c)^2}} \\ y = y' \\ z = z' \\ t = \dfrac{t' + vx'/c^2}{\sqrt{1-(v/c)^2}} \end{cases}$$

As a public, we think that time and space are uniform, so the transformation between space-time coordinates must be linear. (X, y, z, t), (x ', y', z ', t') for any event P in the S and S systems, since S 'is parallel to S in parallel to the x-axis Of the speed v for uniform motion, apparently y '= y, z' = z.

(2) From the principle of constant speed of light can be obtained constant k

When the velocity u, v is much smaller than the speed of light c, under the non-relativistic limit, the relativistic velocity transformation formula is transformed into Galileo velocity transformation $u'_x = u_x - v$. Using the speed transformation formula, it can be shown that the speed of light is c in any inertial system.

The quality of an object is infinite, which is unthinkable. To make an infinite quality constant, no need to force an infinite force. However, nature, no one of the quality of the object is infinite, nor a force is infinite. The universe is vast and vast, but every member of the sun, the earth is limited, and the force of each member is limited. In this way, the only correct argument can only be that the speed of movement of all objects cannot exceed or equal to the speed of light.

3.5. Time and space contact

In addition, in classical physics, time is absolute. It has been acting as an independent role different from the three spatial coordinates. Einstein's theory of relativity links time with space. The physical real world is composed of various events, each event by four numbers to describe. The four numbers are its space-time coordinates t and x, y, z, which constitute a four-dimensional rigid continuous space-time, usually called the explicit Hough in the straight space. In the theory of relativity, it is natural to examine the physical real world in a four-dimensional way. Another important result of special relativity is the relationship between quality and energy. Before Einstein, physicists have always believed that quality and energy are very different, they are the amount of conservation. Einstein found that in the theory of relativity quality and energy are inseparable, the two conservation laws combined into a law. He gives a well-known mass-energy formula: E = MC ^ 2, where c is the speed of light. So the quality can be seen as a measure of its energy. Calculations show that tiny qualities contain huge amounts of energy. This was demonstrated in a later nuclear reaction test. For Einstein's introduction of these new concepts, most physicists, including the relativistic transformation of the founder of Lorentz, are unacceptable. The old method of thinking obstacles, so that this new physical theory until a generation after the majority of physicists are familiar with, even the Swedish Royal Academy of Sciences, in 1922 the Nobel Prize awarded to Einstein, it is only that ' His contribution to theoretical physics, but also because he found the law governing the photoelectric effect. 'For the relativity did not mention.

3.6. Inductive innovation - the creation of special relativity

In the 'Electromagnetism of the Motion' thesis, Einstein derives the Lorentz transformation, establishing a new space-time, motion relationship. Then, Einstein summarized the introduction of a new speed addition theorem and amended the Newtonian mechanics in the momentum, kinetic energy, quality and other formulas, so that they have met the principle of relativity. In September the same year, Einstein published the article entitled 'The inertia of the object with the energy it contains?' The paper, put forward the famous qualitative relationship, to clarify the quality of the object is the energy contained in the atomic energy Development, use to provide a theoretical basis. Einstein's two papers became important conclusions of the special theory of relativity; the special theory of relativity was born. The special theory of relativity exposes the deep connection between space and time, as well as space-time and sporty material. This interrelated, the Newtonian mechanics that irrelevant absolute space and absolute time, combined into a unified form of the existence of sports material. The speed of the object is much smaller than the speed of light, the special relativity of the formula into the Newtonian mechanics formula, reflecting the harmony and unity of nature. History proves that the special theory of relativity greatly promoted the process of scientific development and became one of the basic theories of modern physics.

3.6.1 Brief Introduction to Special Relativity

The relativity of special relativity - physics based on Einstein's two basic assumptions, or special relativity is the physics based on Lorentz transformation invariance; Newtonian mechanics is the theoretical system based on Galileo transformation invariance.

3.6.2 The principle of special relativity

The material in the interaction for the eternal movement, there is no non-movement of the material, there is no material movement, because the material is in mutual contact, interaction in the movement, therefore, must be described in the material relationship between the movement, and not May be isolated to describe the movement. In other words, the movement must have a reference, the reference is the reference system. Galileo once pointed out that the movement of the ship is indistinguishable from the motion of the stationary ship, that is, when you are completely isolated from the outside in the enclosed cabin, then even if you have the most developed mind, the most advanced instrument, whether your ship is moving at constant speed or still. However, it has no sense of the size of the speed because there is no reference. For example, we do not know the whole movement of our entire universe, because the universe is closed. Einstein quotes it as the first basic principle of special relativity: the principle of narrow relativity. Its content is: between the inertial system is completely equivalent, indistinguishable. The famous McCormon Morey experiment completely negates the light of the etherist theory, and draws the light and the reference system has nothing to do with the conclusion. In other words, whether you stand on the ground, or standing on the train, the measured speed of light are the same. This is the second basic principle of special relativity: the principle of constant speed of light. From these two basic principles can be directly derived from the relativistic coordinate transformation, speed transformation and all other special relativity. Such as speed transformation, contradictory with the traditional law, but the practice proved to be correct, therefore, in this sense, the speed of light cannot be exceeded, because in that reference, the speed of light are the same. The speed transformation has been proved by countless experiments of particle physics, which is impeccable. Because of this unique nature of light, it is chosen as the only ruler of the four-dimensional space-time. Since Einstein's hypothesis rejects the Galileo transformation, it is necessary to find a transformation that satisfies the basic principles of relativity. Einstein has derived this transformation, commonly known as the Lorentz transformation.

