A Modification of Newton's Formula of Universal Gravitation

Zhi Li and Hua Li
(lizhi100678@sina.com, lihua2057@gmail.com)

Abstract: Based on the assumption of Conservation of Energy-Momentum, this article proves that the static mass of an object is equivalent to the inertial mass, and the total mass of the object is composed of inertial mass and moving mass. The gravitational mass of a passive gravitational object is the total mass, and the gravitational mass of an active gravitational object is the static mass. An object without static mass moving at the speed of light has inertial mass, and its total mass is twice its inertial mass. For an object with static mass, motion does not change its inertial mass, but only increases its gravitational mass. This article proposes a modified formula for Newton's universal gravitation formula, that is, a dynamic correction coefficient (1+V/C) is added in front of the original formula. The modified formula is:

$$F = (1 + \frac{V}{C})\ G\ \frac{mM}{r^2}$$

Keywords: Universal gravitation formula, correction coefficient, gravitational mass, inertial mass

Gravity, along with electromagnetic force, weak interaction, and strong interaction, is one of the four fundamental forces in the universe. [1] Newton's law of gravity was proposed in 1687, which mainly states that each particle in the universe attracts other particles with a force. This force is directly proportional to the product of the masses of each particle and inversely proportional to the square of the distance between them. Its mathematical expression is

$$F = G\ \frac{mM}{r^2}$$

where F gravity, G gravitational constant, m, M mass, and r distance. Newton, who just invented calculus, could perfectly explain Kepler's three laws of planetary motion from this law. However, astronomical observations indicated that there were still phenomena that could not be explained well by it, such as the well-known precession of Mercury.

Mass is a fundamental property possessed by matter, and all matter in the universe possesses mass. At present, humans have defined the static mass of objects, but the existence of a static mass in light has always been an important issue that relates to human understanding of the essence of the universe. The physical connotations of mass and static mass still need further clarification. [2]

Analysis shows that matter in the universe can be divided into three levels:

1. Macro matter: refers to various atoms and their constituent substances;
2. Microscopic matter: refers to the fundamental particles that make up various atoms;
3. Ultra microscopic matter: plasmids of substances that make up elementary particles.

Ultra microscopic matter may be in string or other forms, with plasmids having spin around their own center of mass and always in a state of superluminal motion. [3]

Light is a special type of matter that moves at a relative speed of light in a reference frame, and motion is an inherent property of light. It is generally believed that the speed of light is the boundary between the speed of ultramicroscopic plasmids and microscopic particles. The speed of ultramicroscopic plasmids is greater than the speed of light, while the speed of microscopic particles is less than the speed of light.

Both mass and energy are measures of the supermicroplasmids and their motion as a whole, which includes both physical supermicroplasmids and motion. Mass and energy represent the same thing.

According to the hypothesis of Conservation of Energy-Momentum, the total dynamic mass of an object equals (static mass + moving mass), that is,

$$M_{total} = M_{static} + \frac{V}{C} M_{static}$$

The hypothesis of Conservation of Energy-Momentum demonstrates that the static mass of an object is equivalent to the inertial mass, and it can be inferred that the inertial mass of an object moving at the speed of light without a static mass is equal to half of its total mass. [4]

The light is moving at the speed of light, so its inertial mass is equal to the moving mass, which is half of the total dynamic mass. The existing experimental results show the characteristic that the inertial mass of an object with a static mass remains unchanged in motion. [5] [6]

From the above hypothesis, it can be inferred that the static mass of an object is equal to the inertial mass, and the total mass of an object is composed of two parts: the inertial mass and the moving mass. The gravitational mass of a passive gravitational

object is its total mass, while the gravitational mass of an active gravitational object is its static mass. It can be considered that the gravitational mass of a passive gravitational object is the total mass of the object, (1+V/C)*m, while the gravitational mass of an active gravitational object is equivalent to the inertial mass, that is, the static mass.

Since the moving speed of an object is related to the energy of the object, it indicates that the classic Newton's universal gravitation formula needs to be appropriately modified, that is, adding a dynamic correction coefficient (1+V/C) in front of the formula, where V is the moving speed of the passive gravitational object, C is the speed of light in vacuum. The modified formula is:

$$F = (1 + \frac{V}{C})\ G\ \frac{mM}{r^2}$$

This new theory can better explain Eddington's 1919 total solar eclipse observations. Because Newton's theory and the new theory have the same value when calculating the gravitational force of light on the sun, but the inertial mass is twice as different. This reveals the reason why the light emitted by distant stars during a total solar eclipse is deflected at an angle twice that predicted by traditional Newtonian theory when it passes near the sun.

At the same time, the new theory can also explain the reason for Mercury's precession, as the speed of Mercury's motion at different positions on its elliptical orbit is different, and the gravitational force it receives is also different. This leads to additional gravitational acceleration when approaching the Sun, creating an effect similar to the presence of another asteroid on the inner side of Mercury, resulting in Mercury's aphelion and perihelion not being on the same ellipse.

