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The Energy-Momentum Conservation: A New Perspective on Conservation

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Abstract:
Conservation is a basic law in the field of physics. The momentum conservation and the mass energy conservation are two important laws. Mass is solidified energy and energy is invisible mass. They are two different forms of matter. Momentum, like energy, is an objective existence. It is the manifestation of material existence and will not disappear out of thin air. Lorentz transformation is only a coordinate system transformation, which belongs to the observer effect and cannot be used to calculate the changes of inherent physical quantities of matter, such as the mass and energy of matter.

Combining momentum with energy, the energy-momentum is defined, which is a new perspective of conservation. This leads to the redefinition of the dynamic mass and the dynamic energy. From this, the law of conservation of the energy-momentum, the law of conservation of the dynamic energy, the law of conservation of the dynamic mass and the formula of energy, mass and momentum can be derived.

The analysis shows that the dilemma of interpretations of several representative experiments can be satisfactorily explained within the framework of the energy-momentum.

Key words:
Conservation of the energy-momentum, conservation of the dynamic energy, conservation of the dynamic mass, formula of energy, mass and momentum, Lorentz transformation

The mass-speed relationship proposed by relativity breaks through the framework of Newtonian physics [1] [2]. However, in the relevant experiments of mass, momentum and energy, different explanations or questions have been caused [3] [4] [5] [6].

Conservation is a basic law in the field of physics. The momentum conservation and the mass energy conservation are two important laws. The mass-energy relationship established by relativity shows that mass and energy are equivalent, mass is solidified energy, and energy is invisible mass, they are two different forms of matter. Similarly, momentum, like energy, is an objective existence. It is the manifestation of material existence and will not disappear out of thin air. Motion is an objective physical phenomenon. Momentum, like energy and mass, is one of the manifestations of matter. Therefore, it can be considered that movement itself is an invisible material, which has energy; mass can have momentum, and energy also has momentum.

Since momentum and energy represent different physical properties, a coordinated and unified treatment has not been seen yet. This paper finds that energy can have a definition of momentum, called energy-momentum, and conserved; thus leads to a redefinition of the dynamic mass and the dynamic energy, that is, the dynamic mass or energy is the sum of the internal mass or energy and the motion mass or energy; the three conservation laws of mass, momentum and energy can be combined into one, which are different manifestations of the laws of conservation of matter.

This new perspective of conservation establishes the internal relationship between the three, modifies the existing calculation methods of the dynamic mass and the dynamic energy, unifies the mass-speed relationship and energy-speed relationship between the macro world and the micro world, can satisfactorily explain the questions faced in the current experiments, and enrich people's cognition of the material world.

1、 New laws of conservation

1.1 Law of conservation of the energy-momentum

Define the energy-momentum as the product of energy and speed, and the total energy-momentum as the product of energy and the speed of light, and distinguish between intrinsic energy and motion energy.

Total energy-momentum = intrinsic energy-momentum + motion energy-momentum

$$E_z * C = E_h * C + E_h * V$$

When the moving speed V approaches the speed of light, the total energy-momentum is close to twice its own energy-momentum.

Divided by the speed of light C on both sides of the equation, we can deduce:

1.2 Law of conservation of the dynamic energy

Total energy = internal energy + motion energy

$$E_z = E_h + E_h * \frac{V}{C}$$

When the moving speed V approaches the speed of light, the total energy is close to twice its own energy, which is completely different from the conclusion that the motion energy is close to infinity in the special theory of relativity.

Divide the two sides of the equation by the square of the speed of light C at the same time to deduce:

1.3 Law of conservation of the dynamic mass

Total mass = internal mass + motion mass

$$M_z = M_h + M_h * \frac{V}{C}$$

When the moving speed V approaches the speed of light, the total mass is close to twice its own mass, which is completely different from the conclusion that the motion mass is close to infinity in the special theory of relativity.

1.4 Formula of energy、mass and momentum

Replace the energy on the right side of the equation of conservation law of the dynamic energy with mass and momentum to deduce:

$$E_z = M_h * C^2 + P * C$$

Where: $P=M_h*V$ momentum, E_z total energy, E_h internal energy, M_z total mass, M_h internal mass, V moving speed of energy source, C speed of light.

2、 Thought experiments

2.1 Experiment of the energy-momentum conservation

Momentum, like energy, is an objective existence. It is also a form of matter and will not disappear out of thin air. Suppose there is a car running in the same direction as the train on a high-speed train. According to the law of momentum conservation, the total momentum of the car should be the sum of the train speed V1 and the car speed V2 multiplied by the car mass M. According to the law of conservation of mass and energy, mass and energy can be converted to each other. Assuming that the mass of the car is all converted to light energy E and travels in the same direction as the train, the momentum should remain conserved $E*C=M*C^2*C+M*C^2*V1$.

2.2 Experiment of Doppler photoelectric effect

Suppose there are two trains A and B at points p and q at 10 kilometers away, the tail of train A is equipped with a light emission source, and the wavelength of the emitted light is just less than the frequency that produces photoelectric effect, that is, the cut-off frequency, while the head of train B is equipped with a metal plate that produces photoelectric effect and forms a lighting circuit with the head lighting lamp.

