Errors in Nobel Prize for Physics (3)
——Conservation of Energy Leads to Probability Conservation of Parity, Momentum and so on

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Abstract: One of the reasons for 1957 Nobel Prize for physics is "for their penetrating investigation of the so-called parity laws which has led to important discoveries regarding the elementary particles". While the concepts of parity laws (law of conservation of parity and law of nonconservation of parity) are questionable. For the experiment of Chien-Shiung Wu et al in 1957, the correct way of saying should be that the probability of conservation of parity is 71% and the probability of nonconservation of parity is only 29%. The essential reason for the phenomena of nonconservation (including nonconservation of parity, momentum, angular momentum and the like) is that so far only the "law of conservation of energy" can be considered as the unique truth in physics. As for other "laws", they are correct only in the cases that they are not contradicted with law of conservation of energy or they can be derived by law of conservation of energy; otherwise their probability of correctness should be determined by law of conservation of energy or experiment (currently for the most cases the correctness can only be determined by experiment). Conclusion: besides law of conservation of energy, all other laws of conservation in physics may not be correct (or their probabilities of correctness are all less than 100%). Discussing the examples that law of conservation of momentum and law of conservation of angular momentum are not correct (their results are contradicted with law of conservation of energy). In addition, the essential shortcomings of special relativity and general relativity are caused from the reason that law of conservation of energy was not considered at the established time of these two theories; therefore their results will appear the examples contradicted with law of conservation of energy, and in the area of general relativity the attempt to derive the correct expression of energy will never be success. Finally the examples deriving the improved Newton's second law and improved law of gravity according to law of conservation of energy are discussed, which show the great potentiality of law of conservation of energy, and giving full play to the role of law of conservation of energy will completely change the situation of physics.

Key words: Weak interaction, conservation of parity, nonconservation of parity, nonconservation of momentum, nonconservation of angular momentum, probability, law of conservation of energy, unique truth, expression of energy, improved Newton's second law, improved law of gravity

Introduction

The importance of law of conservation of energy is far from being fully understood, and its great potentiality is far from being fully realized.

One of the reasons for 1957 Nobel Prize for physics is "for their penetrating investigation of the so-called parity laws which has led to important discoveries regarding the elementary particles". Why is the parity nonconservation? The essential reason for this is that so far only the "law of conservation of energy" will be qualified to become the unique truth in physics.

Not only we cannot prove that "law of conservation of parity" is not contradicted with law of conservation of energy, but also cannot prove that "law of conservation of parity" can be derived from law of conservation of energy, so the so-called "law of conservation of parity" is not correct. Similarly, the so-called "law of conservation of momentum" and "law of conservation of angular momentum" are not correct (or their probabilities of correctness are less than 100%).

By extension, all the physical laws that cannot be derived from law of conservation of energy are probably not correct (or their probabilities of correctness are less than 100%). For example, the special relativity and general relativity are not correct (or their probabilities of correctness are less than 100%) for the reason that law of conservation of energy was not considered at the established time of these two theories. Otherwise, all laws that can be derived from law of conservation of energy are correct. For example, the improved Newton's second law and improved law of gravity can be derived from law of conservation of energy.

1 Determine the probabilities of conservation of parity and nonconservation of parity according to the experiment of Chien-Shiung Wu et al in 1957

In the experiment of Chien-Shiung Wu et al in 1957, they found that the number of the electrons that exiting angle $\theta > 90°$ is 40% more than that of $\theta < 90°$. For this result, we cannot simply say that parity is conservation or nonconservation. The correct way of saying should be that the probability of conservation of parity is 71% and the probability of nonconservation of parity is only 29%.

Similarly, the probabilities of correctness for other laws of conservation should be determined by law of conservation of energy or experiment (currently for the most cases the correctness can only be determined by experiment).

2 Examples that the law of conservation of momentum and law of conservation of angular momentum are not correct

In reference [1], an example is presented in which the law of conservation of momentum and law of conservation of angular momentum are not correct (the results are directly contradicted with law of conservation of energy).

Here we present the reason that the law of conservation of momentum and law of conservation of angular momentum are not correct in another way.

As well-known, in many cases, the law of conservation of momentum and law of conservation of angular momentum can be derived according to the original Newton's second law. However, in references [2] and [3], we have pointed out that in some cases the original Newton's second law is not correct, and the improved Newton's second law $F = ma^{1+\varepsilon}$ is needed to be applied. In this case, the law of

conservation of momentum and law of conservation of angular momentum are no longer correct. Here, because the improved Newton's second law is derived according to the law of conservation of energy export, so we can say that based on the improved Newton's second law, the results of law of conservation of momentum and law of conservation of angular momentum are indirectly contradicted with the law of conservation of energy.

