The general mechanics of the moving objects

Peng Gao
Run Jia Petroleum Engineering and Technology Ltd

Abstract: In the article, we establish a completely new theory of mechanics based on absolute frame of reference, demonstrating negating the theory developed by Albert Einstein based on relative frame of reference. We derive the results that are different from Einstein's, explaining the phenomenon that can be explained by Einstein's theory and beyond. The new generalized the theory discovers the principle of the mechanics, with better accuracy between the theoretical prediction and real experimental results compared with Einstein. The article contains 15 sections as the following, 1. The spatial structure of the universe; 2. The absolute and relative frame of reference of Einstein; 3. Absolute four dimensional space time relationship; 4 The rule for the velocity transformation; 5 Length contraction, time dilation and mass reduction; 6. The modification for Newton's law of universal gravitation; 7. The essence of mechanics; 8. Inertial mass and gravitational mass; 9. Gravitational field and acceleration; 10 Mass and energy; 11. "aether", expansion of the universe and the properties of the light; 12. The charge and absolute mechanics; 13. The modification of Coulomb law; 14. The modification of Matter wave; 15. The verification of the wave equation.

Introduction

In 1905, the great German scientist Albert Einstein established the famous theory of relativity. He abandons the concepts of absolute frame of reference and Luminiferous aether and established a new theory based on the Inference of Inertial Properties and the invariance of the speed of light, solving the challenges that the Physics at that time. As the development of the science and technology, people gradually realized that it was unbelievable for the space without "aether". In the absence of it, not only the light can not propagate, but also the standard length and time do not exist, making the fact all the objects in the universe compose the space time uniformly not imaginable. At the same time, the Relativity faces some experimental challenges. For example, the Hafele–Keating experiment in 1971 put some questions on the validity of the time effect of the Relativity. Besides, there is no quantitative link between the Quantum Mechanics developed in the past decades and the Relativity. All these problem illustrated that the theory from Einstein needs further modification and improvement

1. The spatial structure of the universe

The special structure of the universe is a very old topic. As the time passed, it has formed two major schools, the Steady State Theory and the Big Bang Theory. When facing with the practical problems, the two theories contain their own disadvantages. In the universe, a concept that includes all the materials, the objects are moving continuously. But the theories mentioned above lack a direct link to the moving of the objects, which makes them not convincing. . To solve this problem, we now rebuild the model of the spatial structure of the universe, which can precisely reflect the mechanics of the objects. Before the model building, to make the model easy to understand and handle with, we firstly build a new model for the molecule, so that we can get our model of the universe by analogy. We would like to initiate a new assumption without any evidence. Aether is the very basic elements to form all the material. It has mass and is the media for the gravitational and the electromagnetic interactions. All the electromagnetic field formed by the charges are due to some kind of movements of aethers inside the charges. All the space in the universe is filled with aethers. The density of aethers increases monotonically as the goes from the centre of the universe. The validity of the concept will be solidified in the following article and in the next we will start to build our new model for the molecule.

The molecule is composed of spinning atoms that circulate around the mass centre. The atom is composed of nuclei and electrons, while electrons circulate around the mass centre of the nucleus and with their own spin. The nuclei are composed of protons and neutrons. Both of them circulate around the mass centre of the nuclei and have their own spin. All the electromagnetic fields formed by protons, neutrons and electrons are the result of the motion of the aethers in the space around. And we can use the similar method to establish our model for the universe.

We treat the atom as the galaxy in the universe, e.g. Milky Way can be regarded as an atom. The nucleus can be treated as the part in the galaxy where the mass density is high. And each proton and neutron can be treated as star separately. The aether moving around the protons and neutrons can be treated as planet. We can also treat the electron as the star in the galaxy where the mass density is low. And the aether moving around the electrons can be regard as the planets. Therefore, we obtain a spherical structure of the universe with all the objects circulating rapidly around the the mass centre and closed spin.

From the structure of the universe we derived, we can find that the universe originates from the explosion of a spherical with uniform mass density. Since the mass density equality of the universe space leads to the equal-weight of the gravitational force in the universe space. Therefore, the circulating movement between objects can not be implemented correctly. Under the gravitational force, all the objects are drove to the mass centre of the universe with collision and explosion. After the explosion, the objects are thrown away with an extreme speed, and then go to the trajectory and move around the universe mass centre according to their energy. As the result of the spatial non-uniformity of the energy caused by the explosion, the objects transform the energy to the lower region in different forms to recover to the energy uniformity of the universe space. When the energy density in the universe space becomes equal (the equality in the energy means the equality of the mass density which will be proved in the following section), the objects in the universe space fly towards the mass centre again and cause the explosion. After the explosion, the objects are throw away according to the energy non-uniformity. And later start to move based on their own energy trajectories. The old universe dies and the new universe is created. Our universe continues such circle from birth to perish and perish to birth. With such theory, we will observe that the energy density of the universe space approaches a constant as the time passes by and the absolution zero temperature increases as time goes.

2. The absolute and relative frame of reference of Einstein

Based on the Inference of Inertial Properties of the reference frame of Einstein, any two Inertial frame of references K and K' have relativity effect if the relative motion exists. The identical relativity effect can be obtained by any of reference. Such reference definition solved the big challenge of physics, Michelson–Morley experiment at that time. And later, it was verified by other experiments, leading to the abandon of the early reference frame (aether based) unnaturally. As the continuous development of the natural science, people gradually realized the fact that the physics without absolute frame of reference is meaningless.
Not only it hinders the development of the science, but also makes the physics difficult to discover the essence of the motion of the objects. Therefore, there is a need to modify this concept. However, the frame of reference can not be aether as propped by the previous people,

because of the countless of practices that prove the limitation of the aether and the difficulties of the promotion of the theory. As we discussed in section 1, all the objects in the universe are circulating around the universe mass centre continuously. Therefore, without the absolute steadiness, there is no relative motion for all the objects in the universe. All the laws of motion is generated by the absolute steadiness, otherwise our universe would not exist. The mass centre of the universe is the absolute frame of reference, and only the relative motion of the object corresponding to the universe mass centre can produce the laws of the motion.

