Hypothesis

Frame-Dragging Force, Gravitospinism, and Spinity Wave Equation

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Frame-Dragging Force, Gravitospinism, and Spinity Wave Equation

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Abstract

Frame-dragging effect is an inevitable effect derived from Einstein's relativity. I further derive frame-dragging force (spinity) by using relativity. The frame-dragging force is accompanied by gravity. And, it can explain many phenomena like planetary rings, the planetary orbiting direction, moon moving away from earth, and the angular momentum transfer problem in our solar system. This concept can also help to explain why airline traffic is faster if the flight direction is aligned with the earth rotation direction. By using this concept, we can derive gravitospinism (gravitomagnetism) equations just like electromagnetism Maxwell equations. The divergence and curl of gravity field and spinity field are obtained. Thus, rest mass generates gravity, rotating mass generates spinity; rest charge generates electricity, moving charge generates magnetism. Besides, we can get spinity wave and deduct that it is accompanied with gravitational wave. The spinity wave as well as gravitational wave then travels at lightspeed. The ether problem about light transmission is completely solved by using this new theory. The smallest unit of spacetime can also be derived.

Keywords: frame-dragging; gravitational wave; gravitomagnetism; planck length

Spinity in Universe

The frame dragging force is a newly discovered force. Here, I rename this force " spinity or spinism" meaning spin force because this force is generated by rotating mass. I suggest: "Stationary mass produces gravity, rotating mass produces spinism; stationary charge produces Coulomb electrostatic force, rotating and moving charge produces magnetic force". Drs. Lense and Thirring used general relativity to derive the frame dragging effect[1]. Nobel Prize winner Dr. Landau also used general relativity to calculate the Lagrangian of an object orbiting around a central rotating mass[2]. However , these professors did not point out that the dragging is actually a new fundamental force closely related to gravity. I suggest calling this new force "spinism" because "rotation" is the source of this force. A rotating mass can drag nearby space-time to rotate the surrounding mass, so it can actually be derived from the basic concepts of general relativity. The following is a summary of Professor Landau's derivation from general relativity:

$$\text{Vector } g = \left(\frac{2G}{c^3}\right)\frac{Jxr'}{r^2}$$

(J: angular momentum of the central mass, r' = unit vector, direction of vector g = JXr', vector g is the spin field)

Lagrange

$$L = -mc * \frac{ds}{dt} = L_0 + L'$$

$$L' = mc * g * V = \left(\frac{2G}{c^2}\right)\frac{mJ}{r^3} * V * r$$

$$V = r * \omega$$

therefore

$$L' = \left(\frac{2G}{c^2}\right)\frac{mJ\omega}{r}$$

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(W = angular velocity of the surrounding mass orbiting)

L′ = F * R

so

$$F = \left(\frac{2G}{c^2}\right)\frac{mJ \times r' * \omega}{r^2} = \left(\frac{2G}{c^2}\right)\frac{mJV}{r^3} = \frac{SJj}{r^4}$$

($S = 2G / C^2$ = Rotational force constant, J = Central mass spin or orbital angular momentum, j = The orbital angular momentum of the surrounding mass, r = The distance between the center of mass of the central mass and the center of mass of the surrounding mass is r′ is a unit vector, the direction of the force = the unit vector multiplied by the direction of the central angular momentum , and the rotational force is also the inverse square law (in N-dimensional space, the force/intensity is inversely proportional to N-1) , V is the scalar velocity, and the angular velocity ω is also a scalar) . Considering the angle θ between the orbiting object and the equatorial plane of the central mass, we should replace ω with ωcosθ .

How do I know this formula is correct? We can confirm this by calculating that the Moon is actually moving away from our Earth. Laser measurements show that our Moon is moving away from the Earth at a rate of 3.8 cm per year. Current tidal theories cannot correctly calculate this 3.8 cm. I believe that the Moon is moving away from the Earth due to the effect of the Earth's rotation force . This is because the Earth's rotation force is accelerating the Moon's orbit, causing it to move away. We can use the following values: ($S = 2G / c^2 = 1.48 * 10^{-27}$, mass of the Earth = $5.9736 * 10^{24}$ kg, radius of the Earth = 6378 km, the Earth's rotation angular velocity = π / 43200 (radians/second), lunar orbit period = 27.5 days, angle θ = 20° (COSθ = 0.94), the distance between the moon and the earth is 384399 km). Then we get the acceleration, which we can calculate by using $S' = 1 / 2aT^2$ (T = 31536000sec = 1 year) to calculate the moving distance. Since the circumference and radius are related ($S' = 2\pi * R'$), so $R' = S' / 2\pi$. If the Earth's spin angular momentum is actually RMV (derived in a later chapter), then our value of 3.3 cm is very close to the observed 3.8 cm. Therefore, the spin force formula is correct:

$GM / R^2 = mRW^{2,}$

$SjL / R^2 = ma$

The above formula does not violate Kepler's third law of planetary motion R^3 / T^2 = Constant. As the planets orbit, the centripetal force of gravity balances the centrifugal force. This is because the spin force does not provide the centripetal force, but it does provide the force to maintain the planets in their orbits. The spin force can explain many phenomena observed in the universe. The spin force can help explain the structure of spiral galaxies that rotate together. It can well explain why the planetary rings form in the rotation plane of the giant solar system planets such as Saturn or Jupiter. This can also explain why our solar system has eight planets orbiting the sun in the same direction and in the same plane. Therefore, the spin force can explain the phenomenon that the solar system seems to have eight planets orbiting each other. This can also explain why in our solar system, the satellites except Neptune's Triton orbit the planets in the same direction and in the same plane. Uranus has the property of a 90-degree axial tilt, while its rings and satellites are still in the equatorial plane of Uranus' rotation. It is speculated that an asteroid or comet hit Uranus, causing its axis to tilt. The spin force can bring Uranus ' rings and satellites to a new equatorial plane. These are all phenomena that gravity cannot explain. In addition, the relative angular velocity is important. If the satellite's orbital angular velocity is greater than the planet's rotational angular velocity, the orbital angular velocity of small objects at the center of rotation will be continuously reduced. For example, Mars' satellite Phobos slows down by about 1.8 meters per century.

The nebular theory is the leading theory of the formation of the solar system. However, it faces an unresolved angular momentum transfer problem, Saturn and Jupiter have the largest angular momentum in the solar system, while the sun itself has only 2% of the angular momentum. The rotational force will cause the sun's angular momentum to be transferred to the surrounding planets, thus solving the angular momentum transfer problem. Kepler's second law states that there is no external torque in the solar system, because our sun is rotating slowly now and its rotational force

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may be much smaller than the initial formation process of the solar system. Gravity always attracts smaller objects to fall to the center. If only gravity exists, it cannot explain the rotational behavior around the central celestial body. Even if the rotational force of the planets rotating around the sun is reduced to much smaller than gravity, the planets still rotate around the sun due to inertia. Because the rotational force generated by the sun is really small, Kepler's second law of planetary motion is valid in our solar system. Moreover, gravity can prevent planets from escaping the solar system. However, the entire planetary motion equation should be:

$$\frac{GMm}{r^2} + \frac{SJm\omega}{r^2} = \mathrm{mr}\omega^2$$

We can see that this equation is an elliptical or circle formula, which fits our solar system. If we want the planet to move in a stable orbit, it is not a simple perfect circle, and the inverse square law is only one of the two possibilities. (Bertrand 's theorem F (R) = -K/R $^{3-\beta\wedge 2}$, β = 1 or 2). Therefore, the movement of the planet is an elliptical path. However, due to the small rotation force of the sun , the trajectory of the planetary motion in our solar system is nearly circular.

Kepler's second law, which states that the areas swept by a planet are equal in equal amounts of time, needs to be reviewed.

$\mathrm{dA} = \frac{1}{2} rxds = \frac{1}{2}\mathrm{r}\times \mathrm{vdt}$

$$\frac{dA}{dt} = \frac{1}{2m}(r \times mv) = \frac{1}{2m}L$$

rxv is a constant at perihelion and aphelion (the two ends of the major axis of the ellipse) . The planetary acceleration is:

$$\mathrm{a} = \left(\ddot{r} - r\ddot{\theta}^2\right)r' + \left(r\ddot{\theta} + 2\dot{r}\dot{\theta}\right)\theta'$$

The first term is the radial acceleration, which is the acceleration due to gravity , and the second term is the tangential acceleration .

$$\frac{dL}{dt} = \mathrm{mr}\left(r\ddot{\theta} + 2\dot{r}\dot{\theta}\right)$$

The tangential acceleration of a planet is zero only at perihelion and aphelion , and the angular momentum does not change. At other points, the angular momentum is not constant, that is, there is a rotational torque.