3 Example that relativity theory is contradicted with law of conservation of energy

The essential shortcomings of special relativity and general relativity are caused from the reason that law of conservation of energy was not considered at the established time of these two theories; therefore their results will appear the examples contradicted with law of conservation of energy.

For example, according to relativity theory, an object’s speed cannot reach the speed of light. However, based on law of conservation of energy, when the speed of an object is close or equal to the speed of light, for breaking the light barrier, the speed of this object could be faster than light as it passes through the Sun’s gravitational field.

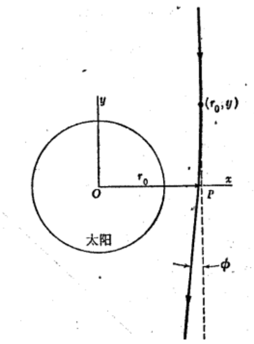

Figure 1. An object passes through the Sun's gravitational field at the speed of light

As shown in Figure 1, an object passes through the Sun's gravitational field at the speed of light from the infinite distance, assuming that its closest distance to the Sun is equal to r_0, if the orbit of this object will be tangent to the Sun, then r_0 is equal to the radius of the Sun. Try to decide this object’s maximum speed $v_{\max}$ as its distance to the Sun is equal to r_0.

For this problem, in reference [3], the improved law of gravity reads

$$F = -\frac{GMm}{r^2} - \frac{1.5GMmr_0^2}{r^4} \qquad (1)$$

For the reason that, as the object is located at the infinite distance, and the closest distance to the Sun, the energies should be equal, so we have

$$\frac{1}{2}mc^2 = \frac{1}{2}mv_{\max}^2 - \frac{1.5GMm}{r_0}$$

It gives

$$v_{\max} = \sqrt{c^2 + 3GM / r_0} \qquad (2)$$

Obviously this speed is faster than the speed of light, if the orbit of this object will be tangent to the Sun, after calculating it gives

$$v_{\max} = (1 + 3.18 \times 10^{-6})c \qquad (2A)$$

In addition, in the area of general relativity the attempt to derive the correct expression of energy will never be success. Einstein could not derive this expression of energy, other people also cannot derive it.

4 Deriving the improved Newton's second law and improved law of gravity according to law of conservation of energy

Now for an example, we simultaneously derive the improved Newton's second law and improved law of gravity according to law of conservation of energy, and it should be noted that they are suitable for this example only.

Firstly, the variational principles established by the law of conservation of energy can be given with least squares method (LSM).

Supposing that the initial total energy of a closed system equals $W(0)$**, and for time** t **the total energy equals** $W(t)$**, then according to the law of conservation of energy:**

$$W(0) = W(t) \qquad (3)$$

This can be written as:

$$R_W = \frac{W(t)}{W(0)} - 1 = 0 \qquad (4)$$

According to LSM, for the interval [t_1, t_2**], we can write the following variational principle:**

$$\Pi = \int_{t_1}^{t_2} R_W^2 \, dt = \min_0 \qquad (5)$$

where: $\min_0$ **denotes the minimum value of functional** Π **and it should be equal to zero.**

It should be noted that, in many cases $W(t)$ **is approximate, and** R_W **is not identically equal to zero, therefore Eq.(5) can be used to solve the problem.**

Besides the time coordinate, another one can also be used. For example, for interval [x_1, x_2], the following variational principle can be given according to the law of conservation of energy:

$$\Pi = \int_{x_1}^{x_2} R_W^2 dx = \min_0 \qquad (6)$$

The above-mentioned principles are established by using the law of conservation of energy directly. Sometimes, a certain principle should be established by using the law of conservation of energy indirectly. For example, a special physical quantity Q may be interested, not only it can be calculated by using the law of conservation of energy, but also can be calculated by using other laws (for this paper they are the law of gravity, and Newton's second law). For distinguishing the values, let's denote the value given by other laws as Q, while denote the value given by the law of conservation of energy as Q', then the value of R_W can be redefined as follows:

$$R_W = \frac{Q}{Q'} - 1 = 0 \qquad (7)$$

Substituting Eq. (7) into Eqs. (5) and (6), as Q' is the result calculated with the law of conservation of energy, it gives the variational principle established by using the law of conservation of energy indirectly. Otherwise, it is clear that the extent of the value of Q accords with Q'.