3. Absolute four dimensional space-time relationship

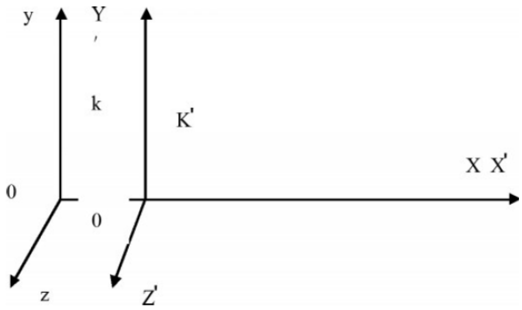


Figure 3-1

Plenty of physical experiment have proven that the speed of the objects in the universe has a limitation. If there is no speed limitation, the absolute four dimensional space-time relationship we are going to investigate would not exist. Before the research on the four dimensional space-time relationship, we firstly assume that the speed of light is a constant and it is the limit of the moving object. The validity of this principle will be solidified in the following part. In section 2, we prove that the law of the motion can only occur when the object moves relatively to the mass centre of the universe. For the convenience and the generality of the conclusion, we establish the coordinate system as shown in Fig. 3-1.

Let reference frame K be the mass centre of the universe with absolute steadiness. The reference frame K' moves with the speed v according to K. At $t = t' = 0$, the origins of the two coordinates o and o' coincide. Two optical signals are transmitted from the two origins separately. After some time, the origin o' of K' arrives at the position as shown in the figure. The wave front of the optical signal goes to one point along x (or x') axis. Base the invariance of the light speed, the coordinates of points where the observed optical signals arrive are:

$$x^2 = c^2t^2 \ , \ \ y = 0, \ \ z = 0 \tag{1}$$

$$x'^2 = c^2t'^2, y' = 0, \ \ z' = 0 \tag{2}$$

the transformation relationship between spatial variant (x', t') and (x, t) is

$$\begin{cases} x' = x'(x, t) \\ t' = t'(x, t) \end{cases}$$

since the point we select is on the x (or x') axis, $y = y' = 0$ and $z = z' = 0$. And the relationship between (x', t') and (x, t) does not contain the term of (y, z) and (y', z'). Since it is the result of observation of the same event, an one to one mapping must exist. If there is a result observed in reference frame K, there must be one result observed in reference frame K', demonstrating the linear characteristics between the transformation relationship:

$$x' = a_{11}x + a_{12}t \tag{3}$$

$$t' = a_{21}x + a_{22}t \tag{4}$$

To solve the constant $a_{11}, a_{12}. a_{21}$ and a_{22} a in the above equation, we firstly investigate the motion of the origin o' . In the frame K', the coordinate observing it is $x' = 0$ while it moves with the speed v observed in the frame K, with the coordinate $x = vt$.
Use (3) we can get,

$$a_{12} = -a_{11}v \tag{5}$$

then plug (5) into (3) we get,

$$x' = a_{11}(x - vt) \tag{6}$$

from equation (1) and (2).

$$x'^2 - c^2t'^2 = x^2 - c^2t^2 \tag{7}$$

$$y = y' \tag{8}$$

$$z = z' \tag{9}$$

plug equation (6), (4) into the left hand side of (7), we get:

$$a_{11}^2(x - vt)^2 - c^2(a_{21}x + a_{22}t)^2 = x^2 - c^2t^2$$

Due to above identity (for any x and t, the equality is valid) , the corresponding coefficient of both side should be equal. Then we have

$$a_{11}^2 - c^2a_{21}^2 = 1 \tag{10}$$

$$-2a_{11}^2 v - 2c^2a_{21}a_{22} = 0 \tag{11}$$

$$a_{11}^2v^2 - c^2a_{22}^2 = -c^2 \tag{12}$$

from (11) and (12) we can get:

$$c^2a_{21}^2 = a_{11}^2 - 1 \tag{13}$$

$$c^2a_{22}^2 = v^2a_{11}^2 + c^2 \tag{14}$$

from (13) and (14), we have:

$$c^4a_{21}^2a_{22}^2 = (a_{11}^2 - 1)(v^2a_{11}^2 + c^2) \tag{15}$$

with (11)

$$c^2a_{21}a_{22} = -va_{11}^2 \tag{16}$$

plug (16) into (15),

$$(-va_{11}^2)^2 == (a_{11}^2 - 1)(v^2a_{11}^2 + c^2)$$

Thus, we have:

$$a_{11} = 1\Big/\sqrt{1 - v^2/c^2} \tag{17}$$

feed (17) back into (12), we can get,

$$a_{22} = 1\Big/\sqrt{1 - v^2/c^2}$$

put a_{11} and a_{22} into (11) and use (5), we can get

$$a_{21} = v/c^2\Big/\sqrt{1 - v^2/c^2}\ , a_{12} = -v\Big/\sqrt{1 - v^2/c^2}$$

let $B = v/c$, we have

$$a_{11} = a_{22} = 1\Big/\sqrt{1 - B^2}$$

$$a_{12} = -v\Big/\sqrt{1 - B^2}$$

$$a_{21} = v/c^2\Big/\sqrt{1 - B^2}$$

put all the coefficient into (3) and (4), we have

$$x' = \frac{x - vt}{\sqrt{1 - B^2}}$$

$$t' = \frac{t - vx/_{c^2}}{\sqrt{1 - B^2}}$$

4 The rule for the velocity transformation

From the absolute four-dimensional relationship we derived in section 3

$x' = \frac{x-vt}{\sqrt{1-B^2}}$

$y' = y$

$z' = z$

$t' = \frac{t-{vx}/{c^2}}{\sqrt{1-B^2}}$

make derivative of two sides of the equation above

$dx' = \frac{dx-vdt}{\sqrt{1-B^2}}$

$dy' = dy$

$dz' = dz$

$dt' = \frac{dt-{v\,dx}/{c^2}}{\sqrt{1-B^2}}$

divided the first three equations with the last one, we get

$$v_x' = \frac{v_x-v}{\sqrt{1-B^2}} \quad (1)$$

$$v_y' = \frac{v_y\sqrt{1-B^2}}{1-v_xv/c^2} \quad (2)$$

$$v_z' = \frac{v_z\sqrt{1-B^2}}{1-v_xv/c^2} \quad (3)$$

5 Length contraction, time dilation and mass reduction

If an object moves at eh speed of v according to the mass centre of the universe, the length contract, the time dilates and the mass reduces. We will investigate the validity of these laws based on the absolute four-dimensional relationship we established.