Furthermore, the spin force can explain why protoplanetary disks can form. Once a protostar like the Sun forms and begins to rotate to counteract the inward force of gravity, the spin force of the protostar may cause other interstellar gas and rock to rotate around it. Thus, the protoplanetary disk forms planets.

The spin force can explain why the large planets have rings in their equatorial planes, such as Saturn, Jupiter, Uranus, and Neptune. The rings cannot be explained by gravity alone. The spin force can help explain the precession of Mercury, the precession of Venus, the precession of the Earth, and the precession of artificial satellites. The spin force can explain why most of the planets in the solar system spin and orbit in the same direction as our Sun and the Sun's spin. This is because when the Sun and the planets rotate in opposite directions, the solar spin force and the planetary spin force cancel each other out. Therefore, most planets except Venus rotate in the same direction, and the angular velocities of the central mass and the outer orbiting masses will tend to end up being the same. The spin force is actually the dragging effect of spacetime caused by the central rotating mass. The spin force can explain why the Earth's rotation speed is decreasing, because the Earth's spin force is transferred to our Moon as angular momentum. The spin force can explain why retrograde satellites are more difficult to maintain than prograde satellites, because retrograde satellites need to overcome the Earth 's spin force . Airplane flights from the United States to Japan take longer than flights from Japan to the United States because the retrograde flight needs to overcome the Earth 's spin force . Some people think that this is due to a continuous flow of air called the "jet stream" flowing from the equator from west to east. However, if the jet stream exists, it is actually due to the rotation of the earth. The rotation force can explain why free-falling objects tend to bend to the east, because the earth has a west-to-east rotation force.

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Someone once asked Newton, "Why can the Earth revolve around the Sun?" If there was only gravity, then all the planets would fall towards the Sun. Newton didn't know the answer. He said that it was God's first impulse that made the planets move around the Sun. If the spin force is correct, then it can perfectly explain the movement of the planets. The spin force will make the planets start to orbit the Sun. In addition, it can speed up the planets in that orbit to increase their rotation speed and subsequent centrifugal force. When the centrifugal force on the Earth is strong enough to balance the gravity of the Sun, then the Earth can maintain a constant and uniform state of motion. The spin force is an inevitable result of the general theory of relativity. Therefore, many phenomena such as the precession of Mercury can be explained. The spin force can also explain the reasons for the anomalies of flyby satellites, such as the Pioneer anomaly, because the spin force provides power to accelerate these spacecraft . The spin force can also explain the deceleration problem of Phobos . When the Sun exerts a spinity field of SJ/r ² on the eight planets , the planets give the Sun an opposite spinity field Sj/r ² due to the principle of action and reaction, which slows down the rotation of the Sun and explains the angular momentum transfer of the solar system . Similarly, rotational force can also be used to explain that the moon's anti-rotational force field will cause the earth's rotation to slow down .

Another thing about the linear drag effect is that it is due to linear momentum, and I call this new force the Impelity drag effect . Linear dragging is also an inevitable result of general relativity, and Einstein predicted its existence. But compared to the evidence for the existence of the spin force, the evidence for the existence of the impelity is much smaller.

Unlike the rotational dragging of rotational force, the linear dragging effect does not conform to the principle of action and reaction to make the linear moving object move forward with nearby objects, but only keeps itself moving forward according to the law of conservation of momentum. The evidence of the existence of the rotational force is not as good as that of the rotational force, and the definition of force is the time rate of change of momentum. The constant linear momentum will not produce force, otherwise it will conflict with Newton's second law of motion and special relativity. Only linear dragging effect exists.

Gravitospinism Maxwell Equations

The gravitational field seems to have the same properties as the electromagnetic field. In classical electromagnetism, Maxwell's equations play a central role. Maxwell's equations clearly state the relationship between the electric field and the magnetic field. I will check whether the gravitational field and the spinity field also have the same relationship as Maxwell's equations. First, we need to define what is the spinity field:

Spinity field:

$$\mathrm{s} = \frac{\mathrm{SJxr'}}{\mathrm{r}^2}$$

the rotation field is the angular momentum of the central mass multiplied by the direction of the radius unit vector.

