Space motion theory

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Abstract

Relativity Theory indicates motion is relative and determined by reference systems, which is supported by the Lorentz transformation in Special relativity. However, there are mathematically logical flaws in the deductions of the Lorentz transformation and motion may not be relative. Here, relative quantities and absolute quantities are defined in order to establish a new thinking model, based on which and the equations the Planck–Einstein equation $E=h\nu$ (here, $E=hN$) and Einstein's Energy–mass equation $E=mc^2$ (here, $E=Mc^2=\gamma M_0c^2$), it is deduced that every point of space has specific motion state, which is the sum of the motion of the distributions of every particle in the universe; and, every particle has a specific and absolute motion named energy velocity (v), which is relative to the space motion background and the motion energy (E_m) is $E_m=Mv^2$.

1 Introduction

Relativity Theory is considered a milestone leap in science history. Most of new physical theories in the past one hundred years were affected by the theory. However, the relativity theory may have distorted the logic of time and space by which humans perceive things to a large extent. Einstein's relativity theory is established on an entire set of mathematical results, but the mathematical results do not reveal clear physical meanings. However, Einstein provided an explanation that is difficult to prove or disprove via mathematics or experiments: the relativity of simultaneity, based on which Einstein interpreted his theories by sophisticated logic.

In the section 12 of Einstein's booklet Relativity: The Special and the General Theory (A Popular Account), he wrote the factor of the time dilation $t=\gamma$ is obtained from the two equations in the section 11: $x^{'}=\gamma(x-vt)$ and $t^{'}=\gamma(t-vx/c^2)$, where γ is Lorentz factor and $\gamma=(1-v^2/c^2)^{-1/2}$. However, the deduction $t=\gamma$ obtained is not correct, as make $x^{'}=0$, get $x=vt$, then bring $x=vt$ into $t^{'}=\gamma(t-vx/c^2)$ and obtain $t^{'}=t/\gamma$, where $x=vt$ is inconsistent with the prerequisite $x=ct$. (The details have been carefully discussed in another my paper: Simultaneity based on momentum conservation.)

2 Absolute quantities and relative quantities

Measurement and observation are two different processes but they are always confused in analyses. In this theory, observers are referred to in order to measure quantities; a light source can also be called a sender while the recipient of the photons is called the recipient but cannot be called the observer.

Absolute quantities: absolute energy (E), absolute mass (M), absolute time (T), absolute lengths (L) and absolute quantum frequency (N), are the quantities of an observed measured by the quantities of the standard objects static to and at the observer. The quantities of the observer need to be invariant in the analysis scope.

Relative quantities: relative energy (e), relative mass (m), relative time (t), relative lengths (l) and relative quantum frequency (ν), are the inside quantities of a system or a point, which are measured by the quantities of the standard objects static to and at the point. It should be noticed that this definition does not include velocities, because a relative velocity is the inside quantity of the higher system.

Quantity ratios: $E^q=E/e$, $M^q=M/m$, $T^q=T/t$, $L_{x,y\text{ or }z}{}^q=L_{x,y\text{ or }z}/l$; $N^q=N/\nu$ are the ratios of the absolute quantities of a standard object to the relative quantities of the standard object. (Quantity ratios can also represent the systemic changes of quantities.)

3 Vacuum distribution energy

The existence of vacuum fluctuations was predicted by quantum field theory [1,2] and has been proven by many experiments. However, the theoretical density of the quantum fluctuations was 120 orders of magnitude greater than the measured value [3], which is the actuality fundamental of this theory.

This theory suggests the collapse probability the measured value is not the probability of the distribution of coherent particles the theoretical density; that is to say: if there is not de–coherence in the universe, no galaxies, celestial bodies or specific particles form and all the particles are in a group, the theoretical density of the quantum fluctuations will be equal to the measured value.

In this research, vacuum energy is vacuum itself but not the detectable quantum fluctuations in vacuum; all quantum collapse is regarded as in particle positions in order to ignore the detectable quantum fluctuations in vacuum; and, the uncertainty of particles is not considered.

The energy of a particle in the universe (E_u) is composed the particle energy (E) and the vacuum distribution energy (E_v).

$$E_u=E+E_v$$

E_v has energy effect which can change the time and length of the particles in it but has no impact effect or gravity effect, such as gravitational waves.