5-1 Length contraction

Assume that there is a rigid body with length L is steady at the universe mass centre § frame K. It locates at the x axis in K frame with the measured length $L = x_2 - x_1$ (as shown in Fig.3-1). Suppose that the rigid body moves at the speed v with frame K' according to frame K (the mass centre of the universe). In the frame K', at the instantaneous time $t_1' = t_2' = t'$, make a measurement to the rigid body and get the length $L' = x_2' - x_1'$. At this time in frame K make an observation $t_1 \neq t_2$, (since $x_1 \neq x_2$). From the absolute four-dimensional relationship, we have:

$$x' = \frac{x-vt}{\sqrt{1-B^2}} \quad (1)$$

from (1) we get

$x_1' = \frac{x_1-vt_1}{\sqrt{1-B^2}}, x_2' = \frac{x_2-vt_2}{\sqrt{1-B^2}}$

make a subtraction, we have:

$$x_2' - x_1' = \frac{(x_2-x_1)+v(t_2-t_1)}{\sqrt{1-B^2}} \quad (2)$$

with $t' = \frac{t-{vx}/{c^2}}{\sqrt{1-B^2}}$ we get

$t_1 = t_1'\sqrt{1-B^2} + {vx_1}/{c^2}, t_2 = t_2'\sqrt{1-B^2} + {vx_2}/{c^2}$

plug t_1 and t_2 into (2), we get

$$x_2' - x_1' = (x_2 - x_1)\sqrt{1-B^2}$$

that is, $L' = L\sqrt{1-B^2}$.
Since L' is the length of the rigid body that has the relative motion with the steady mass centre of the universe while L is the length of the steady rigid boy according the universe mass centre, only the object with the relative motion with the mass centre of the universe experiences the length contraction.

5-2 Time dilation

Assume that the frame K absolutely steady with mass centre of the universe. At one point on the ox axis, an event occurs (as shown in Fig. 3-1). When the measurement is implemented in frame K, the event starts at t_1 and finishes at t_2, with the duration $\Delta t = t_2 - t_1$. Assume that after the occurrence of the event, the frame K moves at the speed of v along the ox axis corresponding to the universe mass centre and the same event reoccurs at the same point. Based on the four-dimensional relationship, at current time, the starting time and ending time is:

$t_1' = \frac{t_1 - {vx_1}/{c^2}}{\sqrt{1-B^2}}$, $t_2' = \frac{t_2 - {vx_2}/{c^2}}{\sqrt{1-B^2}}$

Because we assume that the event happens at the same point, using the four-dimensional relationship, we have (all four-dimensional relationship mentioned below is the absolute four-dimensional relationship):

$x_1 = x_2 = x$

therefore,

$t_2' - t_1' = \frac{t_2 - t_1}{\sqrt{1-B^2}}$

that is $\Delta t' = \frac{\Delta t}{\sqrt{1-B^2}}$.

Since $\Delta t'$ is the starting and ending time of the event with the relative motion according to the mass centre of the universe while Δt is the starting and ending time of the steady event with the mass centre of the universe, only the starting and ending time of the event with relative motion according to the universe mass centre experiences the time dilation, i.e., the life time will be elongated only for the object that moves relatively to the mass centre of the universe.

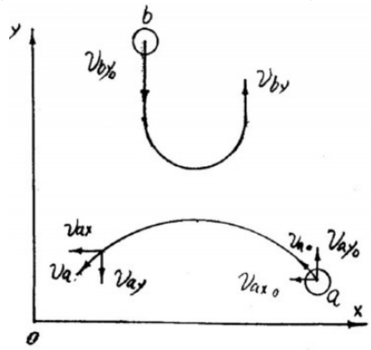


Figure 5-1

5-3 mass reduction

For the convenience of the analysis, we establish the figure as shown in Fig. 5-1 without losing the generality.

Assume there are two small balls a and b that locate in the frame K that is steady with the mass centre of the universe. When the two balls are steady with frame K, the mass is $m_a = m_b = m_0$, as shown in Fig. 5-1. From the figure, we assume that the two balls have an elastic collision at the same time. From the conservation of the momentum, we have

$m_b v_{by} + m_a v_{ay} = 0$ (1)

from the velocity transformation in section 4 we know:

① $v_{by} = \frac{v_y\sqrt{1-B^2}}{1-v_x v/c^2}$

The ball b moves relative to frame K (the mass centre of the universe) along ox axis with the velocity $v_x = 0, v = 0$.

Therefore, we have:

$$v_{by} = v_y \tag{2}$$

② $v_{ay} = \frac{-v_y\sqrt{1-B^2}}{1-v_x v/c^2}$

The ball a moves relative to frame K (the mass centre of the universe)along ox axis with the velocity:

$$v = v_x = -v_{ax}$$

Thus we have:

$$v_{ay} = -\frac{v_y}{\sqrt{1-v_{ax}^2/c^2}} \tag{3}$$

Plug (2) and (3) into (1), we get:

$$m_b v_y - m_a \frac{v_y}{\sqrt{1-v_{ax}^2/c^2}} = 0$$

Let $B = v_{ax}/c$, we have:

$$m_a = m_b\sqrt{1-B^2} \tag{4}$$

Since the ball b is steady relative to the mass centre of the universe along the ox axis $m_b = m_0$. And since ball a is moving with the speed v_{ax} steady relative to the mass centre of the universe along the ox axis, $m_b \neq m_0$. Plug the result discussed above into (4) we have:

$$m_a = m_0\sqrt{1-B^2} \tag{5}$$

From (5), we know that the mass of the object moving relatively to the mass centre of the universe reduces.

