Shortcomings and Applicable Scopes of Special and General Theory of Relativity

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Abstract: The special theory of relativity and general theory of relativity have three basic shortcomings. First, the special and general theory of relativity respectively have two basic principles, altogether have four basic principles in the interior of relativity, these obviously do not conform to the truth uniqueness; Second, for the two basic principles of special theory of relativity and the two basic principles of general theory of relativity, no one is generally correct; Third, establishing the physical theory from the mathematics principle instead of the physical principle. In this foundation, presents the applicable scopes of special and general theory of relativity. Points out some wrong results caused by the theory of relativity (including the Lorentz transformation), such as the problems that the sonic speed in vacuum permanently is equal to zero, the twin paradox that the two brothers' state of motion are quite same, and so on. Proposes that taking law (principle) of conservation of energy as the interdisciplinary grand unified theory to unified process all the problems related to energy in physics, astronomy, mechanics, chemistry, biology, medicine, engineering and so on; taking the unified variational principle for quantization in dynamic Smarandache multi-space and the fractal method as the interdisciplinary grand unified method; and taking the "science of conservation of energy" to replace or partially replace the theory of relativity.

Key words：Special and general theory of relativity, shortcomings, applicable scope, science of conservation of energy

Introduction

People generally believe that, Einstein is the greatest scientist in the 20th century, and his achievement is only inferior to Newton.

At the same time, the scientific circles generally thought the theory of relativity is one of the greatest scientific achievements in the 20th century.

But on the other hand, since the 1920s, Einstein and the theory of relativity have been gradually held in both hands to the god world.

Enter into the 21st century, the situation has changed, Einstein and the theory of relativity already start to go down the god world.

The Chinese renowned scientist Academician Song Jian boldly questions Einstein, and calls the young scientists dare to innovate. He read out the science report entitled "Astronautics, Astronavigation and Light Barrier" in the 242nd Xiangshan conference. Pointed out that, 100 years ago, Einstein, in his paper about special relativity that shocked the scientific circles, proposed a famous saying, it is impossible to exist any movement to travel faster than the speed of light. The present scientific circles name this phenomenon "light barrier". However, this "extrapolation" certainly hasn't been proved by any direct experiment.

Many men of insight already pointed out that, taking the research and challenge to the theory of relativity as the turning point, will have the possibility to lead more scientists to occupy the more and more scientific peaks gradually.

As we analyze the theory of relativity, besides the positive, remorseless, careful and valuable consideration, also emphasize and give prominence to the aspects of philosophy and critique. All of these provide the beneficial imagination space for surmounting Einstein and the theory of relativity. The people are not difficult to understand that, from the angle of natural sciences theory to criticize the theory of relativity, is an extremely difficult matter, this paper truly involves many contents about this aspect, however the effects will wait for the reader to comment; Whereas, from the angle of philosophy to challenge and criticize the

theory of relativity, will have the possibility to let the reader easy to understand, and may extrapolate, positively join the beneficial exploration.

The rivers and mountains breed the talent person from generation to generation. Einstein and the theory of relativity will be surpassed; this is the matter of sooner or later.

Recently, some scientists pointed out, the theory of relativity had not considered temperature factor, this is a big flaw. While considering the temperature factor, the theory of relativity inevitably must be rebuilt.

The purpose of this paper is to discuss the shortcomings and applicable scopes of special and general theory of relativity

1 Shortcomings of special and general theory of relativity

The first basic shortcoming of the special and general theory of relativity is that they do not conform to the truth uniqueness.

In the natural sciences domain, as dealing with a specific issue, should only have one truth.

But, the two basic principles of special theory of relativity are the special principle of relativity and the principle of constant speed of light; the two basic principles of general theory of relativity are the principle of equivalence and the principle of general covariance; In other words, the special theory of relativity has two truths; the general theory of relativity also has two truths; while in the entire theory of relativity, altogether has four truths. These obviously do not conform to the truth uniqueness.