Substituting the related quantities into Eq. (5) or Eq. (6), the equations derived by the condition of an extremum can be written as follows:

$$\frac{\partial \Pi}{\partial a_i} = \frac{\partial \Pi}{\partial k_i} = 0 \qquad (8)$$

After solving these equations, the improved law of gravity, and Newton's second law can be reached at once. According to the value of Π, the effect of the solution can be judged. The nearer the value of Π is to zero, the better the effect of the solution. It should be noted that besides of solving equations, optimum-seeking methods could also be used for finding the minimum and the constants to be determined. In fact, the optimum seeking method will be used in this paper.

Now we solve an example. As shown in Fig.2, supposing that the small ball rolls along a long incline from A to B. Its initial velocity is zero and the friction and the rotational energy of small ball are neglected.

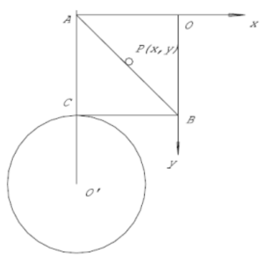

Fig.2 A small ball rolls from *A* to *B*

Supposing that circle O' denotes the Earth, M denotes its mass; m denotes the mass of the small ball (treated as a mass point P), O'A is a plumb

line, coordinate x is orthogonal to O'A, coordinate y is orthogonal to coordinate x (parallel to O'A), BC is orthogonal to O'A. The lengths of OA, OB, BC, and AC are all equal to H, and O'C equals the radius R of the Earth.

In this example, the value of v_{P}^2 which is the square of the velocity for the ball located at point P is investigated. To distinguish the quantities, denote the value given by the improved law of gravity and improved Newton's second law as v_{P}^2, while v'^2_{P} denotes the value given by the law of conservation of energy, then Eq.（6）can be written as

$$\Pi = \int_{-H}^{0} (\frac{v_P^2}{v'^2_P} - 1)^2 dx = \min_0 \qquad (9)$$

Supposing that the improved law of gravity and improved Newton's second law can be written as the following constant dimension fractal forms

$$F = -\frac{GMm}{r^D} \qquad (10)$$

$$F = ma^{1+\varepsilon} \qquad (11)$$

where: D and ε are constants.

Now we calculate the related quantities according to the law of conservation of energy.

From Eq.(10), the potential energy of the small ball located at point P is

$$V = -\frac{GMm}{(D-1)r_{O'P}^{D-1}} \qquad (12)$$

According to the law of conservation of energy, we can get

$$-\frac{GMm}{(D-1)r_{O'A}^{D-1}} = \frac{1}{2}mv'^2_P - \frac{GMm}{(D-1)r_{O'P}^{D-1}} \qquad (13)$$

And therefore

$$v'^2_P = \frac{2GM}{D-1}[\frac{1}{r_{O'P}^{D-1}} - \frac{1}{(R+H)^{D-1}}] \qquad (14)$$

Now we calculate the related quantities according to the improved law of gravity and improved Newton's second law.

Supposing that the equation of rolling line is

$$y = x + H \qquad (15)$$

For the ball located at point P,

$$dv/dt = a \qquad (16)$$

because

$$dt = \frac{ds}{v} = \frac{\sqrt{2}dx}{v}$$

therefore $vdv = a\sqrt{2}dx$ （17）

According to the improved law of gravity, the force along to the tangent is

$$F_a = \frac{GMm}{r_{O'P}^D}\frac{1}{\sqrt{2}} \quad (18)$$

According to the improved Newton's second law, for point P, the acceleration along to the tangent is

$$a = (\frac{F_a}{m})^{1/1+\varepsilon} = (\frac{GM}{r_{O'P}^D\sqrt{2}})^{1/1+\varepsilon} \quad (19)$$

From Eq.（17）, it gives

$$vdv = \{\frac{GM}{[(H+x)^2+(R+H-y)^2]^{D/2}\sqrt{2}}\}^{1/1+\varepsilon}\sqrt{2}dx \quad (20)$$

Substituting Eq.(15) into Eq.(20), and for the two sides, we run the integral operation from A to P, it gives

$$v_P^2 = 2\int_{-H}^{x_P}\{\frac{GM}{[(H+x)^2+(R-x)^2]^{D/2}}\}^{1/1+\varepsilon}(\sqrt{2})^{\varepsilon/1+\varepsilon}dx \quad (21)$$

then the value can be calculated by a method of numerical integral.