6. The modification for Newton's law of universal gravitation

In the spatial structure of the universe described in section 1, we have a clear idea that the universe is a sphere composed of different kinds of astronomical objects and all the astronomical objects rotate the absolutely steady mass centre in circular trajectories. Making a vector with the origin as the mass centre of the universe, the density of the astronomical objects decreases as the increment of the radius and the speed of the circular motion increases. To further investigate the gravitational force among moving objects and for the convenience of the analysis, we choose that the velocity of the place with higher density to zero relatively to the mass centre of the universe. We select z axis as the mass axis passing the mass centre of the universe and the original as the mass centre of the universe to build the coordinate. And make a cross section perpendicular to the z axis. On the cross section, we arbitrarily choose two mass points M_1 and M_2 (as shown in Fig. 6-1).

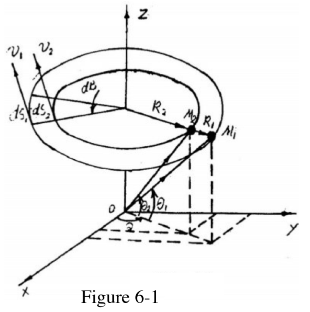


Figure 6-1

From Fig. 6-1 we know that positions of the mass points M_1 and M_2 are decided by the parameters θ_1, r_1, α and θ_2, r_2, α. For the convenience of analysis, we change the spherical coordinates to Cartesian coordinates,

$x_1 = r_1 \cos\theta_1 \cos\alpha, y_1 = r_1 \cos\theta_1 \sin\alpha, z_1 = r_1 \sin\theta_1, R_1 = r_1 \cos\theta_1$

$x_2 = r_2 \cos\theta_2 \cos\alpha, y_2 = r_2 \cos\theta_2 \sin\alpha, z_2 = r_2 \sin\theta_2, R_2 = r_2 \cos\theta_2$

On the circumference of R_1 and R_2, we separately pick up an infinitesimal arc ds_1 and ds_2.
As $ds_1 \to 0$ and $ds_2 \to 0$, we have $ds_1 = dBR_1$ and $ds_2 = dBR_2$.
Since ds_1 and ds_2 are the trajectories of the motion of M_1 and M_2 relatively to the mass centre of the universe and the length of the arc ds approaches zero, we can treat them as the linear ones. Based on the length contraction effect in section 5-1 and suppose the speed be v_1 and v_2, then we have:

$$ds_1 = R_1 dB\sqrt{1 - {v_1^2}/{c^2}}, ds_2 = R_2 dB\sqrt{1 - {v_2^2}/{c^2}}$$

Make the integration in $[0,\ 2\pi]$ we have:

$$S_1 = \int_0^{2\pi} R_1 dB\sqrt{1 - {v_1^2}/{c^2}} = 2\pi R_1\sqrt{1 - {v_1^2}/{c^2}}$$

$$S_2 = \int_0^{2\pi} R_2 dB\sqrt{1 - {v_2^2}/{c^2}} = 2\pi R_2\sqrt{1 - {v_2^2}/{c^2}}$$

Plug R_1 and R_2 into the equations above, we get:

$$S_1 = 2\pi r_1 \cos\theta_1 \sqrt{1 - {v_1^2}/{c^2}} \tag{1}$$

$$S_2 = 2\pi r_2 \cos\theta_2 \sqrt{1 - {v_2^2}/{c^2}} \tag{2}$$

Since 2π is a constant, through the analysis for (1) and (2), we know that the radius of the circular trajectory reduced by a factor of $\sqrt{1 - {v^2}/{c^2}}$ for the relative motion according to the mass centre of the universe. Therefore, we have:

$$R_1 = r_1 \cos\theta_1 \sqrt{1 - {v_1^2}/{c^2}} \tag{3}$$

$$R_2 = r_2 \cos\theta_2 \sqrt{1 - {v_2^2}/{c^2}} \tag{4}$$

From section 5-3, we know that the mass of the object with relative motion to the mass centre of the universe reduces by a factor of $\sqrt{1 - {v^2}/{c^2}}$. Thus the mass of the two point are:

$$M_1 = M_{10}\sqrt{1 - {v_1^2}/{c^2}} \tag{5}$$

$$M_2 = M_{20}\sqrt{1 - {v_2^2}/{c^2}} \tag{6}$$

From plenty of experiments we know that "the gravitational force between two objects is inverse promotional to the square of the distant between the two and proportional to the product of the two mass". Combine (3), (4), (5) and (6), we have:

$$F = G\frac{M_{10}\sqrt{1-v_1^2/c^2}M_{20}\sqrt{1-v_2^2/c^2}}{\left(r_1\cos\theta_1\sqrt{1-v_1^2/c^2}-r_2\cos\theta_2\sqrt{1-v_2^2/c^2}\right)^2} \tag{7}$$

Discussion:

① When $r_1 \to r_2, \theta_1 \to \theta_2 \to \theta, v_1 \to v_2 \to v$. So we can approximate (7) as:

$$F = G\frac{M_{10}M_{20}(1-v^2/c^2)}{\cos^2\theta(r_2-r_1)^2(1-v^2/c^2)}$$

Let $\cos\theta\,(r_2 - r_1) = r$, we have:

$$F = G\frac{M_{10}M_{20}}{r^2} \tag{8}$$

We find that (8) is the Newton's law of universal gravitation, which is the gravitational force between the two objects on the same moving object.

② Suppose that M_2 is absolutely steady to the mass centre of the universe and we take the M_2 as the reference, $v_1 = v, r_1 = r, v_2 = 0, r_2 = 0, \theta_2 = 0, \theta_1 = \theta$. Plug these expressions into (7), we have:

$$F = G\frac{M_{10}M_{20}\sqrt{1-v^2/c^2}}{\cos^2\theta\, r^2(1-v^2/c^2)}$$

Let $\cos^2\theta\, r^2 = R^2$, we get:

$$F = G\frac{M_{10}M_{20}}{R^2\sqrt{1-v^2/c^2}} \tag{9}$$

From (9) we can see this is the equation for the gravitational force between the objects when there is a relative motion.