4 Motion energy

E represents all the energy of a particle that has impact and gravity effect; E_i represents the inside energy of the particle and E_m represents the motion energy of the particle.

$$E=E_i+E_m=E_0+E_k$$

Where E_0 is the energy of the particle in static and E_k is the kinetic energy of the particle. M_0, T_0 and L_0 also mean the quantities of a particle in static.

E_m is the outside energy that cannot affect inside changes and forms de Broglie waves while E_k is the energy variance after the acceleration.

Besides the energy of photons, Planck–Einstein equation E=hN (The traditional expression is written as E=hν), where h is Planck constant, is considered valid in the energy of all particles, as $E_i=hN_i$ and $E_m=hN_m$.

According to the formula of de Broglie wavelength λ=h/p, where p represents momentum and p=Mv, and λ is wavelength, it can be obtained that λ=h/(Mv). Consequently, $N_m=v/\lambda=Mv^2/h=E_m/h$. (Here, N_m, v, λ and M is relative to and measured by the observer static to space background and at the position of the motion subject.)

Therefore, E_m can be expressed as:

$$E_m=Mv^2$$

In Special relativity, $E=mc^2$, which is written as $E=Mc^2=\gamma M_0c^2$ corresponding to the expression of this theory, where γ is Lorentz factor; $\gamma=(1-v^2/c^2)^{-1/2}$.

Because $E=E_i+E_m=Mc^2$, $E_i=Mc^2-Mv^2=E/\gamma^2$.

$E_0=E/\gamma=\gamma E_i$. Therefore, the inside energy E_i varies with velocity.

When some photons are injected into a system, if the original structure of the system is unchanged (In actuality, heat generation or other inside changes could hardly be avoided.), the energy of the injected photons are E_k, which must make the quantities of the system change systemically and accelerate the system.

According to $E=\gamma M_0c^2=\gamma E_0$, kinetic energy E_k can be expressed as:

$$E_k=E-E_0=Mc^2-M_0c^2=(\gamma-1)M_0c^2=(\gamma^2-1)M_0c^2/(1+\gamma)=M_0v^2\gamma^2/(1+\gamma)=Mv^2\gamma/(1+\gamma)$$

5 The principle of relative invariance

The change of E_i induces the systemic changes of the inside absolute quantities, such as length contraction and time dilation, while the inside relations between the relative quantities of particles are invariant; this invariant effect is named the relative invariance.

Different from the principle of relativity, the systemic changes are real and absolute, which are induced by motion or gravity changes, but are not the relative effects that are determined by reference systems.

5.1 $E_i^q=1/T^q$

There is the same change, such as an atomic clock passing a second, on the earth, at another place and at an observer. Measured by the observer, the change on the earth takes a time T_e; the change at the other place takes a time T_x; and the change at the observer takes a time t one second. T_e/t is the time dilation coefficient on the earth ($T^q{}_e$) and T_x/t is the time dilation coefficient at the other place ($T^q{}_x$); T^q represents absolute time–amount quantity ratio.

$1/T^q$ represents the absolute time–rate quantity ratio. For a system with the relative invariance, $N_i^q=1/T^q$. Furthermore, $N_i=E_i/h$; $\nu=e/h$ and thus $N_i^q=E_i^q$.

Therefore, the following relation can be obtained: $E_i^q=1/T^q$.

5.2 The time dilation with velocity $T^q=T/T_0=\gamma$

Since $E_i^q=1/T^q$, $(1/T_0)/(1/T)=(t/T_0)/(t/T)=(1/T^q{}_0)/(1/T^q)=E_i{}^q{}_0/E_i^q=(E_{i0}/e)/(E_i/e)=E_{i0}/E_i$. According to the physical meaning, E_{i0} is E_0. Consequently, $T/T_0=E_0/E_i=\gamma$.

Therefore, the factor of the time dilation with velocity is γ.

5.3 $E_i^q=L_x^qL_y^qL_z^q$

According to the actual measurement results for the Lorentz transformation in Relativity Theory, $L_v^q=L_v/L_{v0}=1/\gamma$, where L_v^q represents the length quantity ratio in the direction of the velocity.

This theory suggests the systemic changes of lengths is induced by the change of inside energy, as $E_i^q=L_x^qL_y^qL_z^q$, where $L_{x,\, y \text{ or } z}{}^q$ is the quantity ratio of the space on the axis x, y or z.