For the reason to disobey the truth uniqueness, between the two basic principles of special theory of relativity, as well as between the two basic principles of general theory of relativity, inevitably will appear the contradictions which are unable to solve.

The second basic shortcoming of the special and general theory of relativity is that, for the two basic principles of special theory of relativity and the two basic principles of general theory of relativity, no one is generally correct. Therefore it is wrong to take them as the general truth.

This certainly doesn't mean that, the special theory of relativity and general theory of relativity are completely wrong. For some partial questions, the special theory of relativity and general theory of relativity also may produce the correct conclusions or the approximate results.

The third basic shortcoming of the special and general theory of relativity is that, to establish the physical theory from the mathematical principle instead of the physical principle.

If this road is correct, then the mathematicians will have the ability to govern physics and nearly all natural sciences. But this obviously is not impossible.

In the physics domain, to command physics with mathematics, instead of command mathematics with physics, this is the biggest misguide to physics given by Einstein. As a result of this kind of misguide, besides some individual success, the innumerable time and energy of many people with outstanding ability (including Einstein himself) have been wasted.

2 Contradictions between the basic principles of special and general theory of relativity

Firstly we discuss the contradictions between the two basic principles of special theory of relativity.

The special principle of relativity states that physical laws should be the same in all inertial reference frames.

The principle of constant speed of light states that light is propagated in empty space in straight lines with a velocity c= 300,000 km/s.

Einstein firstly noted the apparent incompatibility of the law of propagation of light with the principle of relativity. It can be stated briefly as follows [1].

As such a system let us again choose our embankment. If a ray of light be sent along the embankment, the tip of the ray will be transmitted with the velocity c relative to the embankment. Now let us suppose that our railway carriage is again traveling along the

railway lines with the velocity v, and that its direction is the same as that of the ray of light. Let us inquire about the velocity of propagation of the ray of light relative to the carriage, w is the required velocity of light with respect to the carriage, and we have

$$w = c - v.$$

The velocity of propagation of a ray of light relative to the carriage thus comes cut smaller than c.

But this result comes into conflict with the principle of relativity. For, like every other general law of nature, the law of the transmission of light in vacuum must, according to the principle of relativity, is the same for the railway carriage as reference body as when the rails are the body of reference.

For this apparent incompatibility, Einstein proposed two kinds of choices: (1) abandon either the principle of relativity or the law of the propagation of light in vacuum; (2) systematically holding fast to both these laws a logically rigid theory could be arrived at.

This theory has been called the *special theory of relativity*, which was established by Einstein according to the second choice.

Now we must discuss the question that, whether or not the special theory of relativity can truly solve the contradiction between the law of propagation of light and the special principle of relativity. Our answer is that it cannot.

Considering all the possible situations, the people cannot help to ask: As deriving the Lorentz transformation, why only the principle of invariance of light speed was used? Why didn't consider the principle of invariance of other speed?

Obviously, for the principle of invariance of other speed, combining with the special theory of relativity, similarly may obtain other one kind of transformation relations. Thus inevitably appears the irreconcilable contradiction.

Then, whether or not the principle of invariance of other speed is existed? The answer is affirmative. For example, in all the reference frames at the vacuum state, the sound propagation velocity is zero.

In addition, we also may find many examples that the conclusions of special theory of relativity (including the Lorentz transformation) bring on the wrong results, see below.

Therefore, the special theory of relativity doesn't successfully solve the contradiction between the law of propagation of light and the special principle of relativity.

Whether has the other way to successfully solve this contradictory? The answer is affirmative. For the apparent incompatibility of the law of propagation of light with the principle of relativity, besides the two kind of choices proposed by Einstein, still may simultaneously give up the special principle of relativity and the law of propagation of light in vacuum, and choose another principle or law (for example, the law of conservation of energy) as the only truth, to establish the new physical system. This choice may be considered as a correct way to surmount or replace the theory of relativity. Certainly, it is very difficult to reach this achievement.