Since equation (8) and (9) are verified by practice, we can claim that the derivation of the length contraction and mass reduction relative to the mass centre in 5-1 and 5-3 is valid.

7. The essence of mechanics

In section 4, we obtain the formula of velocity transformation of the object with relative motion to the mass centre of the universe:

$$u' = \frac{u-v}{1-uv/c^2}$$

with u the speed that the object moves relative to the mass centre of the universe, u' the relative speed of frame K' to the mass centre of the universe and v the speed of the object relative to frame K'. We can get the speed of the object relative to the mass centre of the universe by solving the equation above:

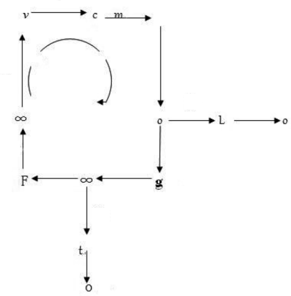
$$u = \frac{u'+v}{1-uv/c^2}$$

In section 5 and section 6, we get the the length contraction $L = L_0\sqrt{1-v^2/c^2}$ and time dilation $t = t_0/\sqrt{1-v^2/c^2}$ and mass reduction $m = m_0\sqrt{1-v^2/c^2}$ of an object moving relative to the mass centre of the universe. The gravitational force between the object is:

$$F = G\frac{M_{10}\sqrt{1-v_1^2/c^2}M_{20}\sqrt{1-v_2^2/c^2}}{\left(r_1\cos\theta_1\sqrt{1-v_1^2/c^2}-r_2\cos\theta_2\sqrt{1-v_2^2/c^2}\right)^2}$$

In section 1, we assume that “aether” is the basic particle that composes all the materials and is the media for the interactions of electromagnetics and gravitational force. Therefore, through the comprehensive analysis we can get a self-consistent theory.

When the object moves relatively to the mass centre of the universe, the length contraction is resulted from the reduction of the mass. The mass loss in the mass reduction is transferred to "aethers" that exist in the limited space around the object. The increment of the aether density around the object means the enhancement of gravitational field and electromagnetic field. Such enhancement of the gravitational field leads to the the speed decrease of the periodic motion of the object, i.e., the time dilation. When $v \to c$, $g \to \infty$. Therefore, we have $F \to \infty$, and the speed of light c is the maximum speed. Through the analysis above, we obtain a self-consistent result. The self-consistency of the theory is also demonstrated in the following figure:



8. Inertial mass and gravitational mass

In the gravitivity established by Einstein, the inertia mass and gravitational mass are equivalent and wave proven by the Hungarian Physicist Loránd Eötvös with Eötvös pendulum in 1906. For this experiment, the position of the pendulum does not change for the suspending ball made of different materials. This is due to the suspending ball is steady relative to the earth and they are in the same inertia frame.

In 5-3, we get the mass reduction of the object that moves at the speed v relative to the mass centre of the universe: $m = m_0\sqrt{1 - v^2/c^2}$.

Combining with the assumption of the property of "aether" in section 1 and the formula of gravitational force in section 6, we know that the loss of the mass turns to aether, which enhances the gravitational field. For the rest of the macroscopic measurable mass is $m_0\sqrt{1 - v^2/c^2}$. The enhancement of the gravitational field of the object relative to the mass centre of the universe is due to fact that the mass of $\Delta m = m_0 - m_0\sqrt{1 - v^2/c^2}$ is transferred to aethers. The claim of the the enhancement of the gravitational field is invalid if the mass that transfers to aethers does not move with the object. Therefore, the lost mass that transfers to aethers must move with the object and the moving mass, i.e., the inertia mass should be $m = m_0\sqrt{1 - v^2/c^2} + \Delta m$, that is m_0. Through the analysis above, we know that the inertia mass of the object is the steady mass of the object which is steady relatively to the mass centre of the universe m_0 and the gravitational mass is $m_0\sqrt{1 - v^2/c^2}$.

9. Gravitational field and acceleration;

In the gravitivity established by Einstein, the gravitational field and the acceleration between the objects are equivalent. These two quantities are equivalent in mathematics, but not equivalent from the point view of physics.

When the object accelerates relatively to the mass centre of the universe, it experiences a resistive force that is opposite direction of the acceleration. This force is due to the continuous change of the velocity of the object relative to the mass centre of the universe. The object continuously throws its mass and transfers to aethers and the aethers transfer to mass. When the acceleration shares the same direction with the motion of the object, the velocity relative to the mass centre of the universe increases continuously, and the mass is continuously thrown away and transfer to "aether". Since the directions of the thrown mass and the motion are the same, they distribute uniformly around the object and go with the motion later. When the acceleration direction is opposite to the direction of the motion, the velocity relative to the mass centre of the universe decreases continuously. The aethers around the object continuously change to mass of the object. The direction of the aether transfer (back to object) is the same as the motion. Based the conservation of momentum, the object must experience a resistive force that is opposite with the acceleration. The gravitational force is transferred by aethers and aethers are the source of the gravitational force. Our universe is composed of the spherical objects that circulate around the mass centre of the universe. From a macroscopic view, every object obeys its own trajectory and for each piece it has the same angular velocity inside the object. So all the aethers in the universe are generated relatively to the motion of the mass centre of the universe and go with the movement of the objects. For a measurement from the overall perspective, they are steady relatively to the objects and thus consist the absolute steadiness of the aether with the object in the universe space. From the circle centre chosen as the mass centre of the universe towards the radius going outside, as the increment of the speed of the objects in the universe space, the density of aether increased continuously. Therefore, the gravitational force exerted on an object that stays steady relatively to the mass centre of the universe obeys the

Newton's law of universal gravitation, which is illustrated in the discussion ① in section 6. When an object moves with the speed v, from the speed transformation formula we derived in section 7: $u = \frac{u+v}{1-{uv}/{c^2}}$, we know that the gravitational field increased by a factor of $\frac{1}{\sqrt{1-u^2/c^2}}$, which is illustrated in discussion in section 6. Through the analysis and discuss above, we will draw the conclusion that the gravitational field is not equivalent to acceleration in physics.