The given data are assumed to be: for Earth, GM=3.99×10^{14}m^3/s^2; the radius of the Earth R=6.37×10^{6}m, H=R/10, try to solve the problem shown in Fig. 2, find the solution for the value of v_B^2, and derive the improved law of gravity and the improved Newton's second law.

Firstly, according to the original law of gravity, the original Newton's second law (i.e., let D=2 in Eq.(10), ε=0 in Eq.(11)) and the law of conservation of energy, all the related quantities can be calculated, then substitute them into Eq.(9), it gives

Π_0=571.4215

Here, according to the law of conservation of energy, it gives v'^2_B=1.0767×10^7, while according to the original law of gravity, and the original Newton's second law, it gives v_B^2=1.1351×10^7, the difference is about 5.4 %. For the reason that the value of Π_0 is not equal to zero, then the values of D and ε can be decided by the optimum seeking method. At present all the optimum seeking methods can be divided into two types, one type may not depend on the initial values which program may be complicated, and another type requires the better initial values which program is simple. One method of the second type, namely the searching method will be used in this paper.

Firstly, the value of D is fixed so let D=2, then search the value of ε, as ε=0.0146, the value of Π reaches the minimum 139.3429; then the value of ε is fixed, and search the value of D, as D=1.99989, the value of Π reaches the minimum 137.3238; then the value of D is fixed, and search the value of ε, as ε=0.01458, the value of Π reaches minimum 137.3231. Because the last two results are highly close, the searching can be stopped, and the final results are as follows

D=1.99989, ε=0.01458, Π=137.3231

Here the value of Π is only 24% of Π_0. While according to the law of conservation of energy, it gives v'^2_B=1.0785×10^7, according to the improved law of

gravity and the improved Newton's second law, it gives v_B^2 =1.1073×10^7^, the difference is about 2.7 % only.

The results suitable for this example with the constant dimension fractal form are as follows

The improved law of gravity reads

$$F = -\frac{GMm}{r^{1.99989}} \quad \text{(22)}$$

The improved Newton's second law reads

$$F = ma^{1.01458} \quad \text{(23)}$$

The above mentioned results have been published on reference [2].

According to the results for the example shown in Fig.2, it can be said that we could not rely on any experimental data, only apply the law of conservation of energy to derive the improved law of gravity, and improved Newton's second law; and demonstrate that the original Newton's law of gravity and Newton's second law are all tenable approximately for this example. So, can only apply the law of conservation of energy to derive that these two original laws or demonstrate they are tenable accurately in some cases? The answer is that in some cases we can indeed derive the original Newton's second law and prove the original Newton's law of gravity is tenable accurately.

Now, in the case that a small ball free falls (equivalent to free fall from A to C in Fig. 2), we derive the original Newton's second law and prove the original Newton's law of gravity is tenable accurately.

Assuming that for the original law of gravity and Newton's second law, the related exponents are unknown, only know the forms of these two formulas are as follows: $F = -\frac{GMm}{r^D}$, $F = ma^{D'}$; where: D and D' are undetermined constants.

As shown in Fig.2, supposing that a small ball free falls from point A to point C. Similar to the above derivation, when the small ball falls to point P (point P is not shown in Fig.2), the value of v_P^2 calculated by the undetermined Newton's second law and the law of gravity, as well as the value of v'^2_P calculated by the law of conservation of energy are as follows:

$$v'^2_P = \frac{2GM}{D-1}\left[\frac{1}{r_{O'P}^{D-1}} - \frac{1}{(R+H)^{D-1}}\right]$$

$$v_P^2 = 2(GM)^{1/D'} \int_0^{y_p} (R+H-y)^{-D/D'} dy$$

$$v_P^2 = 2(GM)^{1/D'}\left\{-\frac{1}{1-D/D'}\left[(R+H-y)^{1-D/D'}\right]\Big|_0^{y_p}\right\}$$

$$v_P^2 = \frac{2(GM)^{1/D'}}{(D/D')-1}[\frac{1}{r_{O'P}^{(D/D')-1}} - \frac{1}{(R+H)^{(D/D')-1}}]$$

Let $v_P^2 = v_P'^2$, then we should have: $1 = 1/D'$, and $D - 1 = (D/D') - 1$; these two equations all give: $D' = 1$, this means that for free fall problem, by using the law of conservation of energy, we strictly derive the original Newton's second law $F = ma$.