Secondly we discuss the contradictions between the two basic principles of general theory of relativity.

Einstein stated that, The Equality of Inertial and Gravitational Mass as an Argument for the General Postulate of Relativity. Its main content is as follows [1].

We imagine a large portion of empty space, as reference body let us imagine a spacious chest resembling a room with an observer inside who is equipped with apparatus. Gravitation naturally does not exist for this observer. To the middle of the lid of the chest，is fixed externally a hook with rope attached, and now a "being" begins pulling at this with a constant force. The chest together with the observer then begin to move "upwards" with a uniformly accelerated motion. He is then standing in the chest in exactly the same way as anyone stands in a room of a home on our earth. If he releases a body which he previously had in his land, the body will approach the floor of the chest with an accelerated relative motion. Relying on his knowledge of the gravitational field, the man in the chest will thus come to the

conclusion that he and the chest are in a gravitational field which is constant with regard to time. Of course he will be puzzled for a moment as to why the chest does not fall in this gravitational field. Just then, however, he discovers the hook in the middle of the lid of the chest and the rope which is attached to it, and he consequently comes to the conclusion that the chest is suspended at rest in the gravitational field.

Guided by this example, Einstein attempted to point out that, our extension of the principle of relativity implies the *necessity* of the law of the equality of inertial and gravitational mass.

Here Einstein attempted to explain that the two basic principles of general theory of relativity (the principle of equivalence and the principle of general covariance) do not have contradictory. But this endeavor is a futile effort.

Einstein said that, our extension of the principle of relativity implies the *necessity* of the law of the equality of inertial and gravitational mass.

According to this viewpoint, how to process the temperature mass and electromagnetic mass, friction mass and so on? Whether or not our extension of the principle of relativity implies the *necessity* of the law of the equality of the three of temperature, inertial and gravitational mass?

If the three masses are not equal, then between "the principle of equivalence" (at present it should be the equality of the three of temperature, inertial and gravitational mass) and the principle of relativity (the principle of general covariance) the contradiction is appeared.

If the three masses are equal, then it is a wrong conclusion. Because as the object temperatures are different, it will contain the different thermal energy. According to the special theory of relativity, the energy may be translated into mass, thus for the same object, when its temperatures are different, its masses are different. But the reason for this mistake is the supposition that the two basic principles of general theory of relativity (the principle of equivalence and the principle of general covariance) do not have contradictory. Therefore this supposition is wrong.

It should be noted that, because the temperature, inertial and gravitational mass are not equal, in passing we find another example that between the special theory of relativity and the general theory of relativity the contradictory is appeared.

3 Mistakes of the basic principles of special and general theory of relativity

Firstly we discuss the mistakes of the two basic principles of special theory of relativity.

According to the special principle of relativity, physical laws are the same in *all* inertial reference frames.

If the meaning of "same" is "completely equal", then the special principle of relativity has the question in the philosophy.

In the world never have two completely equal leaves.

For any two reference frames (coordinate systems), the descriptions to some physical laws impossibly to be completely same. Regarding the different reference-bodies (or their state of motion), at least we may say, the convenient degrees to describe "the law of nature" are different. That is the reason that the rectangular coordinates and polar coordinates are more universal (or more predominant) than other coordinates.

Especially, if these physical laws refer to the quantity relations, or for the reason that some conditions are different, the descriptions for them may be completely dissimilar.

For example, for the law of sound velocity, we may say that, "On the earth's surface with air temperature is 15℃, the sound velocity is 340m/s."

But, for the airplane flying with the sound velocity, if its flight direction is consistent with the sound propagation direction, then the sound velocity is 0m/s. If its flight direction is opposite to the sound propagation direction, then the sound velocity is 680m/s.