10. Mass and energy

Based on work-energy theorem, we know that the change of the kinetic energy of an object is equal to the work of the external force makes to the object. That is:

$dE_k = F\,ds = v\,F\,dt = v\,d(m_o v)$

For the simplification of the problem and not to lose the generality, we only consider the specific case that the direction of the force is the same as the direction of the motion of the object suppose that the object stay steady relative to the mass centre of the universe at the beginning. Under the the external force F with fixed direction, the object moves from position a to position b and the speed goes from 0 to v. Since the F and v share the same direction, the kinetic energy is:

$E_k = \int E_k = \int_0^v v\,d(m_o v) \; = \int_0^v v\,d\frac{mv}{\sqrt{1-v^2/c^2}}$

Let $B = v/c$ and change the variable:

$E_k = \int_0^v bc\,d\frac{mbc}{\sqrt{1-b^2}}$

That is:

$$E_k = \frac{m}{\sqrt{1-b^2}}c^2 - mc^2 \qquad (1)$$

From section 5-3 we know:

$$M_0 = \frac{m}{\sqrt{1-b^2}} \qquad (2)$$

with m_0 represents the mass of the object staying steady with the mass centre of the universe. Plug (2) into (1), we have:

$E_k = m_0c^2 - mc^2$ (3)

$m_0c^2 = E_k + mc^2$ (4)

From (4) we know that the total energy m_0c^2 of the object equal to the sum of the moving energy and kinetic energy of the object. It totally agrees with the energy conservation law: the energy cannot be generated or annihilated, but transfers from one form to another form.

11. Aether, expansion of the universe and the properties of the light

In section 9, we have discussed the aethers in the universe space is absolute steady relative to the objects in the universe when observed in the whole universe space. Because of such absolute steadiness, and also due to the fact that aethers are the media for the light propagation, the speed of light is a constant measured at any corner of the universe. Considering the speed of light is the upper limit of the speed of the object, the mass formula in section 7-3: $m = m_0\sqrt{1 - v^2/c^2}$ and the formula of gravitational force for the moving object in the discussion②: $F = G\frac{M_{10}M_{20}}{r^2\sqrt{1-v^2/c^2}}$ are clarified. When $v \to c, m \to 0$, i.e., the mass of the object has the trend to completely transfer to aether. When $g \to \infty$, then $F \to \infty$. Therefore, the speed of the object can only reach the speed of light when it completely transfers to aether, which is contradictory to the law of the Nature. Thus, the speed of light the limit of the speed of an object.

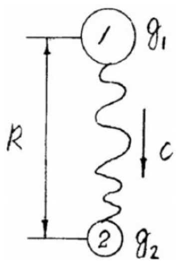


Figure 11-1

In the current hypothesis of the universe, there is an accelerating expansion of the universe. It is resulted from the red shift and blue shift of the light rays observed in the universe. The hypothesis can explain this phenomenon of the light in the universe space, but it does not reflect the true of the essence of moving for the objective things. We know that the frequency varies when a beam of light moves towards to the gravitational field, that is, the energy changes. Now we assume that a beam of light moves from one gravitational source ① to gravitational source ②, and accepted by the source ②, as shown in Fig. 11-1. And we choose the intensity of the source ① and ②as g_1 and g_2 seperately and the distance between the two sources is R. Let the frequency of the light emitted from source ① be r_1, combine with Plank's assumption of proton, we know that the energy reaches the gravitational source ② is the original energy. R_1h plus its required gravitational energy potential: $mg_1R - mg_2R$. Let the frequency of the light arrives source ② be r_2. Then we have:

$hr_1 + mR(g_1 - g_2) = hr_2$ (1)

From (1) we have:

$r_2 - r_1 = {}^1\!/_{hmr}(g_1 - g_2)$ (2)

with m the mass of the photon.

Discussion for (2):

① When $g_1 > g_2, r_2 - r_1 > 0$. The frequency of the light increases and blue shift occurs.

② When $g_1 = g_2, r_2 - r_1 = 0$. The frequency of the light remains the same.

③ When $g_1 < g_2, r_2 - r_1 < 0$. The frequency of the light decreases and red shift occurs.

Since the universe is a spherical object with all the objects inside circulating to the mass centre of the universe, from the circle centre at the mass centre of the universe, the relative speed to the mass centre of the universe increases and the density of the aether continuously increases. Therefore, the intensity of the gravitational force increases along the radius. Now we treat earth as a mass point for the observation of different light waves propagating to the different direction of the universe. We can observe the blue shift for the light along the radius with the earth as the circle centre and point at the mass centre of the universe. The phenomenon is enhanced as the increment of the radius. Will can observe the red shift for the light going along the radius and pointing the boundary of the universe. The phenomenon is enhanced as the increment of the radius. The light along the radius pointing at the position equivalent universe space to the earth will not experience the frequency shift. And therefore, there is no expansion of the universe and the frequency shift of the light is the representation of the laws of the motion of the objects in the universe space.

12. The charge and absolute mechanics

Before discuss the issue, we first make an assumption for the charge carried by a basic electric charge. Of course the assumption is solid, based on the experimental results and combined with the property of aether. The validity of the assumption can only be verified by objective reality. "For the charge q carried by basic electric charge, we regard it as the contribution from the mass of Δm that composes the charge" (Such special mass element with charge is a kind of mass that makes aethers move is a special way). Therefore, we can get:

$$q = k \sum_n \Delta m = km \tag{1}$$

with k proportionality. Obviously, the positive and negative basic charges in our world has different value of k, due to $m_+ > m_-$. From (1) we know that the charge of the charged body completely depends on the amount of the mass element with charge.