6 Space motion background

Every point of space has specific motion, time and lengths.

The motion of a point of space is the sum of the motion of the distributions of the particles in the universe. The velocity of a point of space ($\vec{V}$) relative to and measured by an observer can be expressed as:

$$\vec{V} = \sum_{i=1}^{n} \vec{V}_i \, \sigma_i$$

Where $\vec{V}_i$ is the absolute velocity of a particle relative to and measured by the observer, σ_i is the energy proportion of the particle at the point of space; $\sum_{i=1}^{n} \sigma_i = 1$.

The time of a timer static to and at the point of space is the time of the point of space. (Assuming the timer will not affect the motion of the point of space.)

The length of a ruler static to and at the point of space is the length of the point of space in the same direction with the length of the ruler.

A large uniform space (relative to the substance in it) that the motion state will hardly be affected by a substance in it is the space motion background of the substance, or called space background.

6.1 Energy velocity

A train travels on a planet at a velocity v, v (namely v_1) is relative to and measured by the time and length of the space background mainly provided by the planet (t_2 and l_2); $v_1=l_2/t_2$.

The velocity of a particle relative to and measured by the time and length of the space motion background is named the energy velocity of the particle.

6.2 T^q_{min}

The absolute time–amount quantity ratio of a specific massive particle at a specific position has different values, which is determined by the energy velocity. T^q_{min} is the minimum absolute time–amount quantity ratio of the massive particle at the position and the particle with T^q_{min} is static to the space background.

T^q_{min} is a special T^q_0. For a particle with an energy velocity v and T^q at a position, there is a unique motion state with T^q_{min} at the position, but there are countless motion states with T^q_0 at the position which form a spherical surface and the diameter of the sphere is the vector of v. If the vector of v is drawn as from T^q_{min} to T^q, the vector of the energy velocity of a motion state with a T^q_0 is drawn as from T^q_{min} to the T^q_0.

6.3 The invariance of energy velocity

As a relative quantity, energy velocity v has the relative invariance.

If a people on a great celestial body will not perceive the variance of velocities or the variance of lengths on the celestial body when the motion and position state of the celestial body changes, the change of V^q should be equal to the factor of the length contraction in the direction of the velocity L_v^q divided by the factor of the time dilation T^q; $V^q=L_v^q/T^q$. For example, if a celestial body moves from static to v, the movements with energy velocities on the celestial body in the direction parallel to the vector of v will increase by the factor $V^q=L_v^q/T^q=(1/\gamma)/\gamma=1/\gamma^2$; the movements with energy velocities perpendicular to the vector of v will increase by the factor $V^q=L_v^q/T^q=1/\gamma$; but, the energy velocities v are invariant.

$L_{x,\ y\ or\ z}^q$ is the quantity ratio of the space on the axis x, y or z. $L_{x,\ y\ or\ z}^q=L_{x,\ y\ or\ z}/l$, where $L_{x,\ y\ or\ z}$ is the absolute length on the axis x, y or z and l is the relative length. The length quantity ratio in the direction of the velocity or any direction (L_v^q) can be expressed as:

$$L_v^q=[(xL_x^q)^2+(yL_y^q)^2+(zL_z^q)^2]^{1/2}$$

Where $L_v^q=L_v/l$; x, y and z represent the projections of a relative length unit in the direction of the velocity on the axes x, y and z; $x^2+y^2+z^2=1$.

Light speed c is the speed of the fastest energy velocity.

6.4 The hierarchy of motion

A free particle or an object is regarded as the first level system, the motion of which is relative to the second level system, which may be a celestial body and its close vacuum distribution; the motion of the second level system is relative to the third level system, which may be a greater mass system with its close vacuum distribution until the motion of the last but one level system is relative to the maximum level system the universe.

The time and lengths of a space background varies with its energy velocity as the same as particles. However, the actual calculation for the motion and the time and lengths of a space may be very complicated. Thus, the space close to the surface of a great mass and low rotation speed celestial body is usually selected as the space background, which can be seen as static to the surface particles of the celestial body approximately, such as the space close to the ground on the earth.

6.5 Rotation energy velocities

As the same as other motion, rotation is localized relative to the space background. Besides, a local vacuum in or around a system with a great mass is affected by the system itself.