Moreover, for the coordinate systems in vacuum state, among them the sound simply cannot propagate, thus the sound velocity is 0m/s forever. Please note this conclusion, because we can see later that no other than this conclusion, will cause the Lorentz

transformation to induce the wrong result.

The reader may display own imagination as far as possible, to find more misgivings about the special principle of relativity.

According to the principle of constant speed of light, light is propagated in empty space in straight lines with a velocity c= 300,000 km/s.

For the experimental confirmations to the principle of constant speed of light, we should say that the experiments are extremely limited, many factors have not considered. For example, under the strong heat source radiation, whether or not the speed of light is the same as no heat source radiation?

For the light propagation, if on a certain point to project two lights along the opposite direction at the same time, then the speed for these two lights to be mutually far away no longer is a speed of light, but is two times of speed of light.

Moreover, Einstein also pointed out that, one of the significant inferences from the general principle of relativity is: in general, rays of light are propagated curvilinearly in gravitational fields. A curvature of rays of light can only take place when the velocity of propagation of light varies with position. Therefore the special theory of relativity cannot claim an unlimited domain of validity; its results hold only so long as we are able to disregard the influences of gravitational fields on the phenomena (*e.g.* of light).

Here we have a problem immediately: Only in the gravitational field could the light be curving?

Be careful, Einstein wrote that, the special theory of relativity cannot claim an unlimited domain of validity. In other words, this is another example that between the special theory of relativity and the general theory of relativity the contradictory is appeared.

Second we discuss the mistakes of the two basic principles of general theory of relativity.

Now we discuss the question of the principle of equivalence (inertia mass and gravitational mass are equal). Still consider the temperature question. For the heavenly body moves around the sun, if the sun does not radiate the heat energy, then the principle of equivalence may be correct. But, the sun radiates the heat energy. Front already has said, as the object temperatures are different, then its masses are also different, therefore, the inertia mass under one kind of temperature is not the same as the gravitational mass under another kind of temperature.

Thus it can be seen, the principle of equivalence at least should be revised as follows: Under the same temperature the inertial mass and the gravitational mass are equal.

But another question will be coming, the masses of some objects also could be changed in the electromagnetic field, thereupon the principle of equivalence should be revised again as follows: Under the same temperature and the same electromagnetic field situation the inertial mass and the gravitational mass are equal.

To this analogizes, when will such revisions be finished?

As for the question of principle of relativity (the principle of general covariance), it does not need us to point out, Einstein himself already revised his original viewpoint. In other words, to withdraw a stride from his originally proposed principle of relativity (the principle of general covariance).

In reference [1] Einstein pointed out that, the following statement corresponds to the fundamental idea of the general principle of relativity: *"All Gaussian coordinate systems are essentially equivalent for the formulation of the general laws of nature."*

Here, Einstein already has obviously drawn back a step, from "*All coordinate systems are essentially equivalent for the formulation of the general laws of nature*", drew back to be restricted in "all Gaussian coordinate systems" only.

As for the reason to draw back this step, we cannot find the explanation.

A logical explanation is that the general principle of relativity has encountered the problem.

Moreover, it also has another question: Why has to draw back to "all Gaussian coordinate systems"? We cannot find the explanation also. A logical explanation is that,

because the general theory of relativity used the Gaussian coordinate systems, therefore it could not draw back further.

It is difficult to understand that, the Einstein already discarded the general principle of relativity, i.e., "*All coordinate systems are essentially equivalent for the formulation of the general laws of nature*" (or similar statement), but at present it still be used in many textbooks!

Here we present an example to show that *all coordinate systems are not essentially equivalent for the formulation of the general laws of nature*.

As well-known, the fractal distribution reads

$$N = \frac{C}{r^D}$$

The fractal distribution is a straight line only in the double logarithmic coordinates. Therefore, if some law of nature conforms to the fractal distribution rule, then the law that "the change of this natural phenomenon conforms to the linear rule" is only correct in the double logarithmic coordinates.