In 5-3 we derived that for a object with mass m_0 that moves with speed of v, the mass reduction is

$$m = m_0\sqrt{1 - v^2/c^2} \tag{2}$$

We assume that the mass of a charge that is absolute steady is m_0, and with charge q_0. When it moves at a speed v according the mass centre of the universe, it has a mass m and charge q. From (1) and (2), we have:

$$m = m_0\sqrt{1 - v^2/c^2}, q_0 = km_0, q = km$$

Using the three equation above, we have

$$q = q_0\sqrt{1 - v^2/c^2} \tag{3}$$

Since the charge carried by the object is the algebraic summation of the charge of the basic electric charge:

$$Q = \sum_n \mathrm{q} = \sum_n q_0\sqrt{1 - v^2/c^2}$$

Let $Q_0 = \sum_n \mathrm{q}_0$, we have:

$$Q = Q_0\sqrt{1 - v^2/c^2} \tag{4}$$

From (4) we know that for an object moving with speed v relative the mass centre of the universe, the carried charge is reduced by a factor of $\sqrt{1 - v^2/c^2}$.

13. The modification of Coulomb law

For the simplicity of the problem, we consider the electric force in a plane, with the result not losing the generality. For the convenience of the discussion, we apply the atomic model from Rutherford as the background to establish the figure 13-1.

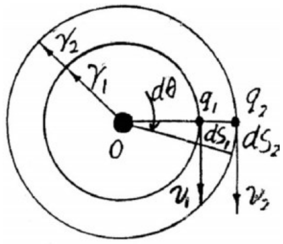


Figure 13-1

As shown in the figure, there is a charge q_1 on the circle r_1 and a charge q_2 on the circle r_2. The speed relative to the centre is v_1 and v_2. Assume the angle velocity of the two charge is the same and the centre O is absolutely steady relative to the mass centre of the universe. We select two infinitesimal arc ds_1 and ds_2. When $ds_1 \to 0$ and $ds_2 \to 0$, we have:

$$ds_1 = r_1\, d\theta \tag{1}$$

$$ds_2 = r_2\, d\theta \tag{2}$$

From 5-1 we know that the length contraction with a factor of $\sqrt{1 - v_1^2/c^2}$ when it moves relative to the mass centre of the universe:

$$ds_1 = r_1\, d\theta\sqrt{1 - v_1^2/c^2} \tag{3}$$

$$ds_2 = r_2\, d\theta\sqrt{1 - v_2^2/c^2} \tag{4}$$

Integrate (3) and (4) between 0 and 2π:

$$s_1 = \int_0^{2\pi} ds_1 = 2\pi r_1\sqrt{1 - v_1^2/c^2} \tag{5}$$

$$s_2 = \int_0^{2\pi} ds_2 = 2\pi r_2\sqrt{1 - v_2^2/c^2} \tag{6}$$

Since 2π is a constant, from (5) and (6) we know: it increases by a factor of $\sqrt{1 - v^2/c^2}$ when it moves relative to the mass centre of the universe. From section 12, the charge decreases by a factor of $\sqrt{1 - v^2/c^2}$ when moving relative to the mass centre of the universe. So the real charge of q_1 and q_2 are

$$q_1 = q_{10}\sqrt{1 - v_1^2/c^2} \tag{7}$$

$$q_2 = q_{20}\sqrt{1 - v_2^2/c^2} \tag{8}$$

For the force interaction between the charges, we know from the experiment: “the force is proportional to product of the the charges and inversely proportional to the square of the distance”. Thus, we have:

$$F = r\frac{q_{10}\sqrt{1-v_1^2/c^2}\cdot q_{20}\sqrt{1-v_2^2/c^2}}{\left(r_2\sqrt{1-v_1^2/c^2} - r_1\sqrt{1-v_2^2/c^2}\right)^2} \tag{9}$$

Discussion:

①When $v_1 = v_2 = v$, (9) turns to

$$F = r\frac{q_{10}\cdot q_{20}}{(r_2 - r_1)^2} \tag{10}$$

From (10) we know: “the charges that stays steady relative to mass centre of the universe obey the Coulomb law”.

When $v_2 \neq 0, v_1 = 0$. Since q_1 is steady absolutely relative to the mass centre of the universe, we can select q_1 as the reference plane. So let $r_1 = 0$. Then (9) turns to:

$$F = r\frac{q_{10}\cdot q_{20}}{{r_2}^2\sqrt{1-v_2^2/c^2}}$$

let $\frac{rq_{20}}{{r_2}^2} = E_0$, then we have:

$$F = E_0/\sqrt{1 - v_2^2/c^2} \tag{11}$$

From (11) we know: “a charge that move relatively to the mass centre of the universe, the charge reduces by a factor of $\sqrt{1 - v^2/c^2}$, and the electric field increases by a factor of $\sqrt{1 - v^2/c^2}$”.

14. The modification of Matter wave

When an object moves with the speed of v relative to the mass centre of the universe, the wave proportion is resulted from the joint interaction from the force and acceleration before the speed reaches v. We know that for all the objects obtain a speed v relatively to the mass centre of the universe, they experience a process of acceleration. The object continuously throws its own mass that transfers to aethers during the acceleration and experiences a force that is opposite to the acceleration, as we discussed in section 9. So there are two inverse forces act on the object. If we want to keep the object going forward, the direction of the object must be turned to reduce the perturbation of the acceleration. The motion of turning the direction is also a accelerated motion. Therefore, the object feels two forces, one to prevent its original movement, another to keep its going forward. At the begging the object accelerates, again it experiences the preventing force from acceleration. The object changes its direction to reduce the perturbation from the acceleration, which forms the wave packet. And then the second wave packet starts. The wave packets is continuously generated, if the acceleration does not stops. The frequency of the wave packet increases until the stop of the acceleration, due to the increasing speed of the object. Finally, the object keeps stable wave propagation as an as a fixed wave packet. From this we know, the matter wave is the product of acceleration force and acting force. Through the conservation law of the energy and the quantum assumption from Plank, we can obtain the law of the motion of the matter wave.