The new theory speculates that when a spacecraft leaves the Earth's gravitational field and enters the Sun's gravitational field, it will be subject to additional gravitational constraints. At this time, both the spacecraft and the Earth are passive gravitational objects in the solar system, and it is necessary to increase the correction coefficient to calculate the gravity between the two. The speed of the Earth and spacecraft in the solar system is relatively high, leading to an increase in gravity.

The new theory also speculates that spacecraft will experience additional gravity when flying within the solar system. The reason is that the spacecraft has a motion speed and needs to increase the correction coefficient to calculate gravity.

Main references:

[1] https://en.wikipedia.org/wiki/Gravity
[2] https://en.wikipedia.org/wiki/Mass
[3] Zhi Li and Hua Li. On the static mass of light.

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[4] Zhi Li and Hua Li. The Energy-Momentum Conservation: A new perspective on conservation. https://vixra.org/abs/2204.0063
[5] Hao Ji. Experimental study on the motion law of electrons with different energies in a uniform magnetic field. China Science and Technology Forum (6): 162 DOI: 10.3969/j.issn.1671-2064.2009.06.096, 2009
[6] Hao Ji. Experiment on measuring electronic energy by calorimetric method. Chinese Scientific and Technological Achievements (1): 34-35, 2009

Attachment 1: Experimental Plan for Inertial Mass Measurement

Accelerate the proton to nearly 99.999% of the speed of light, let it enter the reverse deceleration electromagnetic field, and apply a reverse deceleration electromagnetic force to it. There is a functional relationship between the initial inertial mass, electromagnetic force, and velocity. The initial electromagnetic force and the initial velocity of the proton are known, and the velocity of the proton can be measured after being subjected to the electromagnetic field. The initial inertia mass of the proton can be calculated by the deceleration data of the proton.

The theory of relativity holds that the inertial mass and gravitational mass are the same, and their dynamic mass is calculated to be 223.61 times that of the static mass. However, according to the new law of Conservation of Mass-Momentum, the dynamic mass is calculated to be only 1.99999 times that of the static mass.

A Simplified Qualitative Experimental Plan
A reverse deceleration electromagnetic impulse can be applied to the proton, which is equal to magnitudes calculated by 1.0 and 2.0 static mass.

Observing whether a proton can pass through a decelerating electromagnetic field, which can verify the correctness of the theory.

The theory of relativity calculates that its dynamic mass is 223.61 times the static mass of a proton, and the motion speed of a proton after passing through a decelerating electromagnetic field is minimally affected. According to the new law of Conservation of Mass-Momentum, the dynamic mass is only 1.99999 times that of the static mass. Even if the proton momentum value is calculated based on the new dynamic mass, the proton will stop moving.

Obviously, it is more reasonable and logical for the dynamic mass to not exceed twice the static mass.

Charged particles cannot be accelerated to the speed of light in an electromagnetic field, and the faster their speed, the greater the energy required to continue increasing

their speed. The reason is that there is a delay effect in electromagnetic forces, rather than the mass of charged particles becoming larger and larger.

Attachment 2: Gravity Measurement Experiment Plan 1

Select two iron balls A and B with identical physical characteristics such as volume and size, and place them adjacent to each other on a platform approximately 19.6 meters above the ground in a vacuum environment. Among them, the iron ball A falls freely downwards from a stationary state, with its position on the ground being D_1 and the time taken being T_1; At the same time, Iron Ball B freely falls downwards at a horizontal initial speed of 10 meters/second, and its position on the ground is D_2, taking T_2 time.
Newton's theory and relativity predict that iron ball A and iron ball B will land simultaneously, meaning that the positions of the two theories predict that D_2 will coincide, and the horizontal movement distance of D_1D_2 is about 20 meters.

The modified formula for universal gravitation calculates that the inertial mass of a horizontally moving object on the Earth's surface remains unchanged, while gravity increases. Predict that Iron Ball B will land before Iron Ball A, with a landing time of $T_2<T_1$, approximately $3.3*10^{-8}$ seconds faster; And the horizontal movement distance is less than the predicted values of Newton's theory and relativity, that is, $D_1D_2<10$ meters.

This experimental result presents a planetary precession-like effect.

Attachment 3: Gravity Measurement Experiment Plan 2

Using the Cavendish torsion balance method for measurement, first fix a small ball at each end of the T-frame, and then place a large gyroscope near each small ball. When the large gyroscope is stationary or rotating at high speed, measure the angle of the T-frame twisting before and after placing the large gyroscope, in order to determine the gravitational force of the large gyroscope on the small ball at this time.

Predicting that the gravitational force on a small ball, when the large gyroscope rotates at high speed, is greater than the gravitational force on the small ball when the large gyroscope is stationary.