4 Applicable scopes of special and general theory of relativity

Firstly we discuss the applicable scope of special theory of relativity.

Because the two basic principles of special theory of relativity are the special principle of relativity and the principle of constant speed of light, we may say that, in the case that these two principles are correct simultaneously, generally the special theory of relativity is applicable.

For the experiment of Fizeau, these two principles are correct simultaneously.

It should be noted that, in special case, even if these two principles are correct simultaneously, it also possibly causes the wrong result. For example the Lorentz transformation may cause the wrong result.

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For the problems of the motion of the perihelion of Mercury, deflection of light by a gravitational field, displacement of spectral lines towards the red and so on, these two principles are correct simultaneously.

Similarly, in special case, even if these two principles are correct simultaneously, it also possibly causes the wrong result.

5 From mathematics principle or physical principle to establish the physical theory

Einstein thought that [1], every general law of nature must be so constituted that it is transformed into a law of exactly the same form when, instead of the space-time variables x, y, z, t of the original coordinate system K, we introduce new space-time variables x', y', z', t' of a coordinate system K'. In this connection the relation between the ordinary and the accented magnitudes is given by the Lorentz transformation. Or in brief: General laws of nature are covariant with respect to Lorentz transformations. This is a definite mathematical condition that the theory of relativity demands of a natural law, and in virtue of this, the theory becomes a valuable heuristic aid in the search for general laws of nature.

This speech extremely and clearly indicated the viewpoint that to command physics with mathematics, instead of command mathematics with physics. This really is Einstein's biggest misleading to the physics.

Every general law or principle of physics must automatically satisfy the covariance in some significance (but it is not the covariance in the significance of theory of relativity), or it is

correct for all coordinate systems (but it doesn't have the completely same forms). For example, the law of conservation of energy may automatically satisfy the covariance in some significance, namely it is correct for all coordinate systems. But it doesn't have the completely same forms, for different coordinate systems, the sizes of conservation are different.

Therefore, it completely is unnecessary to propose the explicit mathematical condition to the physical law in advance. The physical theory should be established from the physical principle.

It should be noted that, Newton and Einstein formed a sharp contrast. As well-known, Newton was the greatest mathematician, while Einstein wasn't a mathematician. But as establishing the physical theory, Newton simply didn't apply the profound mathematical tool. The Newton's first law and third law nearly didn't apply mathematics. The second law only applied the multiplication operation. The law of universal gravitation also only applied the multiplication, division and square operation. Newton's rich and profound mathematical knowledge only was applied to realize the utilization of the simple and important physical laws.

6 Wrong results caused by Lorentz transformation

First example, suppose we have two reference systems at the vacuum state and their relative speed isn't equal to zero, there is an alarm clock in a reference system, because it is at the vacuum state, the sound propagation speed is equal to zero. According to the Lorentz transformation, in the second reference system the sound propagation speed will not be equal to zero. This obviously is wrong.

Second example, from the Lorentz transformation expression we may see that, the speed of light is the limit of speed. Once appear the speed faster than light, the Lorentz transformation either is not correct, or will cause the wrong conclusion.

But we already said in front, if on a certain point to project two lights along the opposite direction at the same time, then the speed for these two lights to be mutually far away is two times of speed of light. In other words, in this case, the Lorentz transformation will obtain the speed for these two lights to be mutually far away is still equal to the speed of light. That is wrong.

The Lorentz transformation causes the wrong conclusions that certainly are not limited in these two examples, the reader may try to propose other examples.

7 Other mistakes caused by theory of relativity and some questions cannot be solved by theory of relativity

The phenomena of "rods look shorter and clocks look slower" derived by theory of relativity can be stated as follows.

The rigid rod is shorter when in motion in the direction of its length than when at rest, and the more quickly it is moving, the shorter is the rod.

As a consequence of its motion the clock goes more slowly than when at rest.

Now we consider the phenomenon of "clocks look slower", the purpose is to present a wrong conclusion derived by theory of relativity.