Suppose an object with matter wave frequency r. The object has the speed of v relative to the mass centre of the universe under the force F. So the object get the energy: $\frac{1}{2}m_0 v^2$. According to the conservation law of energy, the energy provided by the acceleration force is equal to energy from the mass the object throws away during the acceleration. From section 10 Mass and energy, we know that the energy gaining from acceleration force is $E_2 = \left(m_0 - m\sqrt{1 - v^2/c^2}\right)c^2$. Based on the conservation law of energy and the quantum assumption from Plank:

$$E_1 + E_2 = hr \tag{1}$$

Plug E_1 and E_2 into (1), we have:

$$\frac{1}{r} = \frac{2h}{m_0 v^2 + 2m_0 c^2\left(1 - \sqrt{1 - v^2/c^2}\right)} \tag{2}$$

from wave equation we know: $\lambda = \frac{v}{r}$:

$$\lambda = \frac{2hv}{m_0 v^2 + 2m_0 c^2\left(1 - \sqrt{1 - v^2/c^2}\right)} \tag{3}$$

(2) and (3) are the wave equations for the object with relative motion according to the mass centre of the universe.

15. The verification of the wave equation

For an established theory, the key point is whether it can match the experiment with good accuracy in a board range. That is the criteria to test whether the theory has a boarder and deeper description of the essence of the objective subject compared to the others. To make our theory convincing, we will compare the results from our theory of wave equation to the real experimental results. As the key result of our theory, it is of great significance to verify it, otherwise our theory would be wrong. So it is reasonable that select it for the comparison with experiment.

15-1 The speed of the charged particle under acceleration

Suppose there is absolutely steady electric field with the amplitude of E_0 relative to the mass centre of the universe. There is a charged particle q_0 moving in the electric field. From the result of section 12: $q = \frac{q_0}{\sqrt{1-v^2/c^2}}$, the amplitude of the field increase. From the discussion② we know that the force acting on the charged particle is:

$$F = \frac{e_0 q_0}{\sqrt{1-v^2/c^2}} \quad (1)$$

From Newton's second law:

$$F = m_0 a \quad (2)$$

Plug (1) into (2):

$$a = \frac{E_0 q_0}{m_0\sqrt{1-v^2/c^2}} \quad (3)$$

Let $a = \frac{E_0 q_0}{m_0}$, then (3) becomes:

$$a = \frac{a_0}{\sqrt{1-v^2/c^2}} \quad (4)$$

Suppose the charge particle q_0 moves in the field for a time t, then the speed of the charge particle is:

$$v = at \quad (5)$$

Plug (4) into (4), we have:

$$v = \frac{a_0 t}{\sqrt{1-{v_0}^2/c^2}} \quad (6)$$

Let v_0=$a_0 t$, we get:

$$v = \frac{v_0}{\sqrt{1-{v_0}^2/c^2}} \quad (7)$$

From (7), we know that the speed of the charged particle increases by a factor of $\frac{1}{\sqrt{1-{v_0}^2/c^2}}$ when it enters the electric field. For the speed of the charge particle when it leaves the field, we can decide it by $\frac{1}{2}m_0 v^2 = vq_0$:

$$v_0 = \sqrt{2vq_0/m_0} \quad (8)$$

Plug (8) into (7), we have:

$$v = \sqrt{2vq_0/m_0}\,\frac{1}{\sqrt{1-{v_0}^2/c^2}} \quad (9)$$

(9) is the escaping speed of the charged particle relative to the mass centre of the universe when it gets acceleration in the field.

15-2 Verification of the matter wave

From section 14, we derived the wavelength of the moving object is:

$$\lambda = \frac{2hv}{m_0 v^2 + 2m_0 c^2\left(1-\sqrt{1-v^2/c^2}\right)} \quad (1)$$

The wavelength of the de Broglie wave is:

$$\lambda = \frac{h}{m_0 v_0\sqrt{1-{v_0}^2/c^2}} \quad (2)$$

In 15-1 we got the escaping speed of electron under the acceleration of the electric field is increase by $\frac{1}{\sqrt{1-{v_0}^2/c^2}}$, compared to $v_0 = \sqrt{2vq_0/m_0}$ derived in the classical case. The real speed we measured escaping speed is:

$v = \frac{v_0}{\sqrt{1-{v_0}^2/c^2}}$ (3)

Verification:

① For a electron accelerated by 54V voltage, the wavelength measured by experiment is: $\lambda = 1.65\times10^{-10}$m.

From (1), we know the wavelength by our theory is:

$\lambda_1 = \frac{2hv}{m_0v^2+2m_0c^2\left(1-\sqrt{1-v^2/c^2}\right)}$

From (3) we know the speed is:

$v = \frac{v_0}{\sqrt{1-{v_0}^2/c^2}}$

And $v_0 = \sqrt{{ve}/{m_0}} = 4.3576\times10^6\ m/s.$

Therefore, $v = 4.3580602\times10^6\ m/s$

From (2), we can get the de Broglie wavelength is:

$\lambda = \frac{h}{m_0v_0\sqrt{1-{v_0}^2/c^2}} = 1..671778\times10^{-10}\ m.$

The difference between the calculated and de Broglie wavelength is

$\Delta\lambda = 6.741\times10^{-14}\ m$

② For a electron accelerated by 54V voltage, the wavelength measured by experiment is: $\lambda = 1.49\times10^{-10}$m.

From (1), we know the wavelength by our theory is:

$\lambda_2 = \frac{2hv}{m_0v^2+2m_0c^2\left(1-\sqrt{1-v^2/c^2}\right)}$

From (3) we know the speed is:

$v = \frac{v_0}{\sqrt{1-{v_0}^2/c^2}}$

And $v_0 = \sqrt{{ve}/{m_0}} = 4.781\times10^6\ m/s.$

Therefore, $v = 4.7816077\times10^6\ m/s$

From (2), we can get the de Broglie wavelength is:

$\lambda_2 = \frac{h}{m_0v_0\sqrt{1-{v_0}^2/c^2}} = 1..5232282\times10^{-10}\ m$

The difference between the calculated and de Broglie wavelength is

$\Delta\lambda = 6.741\times10^{-14}\ m$

Through the above comparison among the calculated, experimental and de Broglie wavelength, we know that our theory is more precise than de Broglie, with better match with experiment.

Reference:

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