Here, although the original law of gravity cannot be derived (the value of D may be any constant, certainly including the case that D=2), we already prove that the original law of gravity is not contradicted to the law of conservation of energy, or the original law of gravity is tenable accurately.

For the example shown in Fig.2 that a small ball rolls along the inclined plane, in order to obtain the better results, we discuss the variable dimension fractal solution with Eq.(4) that is established by the law of conservation of energy directly.

Supposing that the improved Newton's second law and the improved law of gravity with the form of variable dimension fractal can be written as follows: $F = ma^{1+\varepsilon}$, $\varepsilon = k_1 u$; $F = -GMm/r^{2-\delta}$, $\delta = k_2 u$; where: u is the horizon distance that the small ball rolls （$u = x + H$）.

With the similar searching method, the values of k_1, k_2 can be determined, and the results are as follows

$$\varepsilon = 8.85\times10^{-8}u, \quad \delta = 2.71\times10^{-13}u$$

The results of variable dimension fractal are much better than that of constant dimension fractal. For example, the final $\Pi = 5.8662\times10^{-4}$, it is only 0.019% of Π_0 (3.1207). While according to the law of conservation of energy, it gives $v_B'^2$ =1.0767$\times$10^7, according to the improved law of gravity and the improved Newton's second law, it gives v_B^2 =1.0777$\times$10^7, the difference is about 0.093 % only.

The results suitable for this example with the variable dimension fractal form are as follows

The improved law of gravity reads

$$F = -\frac{GMm}{r^{2-2.71\times10^{-13}u}} \quad \textbf{(24)}$$

The improved Newton's second law reads

$$F = ma^{1+8.85\times10^{-8}u} \quad \textbf{(25)}$$

where: u is the horizon distance that the small ball rolls （$u = x + H$）

There is another problem should also be discussed. That is the improved kinetic energy formula. As well-known, the kinetic energy formula has been modified in the theory of relativity, now we improve the kinetic energy formula with the law of conservation of energy.

Supposing that the improved kinetic energy formula is $E_d = \frac{1}{2}mv^{2-\lambda}$,

$\lambda = k_3 u$; **where:** u **is the horizon distance that the small ball rolls** （$u = x + H$）.

With the similar searching method, we can get: $k_3 = 9.95 \times 10^{-13}$**, then the improved kinetic energy formula with variable dimension fractal form reads**

$$E_d = \frac{1}{2} m v^{2 - 9.95 \times 10^{-13} u}$$

Because the effect of improvement is very small (the value of Π **is only improved from** 5.8662×10^{-4} **into** 5.8634×10^{-4}**), therefore these results should be for reference only.**

5 Conclusions

In this paper, we reconsider the problems about conservation of parity and nonconservation of parity with a new viewpoint. For the experiment of Chien-Shiung Wu et al in 1957, the new conclusion is that the probability of conservation of parity is 71% and the probability of nonconservation of parity is only 29%. We point out that, besides law of conservation of energy, all other laws of conservation in physics may not be correct (or their probabilities of correctness are all less than 100%). So far, because only the law of conservation of energy can be qualified to become the unique truth in physics, therefore for all the theories and laws in physics (including the relativity theory, law of gravity, Newton's second law, law of conservation of momentum, law of conservation angular momentum, so-called parity laws, and so on), we should re-examine their relations with law of conservation of energy. In fact, many theories and laws (such as improved Newton's second law and improved law of gravity) can be derived according to law of conservation of energy, which show the great potentiality of law of conservation of energy, and giving full play to the role of law of conservation of energy will completely change the situation of physics. In addition, in a more wide range, the law of conservation of energy can be used to deal with all the problems related to energy in physics, astronomy, mechanics, engineering, chemistry, biology, and the like with a unified way.

References

1 Fu Yuhua, Science of Conservation of Energy. Journal of Dezhou University. 2004(6):20-24

2 Fu Yuhua, Deriving Improved Newton’s Second Law and the Law of Gravity at One Time with Form of Fractal Formula, Engineering Science. 2003，Vol.5，No.6，55-58

3 Fu Yuhua. Shortcomings and Applicable Scopes of Special and General Relativity. See: Unsolved Problems in Special and General Relativity. Edited by: Florentin Smarandache, Fu Yuhua and Zhao Fengjuan. Education Publishing, 2013. 81-103