3.6.3 Special Relativistic Effects

According to the principle of narrow relativity, the inertial system is completely equivalent, therefore, in the same inertia system, there is a unified time, called the simultaneity, and relativity proof, in different inertia, but there is no uniform at the same time , That is, two events (time and space) in an inertial system at the same time, in another inertial system may be different, this is the same at the same time, in the inertia system, the same physical process of the time process is exactly the same , If the same physical process to measure the time, you can in the whole inertia system to get a unified time. In the future general relativity we can see that in the non-inertial system, time and space are not uniform, that is, in the same non-inertial system, there is no uniform time, so cannot establish a unified simultaneity. Relativistic derivation of the relationship between time scales between different inertial systems, found that the inertia of the movement of time is slow, which is the so-called clock slow effect. The movement of the clock than the static clocks goes slow, and the faster the movement, the slower the clock, close to the speed of light, the clock almost stopped. The length of the ruler is the difference between the coordinates of the two endpoints obtained by 'simultaneous' in an inertial system. Due to the 'simultaneous' relativity, the length measured in different inertial systems is also different. The theory of relativity proves that the ruler moving in the length of the ruler is shorter than the rest of the ruler, which is the so-called scale effect, when the speed is close to the speed of light, the ruler shrinks into a point. As can be seen from the above statement, the principle of clock speed and scale is relative to the progress of time. In other words,

the time schedule is related to the reference system. This fundamentally negates Newton's absolute view of time and space, the theory of relativity that absolute time does not exist, but time is still an objective amount. Such as twins ideal experiment, brother returned by the ship after the 15-year-old brother may have been 45 years old, indicating that the time is relative, but my brother really lived for 15 years, my brother also think they live for 45 years, this When the time has nothing to do with the reference system, the time is 'absolute'. This shows that irrespective of the state of movement of the object itself, the time it takes is an objective quantity, which is absolute, which is called inherent. In other words, no matter what form you exercise, you think you drink coffee speed is normal, your life laws are not upset, but others may see you drink coffee for 100 years, and from the cup down to It was only a second.

3.6.4 Three relativistic relativistic relations:

From the above discussion, we know that the measure of length and time is related to the selection of inertia. In this way, some of the absolute amount of classical mechanics becomes a relative amount; then, other physical quantities, such as quality, energy, momentum ... and how? The following questions are discussed in this regard.

1) Quality - speed relationship

M = mo /

In relativistic mechanics, mass m is no longer a constant, but a function of velocity. when

V = 0.1 c, the quality increased by 0.5%;

V = 0.866 c, m (mass of motion) = 2mo (still mass);

V = 0.98 c, m = 5mo;

V → c, m → ∞.

This phenomenon was discovered when people studied electronic movement. As early as 1897, the French scientist Kaufman used different speeds of electrons to observe their deflection under the action of the magnetic field, to determine the quality of electrons. The experimental results show that the electronic mass shows a certain difference with the difference of electron velocity.

When the velocity of the object moves v 'c, m ≈ mo. If the speed of the rocket v = 11.2km / s, m = 1.000 000 0009mo, the quality change is very small, difficult to observe.

As the quality of the object cannot be negative, therefore, the speed of light is the speed limit. In 1966, the United States Stanford electronic linear accelerator, a total length of 3000m, acceleration potential difference of 7 Mv / m, the electronic movement speed accelerated to 0.999 999 999 7c, only close to the speed of light, and never reach the speed of light.

The relationship between mass and material relations further reveals the indivisibility between matter and movement.

2) Quality - energy relationship

E = m c2

Quality and energy are two different properties of matter, they have an internal relationship between the quality of the relationship between them will be organically unified.

The qualitative relationship is only an equivalent relationship. It cannot be understood as energy and quality can be transformed between each other, but cannot say that energy is quality.

The qualitative relationship indicates that there is energy at the mass, and the energy corresponds to a state of motion of the object, thus indicating that matter and movement are inseparable, there is no substance that does not move in nature.

3) Energy - momentum relationship

E2 = p2c2 + mo2c4

From this relationship can be seen that the existence of negative energy state, so as to provide a basis for the proposed anti-particles. In 1930, Di rac predicted the existence of electronic anti-particle - positrons; to 1932, the American physicist Anderson in the cloud room really found positive electrons.

4. Conclusion

Relativity is the shining pearl of modern physics, and its basic assumption is the principle of relativity, that is, the law of physics has nothing to do with the choice of reference system. In this paper, we discuss in detail the process of discourse discovery and the contribution of many great scientists in the process, and prove that the theory of relativity is that the theory of relativity is Inheritance or inductive innovation. Classical physics based on classical mechanics, does not apply to high-speed moving objects and microscopic fields. Relativity to solve the problem of high-speed movement; narrow relativity negates the absolute space-time view of Newtonian mechanics; narrow relativity negates the view that the object quality in Newtonian mechanics is absolutely invariable; narrow relativity negates the idea that quality and energy are irrelevant in Newtonian mechanics; And quantum theory, quantum theory is the most representative of the theory of relativity and quantum theory, the combination of quantum theory, has established a number of emerging disciplines, interdisciplinary and marginal disciplines;

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