For a rotating low–energy object, the vacuum influence by itself can be ignored. The vector of the rotation energy velocity of a point on the object ($\overrightarrow{v_r}$) equals the vector of the energy velocity of the point ($\vec{v}$) minus the vector of the energy velocity of the momentum center of the system ($\overrightarrow{v_s}$); $\overrightarrow{v_r} = \vec{v} - \overrightarrow{v_s}$. The centrifugal force: $f=mv_r^2/r$.

For a rotating black hole, the space close to the event horizon is provided by the black hole, so a celestial body close and static to the black hole is static; $v_r=v=0$.

For a rotating high–energy system, the calculation of the rotation energy velocity is complex, which is between the two cases above. For example, the previously measured revolution velocity of a celestial body around the galaxy center in our galaxy is relative to the distant celestial bodies out of our galaxy but the vacuum distribution influence by our galaxy itself is neglected. Therefore, the previously measured revolution velocities of the celestial bodies in our galaxy are quite inaccurate, which are significantly larger than the v_r the actual values corresponding to the centrifugal force.

6.6 Relative energy velocity

v_a is the energy velocity of A; v_b is the energy velocity of B. v_{ba} represents the relative energy velocity of A to B, which means the impact energy of A to B. (A and B should be in the same space background; and, the mass of B is much greater than that of A.)

In low speed, $\overrightarrow{v_{ba}} = \overrightarrow{v_a} - \overrightarrow{v_b}$.

In high speed and in the case that $\overrightarrow{v_a}$ and $\overrightarrow{v_b}$ are in opposite directions, according to the theorem of the addition of the velocities in Relativity $W=(v+w)/(1+vw/c^2)$, $v_{ba}=(v_a+v_b)/(1+v_av_b/c^2)$.

6.7 Position velocity

The position velocity of A relative to B (V_{ba}) is the velocity that A leaves B (or B') in the direction from B (or B') to A and measured by B, or measured by C written as $V_{ba(c)}$. (A and B' are at the same position; B' is static to B measured by absolute lengths.)

7 Gravity

According to the formula for gravitational time dilation based on the general relativity theory, $1/T^q=[1-2Gm^c/(rc^2)]^{1/2}/T^q_{nong}$, where m^c means the relative mass of the celestial body; $1/T^q_{nong}$ is the absolute time–rate quantity ratio of objects without the gravity of the celestial body and static to the celestial body; $1/T^q$ is the absolute time–rate quantity ratio of objects with the gravity of the celestial body at a radius r and static to the celestial body.

According to $1/T^q=E_i^q$, $E_i=[1-2Gm^c/(rc^2)]^{1/2}E_{inong}$, where E_{inong} is the inside energy of an object without the gravity of the celestial body and static to the celestial body; E_i is the inside energy of an object with the gravity of the celestial body at a radius r and static to the celestial body.

$dE_i=E_{inong}\{d[1-2Gm^c/(rc^2)]^{1/2}/dr\}dr=E_{inong}\{(1/2)[1-2Gm^c/(rc^2)]^{-1/2}(2)Gm^c(rc^2)^{-2}c^2\}dr= E_{inong}[1-2Gm^c/(rc^2)]^{-1/2}Gm^cr^{-2}c^{-2}dr=E_iGm^cr^{-2}c^{-2}dr/[1-2Gm^c/(rc^2)]$.

In low energy, $[1-2Gm^c/(rc^2)]$ approximately equals 1.

And, from the view of the object itself, $E_i=e=mc^2$.

Therefore, $dE_i=mc^2Gm^cr^{-2}c^{-2}dr=mGm^cr^{-2}dr$.

$Gm^cr^{-2}=g$ and dr is seen as a height (h): $dE_i=mgh$.

Therefore, $dE_i=mgh=E_p$, where E_p represents gravitational potential, which means E_p is a differentiation of E_i; that is to say: the gravitational potential of an object is the change of the inside energy of the object itself.

This analysis indicates that gravitational acceleration doesn't act by energy transfer and consequently doesn't require gravitons or graviton fields to cause effects. In fact, underground experiment also undermines gravity as the cause of quantum collapse [4].

Data availability

All data generated or analyzed during this study are included in this published article [and its supplementary information files].

Author contributions

The author is the sole author of the manuscript. The author declares that he is responsible for all aspects of the manuscript.

Declaration of Competing Interest

The author declares no competing interests.

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