Spin force:

$$\mathrm{F} = \frac{\mathrm{SJm\omega}}{\mathrm{r}^2} = \mathrm{ms\omega}$$

By definition, we can have a general form for the Lorentz force:

$$\mathrm{F} = \mathrm{m}(g + s \times \omega)$$

$$\mathrm{F} = \mathrm{m}(g + s\omega)$$

We can derive the acceleration of the imaginary force of the rotating coordinate system:

$$\frac{d}{dt} f = \left[\left(\frac{d}{dt}\right)_r + \omega \times\right] f$$

$$V_i = \frac{dr}{dt} = \left(\frac{dr}{dt}\right)_r + \omega \times r = V_r + \omega \times r$$

$$a_i = \left(\frac{d^2 r}{dt^2}\right)_i = \left(\frac{dV}{dt}\right)_i = \left[\left(\frac{d}{dt}\right)_r + \omega \times\right]\left[\left(\frac{dr}{dt}\right)_r + \omega \times r\right]$$

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$$a_r = a_i + 2\omega \times V_r + \omega^2 r + \frac{d\omega}{dt} \times r$$

From the scalar potential E and vector potential A, we can give a formula similar to the Lorentz force: (The rotational force is closely related to the Coriolis force, especially when the speed is in the same direction as the rotational field. The rotational force accelerates on the orbit and eventually generates an outward force to expand the orbit. When the speed is in the opposite direction of the rotational field, it decelerates and makes the orbit smaller, resulting in an inward force). From the third term of the above formula , we know that the centrifugal imaginary force accelerates outward, and from the second term of the above formula, we know that the Coriolis imaginary force accelerates inward.

$$\mathrm{F} = \mathrm{m}(Eg + 2V * \omega)$$

$$\mathrm{F} = \mathrm{m}\left(-\nabla\varphi - \frac{dA}{dt} + curlA' * \omega\right)$$

(V = Linear velocity of track with mass m)

Comparing the two formulas, we can assume:

$$g = -\nabla\varphi$$

$$s = 2V = Curl\ (2A) = Curl\ A'$$

The constant 2 will be proved in the derivation of gravity waves in the later section.

We can use these two definitions to derive the Maxwell equation for the possible gravity force:

First, Gauss's law of gravity:

$$Div\ g = -4\pi G\rho$$

(G = Gravitational constant ϱ = Mass density)

This first equation has been studied many times before. The details are not provided here.

Second, Gauss's law of rotational force :

$$Div\ s = 0$$

Gauss's law for magnetism is zero (div B = 0) because there are no magnetic monopoles. However, Gauss's law for spin force is zero (div s = 0) is because there is no monopolar force and it is just a motion effect like magnetic force:

We can also derive the following (the divergence of the curl is zero):

$$\mathrm{Div\ s} = Div(curl\ A') = 0$$

Third, Faraday's law of gravity and spinity:

$$\mathrm{Curl\ g} = \mathrm{Curl}\ (-\nabla\varphi) = 0$$

The curl of the gradient is zero.

Fourth, Ampere 's law of gravity:

$$\mathrm{Curl(Curl\ A)} = \left(\frac{8\pi\mathrm{G}}{c^2}\right)\mathrm{J} - \left(\frac{2}{c^2}\right)\frac{dg}{dt}$$

$$\mathrm{Curl\ s} = \mathrm{Curl\ (Curl\ A')} = 2 \times \left[\left(\frac{8\pi\mathrm{G}}{\mathrm{c}^2}\right)\mathrm{J} - \left(\frac{2}{\mathrm{c}^2}\right)\frac{\mathrm{dg}}{\mathrm{dt}}\right]$$

(Let S = μ/ 4 π, J = Mass flow density , ε = 2 / μc ^{2} and Jerk(j)=dg/dt)

It is based on the continuity equation (derived later).