Train B moves towards point p from point q at a high speed. Train A turns on the emission light source to illuminate the metal plate of train B. When train B approaches train A, has the light of train B been turned on? If it is not lit, it violates the existing known observation results and logical reasoning. Because the frequency of light appears blue shift and reaches the threshold of triggering photoelectric effect, i.e. the limit frequency, the light of train B should be lit.

On the contrary, suppose that both trains A and B are at point q, the tail of train A is equipped with a light emission source, and the wavelength of the emitted light is just greater than the frequency that produces photoelectric effect, that is, the limit frequency, while the head of train B is equipped with a metal plate that produces photoelectric effect and forms a lighting circuit with the head lamp. Train A turns on the emission light source to illuminate the metal plate of train B. When train A moves towards point p at a high speed, the light of train B should change from on to off.

The experiment can prove the law of dynamic energy conservation. A 1960 experiment obtained the same experimental results [3].

The law of conservation of the dynamic energy can explain that high-speed trains emit light with the same frequency as the ground at the same time, which is essentially different. The same is the speed of light, the different is the energy of light.

The law also solves the problem of unclear energy change and source when the light frequency is blue shifted in Doppler effect.

3、 Validation experiments

3.1 The dynamic mass verification experiment

For substances with static mass, the dynamic mass can be tested [4] [5] for verification. The existing Large Hadron Collider can accelerate the speed of elementary particles to approach the speed of light. According to the theory of relativity, the functional expression of their dynamic mass is:

$$m_t = \frac{m_0}{\sqrt{1-\frac{v^2}{c^2}}}$$

If the proton is accelerated to 99.99% and 99.999% of the speed of light, its motion mass will be 70.7 and 223.6 times of its static mass. According to the new law of the dynamic mass conservation, the total mass is only 1.9999 and 1.99999 times of the static mass.

The protons accelerated to 99.99% and 99.999% of the speed of light are allowed to pass through the electromagnetic field with known intensity, because the charge carried by the protons is considered to be a fixed value and the force received in the electromagnetic field is a fixed value. Their trajectory can be measured, and its trajectory is directly proportional to the mass. Because according to the new law of the dynamic mass conservation, the masses are 1.9999 and 1.99999 respectively, the difference between them is small, and their motion trajectories should be similar. According to the mainstream point of view, its mass is 70.7 and 223.6 respectively. The predicted trajectory is very different, and the theoretical predicted circumferential radius is twice as different. Which theoretical predicted value is correct can be judged according to the experimental results.

The existing experimental results on the trajectory of charged particles in a uniform magnetic field show that [5], when the electron speed is 99.08% and 99.92% of the speed of light, the mainstream theory predicts that the circumferential radius is 11 cm and 33 cm, but the actual measurement results show that the circumferential radius of the trajectory is approximately 18 cm, which is in line with the conclusion that the circumferential radius of the trajectory predicted by the law of conservation of the dynamic mass is approximate.

3.2 The dynamic energy verification experiment

Corresponding experiments can be carried out on the dynamic energy of substances with static mass. Relativity believes that the expression of dynamic energy is:

$$E_t = \frac{E_0}{\sqrt{1-\frac{v^2}{c^2}}}$$

For example, when the electron speed is 0.9997c, the dynamic energy of the electron is 40.82 times (20MeV) of the static energy. According to the law of conservation of the dynamic energy, the calculated energy value is only 1.9997 times of the static energy.

In the paper on verifying the mass speed relationship by calorimetry [6], the relationship curve between electron energy and temperature of different energies clearly shows that the measured temperature when the electron energy is 1.6, 6, 8, 10, 12 and 15 MeV is slightly higher than the Newtonian theoretical value, far lower than the relativistic theoretical value, which is almost a horizontal line like the Newtonian theoretical value. The experimental results are completely consistent with the predicted results of the energy value calculated by conservation law of the dynamic energy.

This clearly explains the mystery of energy loss in high-speed charged particle impact experiments, and the charged particles simply do not have so much energy value like the mainstream view theory predicts.

4、 Conclusion and discussions

According to the experimental results of the motion law of electrons with different energies in a uniform magnetic field [5], the mass speed relationship verified by calorimetry [6] and the thought experiments, it can be judged that the derivation of each dynamic conservation law given above is reasonable.

Momentum, like energy, is an objective existence. It is also a form of matter and will not disappear out of thin air. It is a common understanding that the mass and energy of moving matter are different from those of static state. Now the mainstream view of relativity holds that the mass and energy of matter with static mass gradually increase with the increase of the speed of matter movement. When the speed reaches the speed of light, the mass and energy of matter approach infinity.

But the moving mass and energy of matter, according to the new law of conservation of the dynamic mass and the dynamic energy, is the coefficient V/C multiplied by its intrinsic mass and energy. And regardless of whether the matter has a rest mass, motion increases the mass and energy of the matter. When the speed of motion of the substance is close to the speed of light, its mass and energy are close to its own mass and energy, and the total mass and energy are twice as much as the mass and energy of the substance.

The mainstream viewpoint of motion mass and energy of matter is based on Lorentz transformation, and the mass and the energy of moving matter are derived from Lorentz transformation formula.

However, Lorentz transformation is only a coordinate system transformation and belongs to the observer effect. It cannot be used to calculate the changes of inherent physical quantities of matter, such as the mass and energy of matter, that is, it can only calculate the changes of relative physical quantities, such as time [4] [5] [6].

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