As well-known, the phenomenon of "clocks look slower" causes the twin paradox: according to theory of relativity, supposing there are pair of twins, the younger brother keeps on the Earth, the elder brother roams through the outer space as a astronaut. As the elder brother returns to the Earth, he will be much younger than his younger brother. The twin paradox means: Because the movement is relative, also may think the younger brother is carrying on the space navigation, therefore the younger brother should be much younger than the elder brother. Such two conclusions mutually conflict.

There are many explanations given by theory of relativity to this twin paradox (some of them even use general theory of relativity to carry on the complex computation), but their basic starting point is as follows: Two brothers' states of motion are different. Thereupon we may make another special twin paradox that two brothers' states of motion are quite same. If

the younger brother doesn't keep on the Earth, but the elder brother and the younger brother all ride their respective high speed airships, facing the completely opposite directions to navigate from the identical time and the identical site with the same speed along a straight line, after a quite long period they begin to decelerate simultaneously until static, then they turn around to navigate again along the same straight line with the manner of front to front, finally simultaneously return to the starting point. From the younger brother's viewpoint that, according to the theory of relativity, the elder brother should be much younger than the younger brother; Similarly, from the elder brother's viewpoint that, according to the theory of relativity, the younger brother should be much younger than the elder brother. Who is much younger to the end?

With the theory of relativity, how to explain this special twin paradox that two brothers' states of motion are quite same?

According to the kinetic energy formula of special theory of relativity, when the speed v approaches speed of light c, the kinetic energy approaches infinity; when the speed v is greater than speed of light c, the kinetic energy is an imaginary number. But, it already pointed out in reference [2] that there is no speed barrier in the universe. We also pointed out that, if on a certain point to project two lights along the opposite direction at the same time, then the speed for these two lights to be mutually far away no longer is a speed of light, but is two times of speed of light. In this case, can we have the imaginary number kinetic energy? We cannot. Here the wrong result is derived by the kinetic energy formula of special theory of relativity.

We already pointed out that, the two basic principles of special theory of relativity, in certain situations, will not be correct. Therefore, all conclusions of special theory of relativity, in certain situations also are not correct. The most famous formula in theory of relativity, $E=mc^2$, also is not exceptional, it needs to be revised in certain situations. Some of the revised formula may be found in the related literature or on the internet.

Einstein believed that, there is no more common−place statement than that the world in which we live is a four-dimensional space-time continuum.

Space is a three-dimensional continuum. By this we mean that it is possible to describe the position of a point (at rest) by means of three numbers (coordinates) x, y, z, and that there is an indefinite number of points in the neighborhood of this one, which may be as near as we choose to the respective values of the coordinates x, y, z, of the first point.

Minkowski thought that the "world "is naturally four dimensional. For it is composed of individual events, each of which is described by four numbers, namely, three space coordinates x, y, z, and a time coordinate, the time value t.

The four-dimensional mode of consideration of the "world" is natural on the theory of relativity, since according to this theory time is robbed of its independence.

But, in many situations, it is not enough to describe the movement of an event in space by means of three numbers (coordinates) x, y, z. For example, for the planet movement around the sun, it needs six coordinates (other three coordinates are those to determine the planet rotation around x, y, z axis). In fact, in the engineering, those six coordinates have already been used. For example, in finite element structure analysis, as well as in ship movement analysis.

Now we have this question: How many coordinates are needed to describe the movement of an event in space? Six coordinates are sufficient?

As if we may say that, the coordinate numbers to describe the movement of an event in space should not be fixed. For different question, should have the different solution. For example regarding certain questions, if facilitates, we may again add the temperature coordinate, mass coordinate and so on.

In fact, at present many physical theories have already been established in higher dimensional space. Such as the string theory and so on, they must be established in the

space higher than nine-dimension, some even in 26-dimensional space.

As for time, it also does not need to define as one-dimensional. At present, the time was four-dimensional, three-dimensional, six-dimensional and so on already are proposed. Now we derive one kind of three-dimensional time according to the related formula of Lorentz transformation.

Choosing two different reference systems S and S', their coordinates are x, y, z and x', y', z' respectively. At beginning S and S' are superposition, in system S there is a radial line r to pass the origin of coordinates O, the angles between r and x, y, z are α, β, γ respectively. The corresponding radial line in system S' is r'. Then the origin of coordinates O' of system S' moves with uniform speed V along the direction of radial line r, and x', y', z' are always paralleled with x, y, z respectively. The signs t_x,t_y,t_z and t_r denote the times in the directions of x, y, z respectively in system S, the signs $t'_{x'}, t'_{y'}, t'_{z'}$ and $t'_{r'}$ denote the times in the directions of x', y', z' respectively in system S'.

Suppose the system S is absolutely at rest, then we have

$$t_x = t_y = t_z = t_r = t \qquad (1)$$

For the theory of relativity, suppose system S' is transmitted along x-axis, then the time transformation formula in Lorentz transformation reads

$$t' = \frac{t - (V/c^2)x}{(1 - V^2/c^2)^{1/2}} \qquad (2)$$

According to this, suppose system S' is transmitted along the direction of r, then the time transformation formula in the direction of r' reads

$$t'_{r'} = \frac{t - (V/c^2)r}{(1 - V^2/c^2)^{1/2}} \qquad (3)$$

To project it into the directions of x', y', z', we obtain the times of $t'_{x'}, t'_{y'}, t'_{z'}$ along the directions of x', y', z' in system S' are as follows

$$t'_{x'} = t'_{r'}\cos\alpha \qquad (4)$$

$$t'_{y'} = t'_{r'}\cos\beta \qquad (5)$$

$$t'_{z'} = t'_{r'}\cos\gamma \qquad (6)$$

Thus, for a special case all the related formulas of the three-dimensional time in system S' have already been derived.

Einstein believed that, the Newtonian mechanics was unable to solve the problem of advance of Mercury's perihelion and the problem of gravitational defection of a photon orbit around the sun. Only the general theory of relativity was able to solve these problems.

Actually it is not true, by using the following improved universal gravitation formula [3], for the problem of advance of planet's perihelion, the same results as given by general theory of relativity can be obtained.

$$F = -\frac{GMm}{r^2} - \frac{3G^2M^2mp}{c^2r^4}$$

where: G is gravitational constant, M and m are the masses of the two objects, r is the distance between the two objects, c is the speed of light, p is the half normal chord for the object m moving around the object M along with a curve, and the value of p is given by: $p = a(1-e^2)$ (for ellipse), $p = a(e^2-1)$ (for hyperbola), $p = y^2/2x$ (for parabola).

For problem of gravitational defection of a photon orbit around the sun, by using the above mentioned improved universal gravitation formula, the same results of the angle of deflection as given by general theory of relativity also can be obtained. Thus, the improved Newton theory also may be used to solve the question of high speed movement.

8 New theory to replace or partially replace the theory of relativity

How to establish the new theory to replace or partially replace the theory of relativity? We think that the law (principle) of conservation of energy may be taken as the interdisciplinary grand unified theory to unified process all the problems related to energy in physics, astronomy, mechanics, chemistry, biology, medicine, engineering and so on; taking the unified variational principle for quantization in dynamic Smarandache multi-space [4] and the fractal method as the interdisciplinary grand unified method; and taking the "science of conservation of energy" to replace or partially replace the theory of relativity.

In fact, the concept of "science of conservation of energy" already appeared in 2004 [3].

In science of conservation of energy, the law of conservation of energy plays a leading role. For all problems related with energy, the law of conservation of energy is the only truth; other laws will be derived from or verified by the law of conservation of energy. At present four issues are discussed. First, the relationship between force, mass and velocity is reconsidered according to the law of conservation of energy. It is shown that in the general expression of the force $F = f(m, v, x, y, z, t)$, the form of the function can be obtained by applying the law of conservation of energy. Second, it is shown that other laws, such as the law of gravity and law of Coulomb, can be derived by applying the law of conservation of energy. In passing, the changing rule for the gravitational coefficient (the so-called gravitational constant) is given. Thirdly, it is shown that other laws should be verified or denied according to the law of conservation of energy, and as examples, it is shown that the law of conservation of momentum and the law of conservation of angular momentum are not correct (as their results are in contradiction with the law of conservation of energy). Fourthly, an old discipline of sciences can be updated into a new one; for example, Newton's mechanics can be updated into New Newton's mechanics, in which the law of conservation of energy is taken as the source law to obtain the law of gravity and Newton's second law. New Newton's mechanics can be used partly in place of relativity and even can be used to solve problems which can not be solved by relativity.

Here we actually already propose a new method to establish the natural science theory, i.e., through taking a principle or law as the only truth, to establish a new discipline. This discipline may process unified many questions that is related to this principle or law in many different original disciplines.

Perhaps the reader wants to ask that, why we take the law of conservation of energy as the only truth? Whether or not the law of conservation of momentum or the law of conservation of angular momentum can be taken as the only truth?

Essentially, the law of conservation of momentum or the law of conservation of angular momentum also can be taken as the only truth, thus establish the science of conservation of momentum or the science of conservation of angular momentum. But, the applicable scope of the law of conservation of energy is much greater than that of the law of conservation of momentum or the law of conservation of angular momentum. For example in chemistry, medicine and so on, the law of conservation of momentum or the law of conservation of angular momentum law nearly cannot be used. Therefore we should take the law of conservation of energy as the only truth.

As for taking the unified variational principle for quantization in dynamic Smarandache multi-space and the fractal method as the interdisciplinary grand unified method, the reason can be stated briefly as follows.

Firstly, we discuss the applications of Dynamic Smarandache Multi-Space (DSMS) Theory. Supposing for the n different dynamic spaces (n is a dynamic positive integer and the function of time) the different equations have been established, as these n different dynamic spaces synthesize the DSMS, and they are mutually affected, some new coupled equations need to establish in the DSMS to replace some equations in the original dynamic spaces, as well as supply other equations to process the contact, boundary conditions and so on. For the unified processing of all equations in the DSMS, this paper proposes to run the quantization processing to all the variables and all the equations and establish the unified variational

principle of quantization with the collocation method based on the method of weighted residuals, and simultaneously solve all the equations in the DSMS with the optimization method. Thus by using the unified variational principle of quantization in the DSMS and the fractal quantization method, will pave the way for the unified processing of the theory of relativity and the quantum mechanics, and the unified processing of the four foundational interactions. At present this method can be used to find the coupled solution for the problem of relativity and quantum mechanics.

Secondly, as well-known, the fractal method has been successfully used in some fields, it is used to find the organized structure that deeply hidden in the complex phenomenon. According to many scholars' viewpoints, it will be able to have great development and obtain a bigger success in the 21st century.

At present for the fractal method in common use, the fractal dimension D is a constant, for example the fractal dimension D for the coastline may be taken as 1.02, 1.25 and so on. This kind of fractal may be called the constant dimension fractal. But, in nature the phenomenon that strictly satisfies the relation of constant dimension fractal simply does not exist. Therefore the massive complex phenomena are unable to process with constant dimension fractal. In order to overcome this difficulty, now the concept of variable dimension fractal has been proposed, namely the fractal dimension D is the function of the characteristic scale r. Later, based on the complex number dimension fractal and the fractal series, the variable dimension fractal in hyper complex spaces (in which the fractal dimension D is the function of variable and hyper complex) also is presented.

In a word, the domestic and foreign scholars have already developed the fractal method in many aspects.

Therefore, the fractal method will certainly have the extremely widespread applications.

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