If we remove the doubling factor in the above equation and set u / 4 π= 2G/c^2, we can use the analogy of Ampere's law and the formula for the curl of the force field to show that the mass continuity equation is valid:

$$\mathrm{Curl\ s} = \mathrm{Curl\ (2\ Curl\ A)} = 2\mu\left[J - \epsilon\frac{dg}{dt}\right]$$

Analogous to Lenz's law, the curl of the force field and the derivative of the gravity field should have a negative sign to satisfy the conservation of energy, and the negative sign can derive the correct gravity force wave equation. And the curl formula of the force field must be one positive and one negative to meet the continuity equation, because the divergence of the gravity field has a negative sign. The derivation is as follows:

$$\frac{\partial\rho}{\partial t} + \nabla \cdot J = 0$$

$$\mathrm{Div\ g} = -\frac{\rho}{\epsilon}$$

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$$\mu\nabla\cdot J-\mu\varepsilon\frac{\partial(\nabla\cdot g)}{\partial t}=0$$

$$\text{Curl s}=2\mu\left[J-\epsilon\frac{dg}{dt}\right]$$

From the above derivation, the gravity curl is zero so it is a conservative force pure gradient field and the rotational force divergence is zero so it is a curl field.

$$g=-\nabla\varphi$$

$$s=Curl\ (2A)=Curl\ A'$$

so

$$\nabla^2A'=-2\mu J$$

$$A'=\frac{\mu}{2\pi}\int J\,d^3r'$$

$$A'=\frac{4G}{c^2}\int\frac{\frac{1}{2}RMV}{|r-r'|}d^3r'=\frac{2G}{c^2}\int\frac{RMV}{|r-r'|}d^3r'$$

(1/2RMV is the angular momentum of the two-dimensional disk plane magnetic moment)

$$\text{s}=\left(\frac{2G}{c^2}\right)\frac{L}{r^2}=\left(\frac{\mu}{2\pi}\right)\frac{L}{r^2}$$

We can see that the gravity force has the same beautiful linear form as Maxwell's equation. Therefore, the linear gravity force Maxwell equation is:

$$\text{F}=\text{m}(g+s\times\omega)$$

$$\text{F}=\text{m}(g+s\omega)$$

$$\text{Div g}=-\frac{\rho}{\epsilon}$$

$$\text{Div s}=0$$

$$\text{Curl g}=0$$

$$\text{Curl s}=2\mu\left[J-\epsilon\frac{dg}{dt}\right]$$

For electromagnetic waves, Div E=0, so Div g must be non-zero to provide the origin of the electromagnetic waves.

And similar to Poynting's theorem: (D = ϵg displace mass flow)

$$\nabla\cdot S=-\frac{\partial u}{\partial t}-J\cdot g$$

$$\text{Curl s}=2\mu\left[J-\epsilon\frac{dg}{dt}\right]$$

$$s'=\frac{s}{2\mu}$$

$$\text{Curl s}'=J-\epsilon\frac{dg}{dt}=J-\frac{dD}{dt}$$

$$\nabla\cdot g\times s'=s'\cdot\nabla\times g-g\cdot\nabla\times s'=-g\cdot\nabla\times s'=-g\cdot J+g\cdot\frac{dD}{dt}$$

$$S=g\times s'=\frac{g\times s}{2\mu}=-\frac{s\times g}{2\mu}$$

$$\frac{\partial u}{\partial t}=-g\cdot\frac{dD}{dt}$$

$$u=-\frac{1}{2}g\cdot D=-\frac{g^2}{8\pi G}=-\frac{1}{2}\epsilon g^2$$

At this point we can see that the gyro field does not provide mass energy density. Because the gravity field curl is zero, there is no corresponding electromagnetic Faraday's law, and the magnetic energy density is:

$$u_B=\frac{1}{2}LI^2$$

The gravity force has no corresponding inductance (L), and therefore the force field does not provide mass energy density. Here I also want to derive the gravity wave:

$$E=-\frac{g^2}{8\pi G}=\frac{hf/_{2r}}{4\pi r^2}$$

have to:

$$g=-l_p\omega^2$$

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By analogy with electromagnetism, the unit of the revolving wave Inting vector divided by the speed of light is similar to surface tension (Surface stress) or radiation exposure. And by analogy with Maxwell's equations, the revolving wave Snell 's law of refraction and reflection can be derived. First, the revolving traveling plane wave has the following equation:

$$a(x,t) = -A_0\,\omega^2\cos(\omega t + kx + \varphi)$$

The gravity wave satisfies the boundary conditions of the gravity wave equations. One of the conditions is that the component of the gravity field parallel to the boundary must be continuous in the vicinity of the boundary. Suppose the boundary is in the xy plane:

$$A_i(x,y,0) + A_r(x,y,0) = A_t(x,y,0)$$

Ai, Ar, At represent the components of the gravity field of the incident wave, reflected wave, and refracted wave parallel to the boundary , and their frequencies are ω ◦

$$A_i = A_{i0}\omega^2 e^{i(k_i r-\omega t)}$$
$$A_r = A_{r0}\omega^2 e^{i(k_r r-\omega t)}$$
$$A_t = A_{t0}\omega^2 e^{i(k_t r-\omega t)}$$

Make any position (x,y,0) on the boundary satisfy the boundary conditions and the phase change is the same:

$$k_{ix}x + k_{iy}y = k_{rx}x + k_{ry}y = k_{tx}x + k_{ty}y$$
$$k_{ix} = k_{rx} = k_{tx}$$
$$k_{iy} = k_{ry} = k_{ty}$$

Assuming the third equation equals zero, then Snell's first law holds. From the equation for the x component of the wave vector:

$$k_i \sin\theta_i = k_r \sin\theta_r$$

In the same medium $k_i = k_r$, so second Snell's law is done.

$$\cdot\ n = \frac{c}{v} = \frac{ck}{\omega}$$
$$n_i \sin\theta_i = n_t \sin\theta_t$$

So, third Snell's law is fulfilled.

In addition, the formula that can be used to compare the re-rotation field and the electromagnetic field is as follows:

First is the definition of displacement mass flow:

$D = \varepsilon_0(g + P_g) = (1 + \chi_g)\varepsilon_0 g = \varepsilon_r\varepsilon_0 g = \varepsilon g$

(mass permeability ε_r)

In the medium can be obtained by analogy with the s & W field and the B & H field:

$s = 2\mu_0(W + P_s) = 2(1 + \chi_s)\mu_0 W = 2\mu_r\mu_0 W = 2\mu W$

At this time, W is the spin field strength vector, $P_g$is the mass polarization vector, $P_s$is the spin polarization vector, $\chi_g$is the mass polarizability, $\chi_s$is the spin polarizability, and the relative spin field permeability μ_r.

The speed of gravity waves propagating in a medium is:

$$v = \frac{2}{\sqrt{2\varepsilon\mu}} = \frac{1}{\sqrt{\varepsilon_0 2\mu_0}} \cdot \frac{2}{\sqrt{\varepsilon_r\mu_r}} = \frac{c}{\sqrt{\varepsilon_r\mu_r}}$$

So the refractive index is:

$$n = \frac{c}{v} = \sqrt{\varepsilon_r\mu_r}$$

Comparable to electrical permeability $\varepsilon_r$and magnetic permeability μ_r.

About Gravitational Waves

Maxwell used the propagation of electric and magnetic fields to derive electromagnetic waves: light. Light is produced by the interaction of electromagnetic fields. Since there is also a possible interaction between gravitational fields and spinity fields, I was curious whether there are also gravitospinity waves. Einstein also derived gravitational waves. I will discuss this issue here.

gravitational field:

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$$g = \frac{GM}{r^2} r'$$

Spin force field:

$$s = \frac{SJ}{r^2} xr'$$

However, the Maxwell equation for the gravity force becomes:

$$\text{Div } g = -4\pi G\rho$$

$$\text{Div } s = 0$$

$$\text{Curl } g = 0$$

$$\text{Curl } s = 2\mu \left[J - \epsilon \frac{dg}{dt} \right]$$

We know that the wave equation is:

$$\nabla^2 f = \left(\frac{1}{c^2}\right)\left(\frac{d^2 f}{dt^2}\right)$$

The electromagnetic wave equation is:

$$\nabla^2 E = \left(\frac{1}{c^2}\right)\left(\frac{d^2 E}{dt^2}\right)$$

$$\nabla^2 B = \left(\frac{1}{c^2}\right)\left(\frac{d^2 B}{dt^2}\right)$$

Due to the above equation, we know that the divergence of the gravitational field is non- zero (k ' *g ≠0) and the curl of the gravitational field is zero (k'xg =0), so gravitational waves, if they exist, should be longitudinal waves and the gravity and spin field relationship is s=2g/ω. In addition, we need to consider the possible energy density of gravitational waves. If there is no medium in spacetime for gravitational waves to propagate, gravitational waves will need a transmitting particle called a graviton. However, this spin-2 (based on the second-order energy-momentum tensor) graviton has never been found in nature. The photon, which is closely related to electromagnetism, is a spin-1 particle. It is due to the fact that the electromagnetic four current is a first-order tensor. Here, I suggest that gravitational waves are actually light. Photons are spin-1 particles because the four energy-momentum tensors (E/c, Px , Py , Pz) are also first-order tensors. Gravitons are considered spin-2 bosons because of the 4x4 energy-momentum curvature matrix, which is misleading. We should realize that the Faraday electromagnetic torsion tensor is also a 4x4 matrix. The four- mass current or four-energy- momentum tensor is actually the source of electromagnetism or gravitospinity. The 4×4 matrix is actually the effect of the force on spacetime. We should not be misled. In addition, massless photons can mediate electromagnetism as well as gravity. There is no spin-2 graviton and bosons are only spin-free/spin-0 or spin-1. Electromagnetic waves have a Lorentz metric:

$$\partial_\alpha F^{\alpha\beta} = 0$$

Gravitational waves also have a Lorentz metric:

$$\partial_\alpha h^{\alpha\beta} = 0$$

We can see the similarity. F represents 4 × 4 tensor electric or magnetic field. H can also be viewed as stress 4 × 4 tensors. However, these are not the actual origins. The origins are the 4 currents or the 4 mass currents .

Gravitational waves are radiation waves that propagate when space-time is accelerated. We know the Unruh -Hawking relation: T = ah' / 2πck. Therefore, acceleration directly causes temperature T and temperature T causes radiation KT^4 (Stephen's law). Therefore, it satisfies the definition that gravitational acceleration causes radiation waves. Therefore, light itself is also a gravitational wave. It can explain why gravity propagates at the speed of light.

The wave equation for gravitational waves is actually no different from the wave equation for electromagnetic waves. The wave equation for gravitational waves is:

$$L'' + (\beta')^2 L = 0$$

The wave equation for electromagnetic waves is:

$$L'' + (4\pi T_{uu})L = 0$$

also,

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$$\left[\beta'^2/_{4\pi}\right] = [T_{uu}] = \text{constant}$$

The two wave equations are indistinguishable! This means that the two waves are identical.

It is worth mentioning that gravity is derived from the mc^2 of mass energy. Therefore, this energy will cause the curvature of spacetime. Light is also a kind of energy. Therefore, light has effective mass. The momentum of a photon is E / C = hf / C. Therefore, the frequency of a photon is closely related to its mass. Furthermore, the amplitude of a photon is closely related to its charge. I will discuss this in a later chapter:

Light is a plane wave, which can be expressed as (taking into account the phase angle φ of SHM):

$$A(t) = A_0 \cos(\omega t + \varphi)$$

We differentiate the above formula for t and get:

$$V(t) = -A_0\, \omega \sin(\omega t + \varphi)$$

We differentiate it again and get:

$$a(t) = -A_0\, \omega^2 \cos(\omega t + \varphi)$$

If the wave moves a full wavelength of 2π, the above equation becomes:

$$a(t) = -A_0\omega^2$$

Consider the curl formula of the spin field:

$$\text{Curl s} = 2\mu\left[J - \epsilon\frac{dg}{dt}\right]$$

When there is a transmitting spin field in space :

$$Curl\ S = K \times S_0 f'(ct) = \frac{2dg}{c^2 dt}$$

Integral:

$$\omega s = 2g$$

Space has a smallest unit. It should be quantized. There is a famous Zeno's paradox: if the tortoise is 100 meters ahead of Achilles. When Achilles moves 100 meters, the tortoise can only move 10 meters. When Achilles moves 100 meters, the tortoise moves 10 meters again. When Achilles moves 10 meters again, the tortoise moves 1 meter again. Therefore, Achilles is always behind the tortoise. This does not really happen in the real world. The basic principle for Zeno's paradox to work is that space-time should be continuous and infinitely divisible. The other two-division paradoxes also require that space be infinitely divisible and the arrow paradox requires that time be infinitely divisible. However, since Zeno's paradox does not happen, it means that our space should be discontinuous. Its smallest length (unit length) is the New Planck length and the smallest unit of time is the New Planck time. We can see that space-time is built up of small squares (like pixels or grids). But on large scales such as galaxies, space-time will appear smooth and continuous, making general relativity correct. Based on the light-gravity equations above, we know that the New Planck length is the smallest unit of oscillation. If time and space can be divided infinitely, then light can stop or change speed, which violates the invariance of the speed of light. In addition, we know that the uncertainty principle is Et $\geq$ 1/2h ' and xP $\geq$ 1/2h ' . If time t or space x is infinitely small, then energy or momentum will be infinite. This violates the principles of physics. Therefore, spacetime should be quantized. Since the new Planck length is the smallest unit of spacetime, we cannot use light pressure or Casimir force to calculate the zero-point energy of this unit of spacetime. Even at absolute zero, having the minimum energy E = 1 / 2h'w allows the space unit to oscillate at an angular frequency w. This solves why the zero-point energy calculated from the Casimir effect is much larger than the actual observation. Because the oscillation frequency is inversely proportional to time, the origin of time should be due to the oscillation of the unit space. The derivation of the unit space Planck length comes from the inequality that the Schwartzchild radius must be less than or equal to the radius of the elementary particle.

This means that the light wave is a simple harmonic oscillator. Since acceleration is equal to the gravitational field, we can introduce the gravitational field formula of energy density to see if there is a constant maximum amplitude A_0 to see if the light is a gravitational wave?

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Both gravitational waves and electromagnetic waves are light (photons). The definition of gravitational waves is that they can transmit gravitational fields. Therefore, light can also transmit gravitational fields. The energy density of the gravitational field we know is:

$$E = \frac{-g^2}{8\pi G}$$

If a light has energy E = hf, its energy density is:

$$E = \frac{hf/_{2r}}{4\pi r^2}$$

(r is the photon radius = $\lambda / 2\pi$, and r* ω = c)

We combine the above two formulas and get:

$$g = -\sqrt{\frac{h'G}{c^3}}\omega^2$$

Since the first term on the right-hand side is the unit space, namely the Planck length (lp), we can rewrite it as follows:

$$g = -l_p\omega^2$$

This proves that light waves are simple harmonic oscillators. The gravitational field carried by a photon is proportional to the square of its angular frequency. Moreover, the displacement of the vibration is a constant value called the Planck length. When light passes through spacetime, it causes the smallest unit of spacetime to vibrate at an angular frequency of ω. This oscillation causes an accelerated gravitational field. Therefore, light does carry a gravitational field. This can explain why light can be attracted by a huge mass such as a black hole, or explain the earthquake-inducing effect of electromagnetic waves.

We also know that the spinity field S = 2g / ω. Therefore, light can also carry a spinity field:

$$s = -2l_p * \omega = 2v$$

$$X = l_p$$

Therefore, the spinity field of a photon is proportional to its angular frequency and a constant: the Planck length. Therefore, a photon can carry four fields including electric field, magnetic field, gravitational field, and spinity field. The photon Au four-dimensional vector therefore has four degrees of freedom.

Longitudinal pressure waves are the cause of gravity waves, because pressure causes simple harmonic oscillations in Planck space. From this, we can get the form of the sound wave equation:

$$\nabla^2 P = \left(\frac{1}{v^2}\right)\left(\frac{d^2P}{dt^2}\right)$$

This is the longitudinal component of the light wave. We will first derive the wave velocity v= c from this formula. The universe is dominated by dark energy (gamma = 1). Sound/ pressure wave-like formula is:

$$v = \sqrt{\frac{E}{\rho}} = \sqrt{\frac{\gamma p}{\rho}}$$

and

$$P = \rho c^2$$

(ρ is the mass density)

The gravity waves derived by Einstein are transverse waves based on the weak field approximation method, and the field potential of Einstein's gravity waves is the mass quadrupole moment and the moment of inertia tensor, which shows that it is closely related to my spinity waves and transverse waves based on angular momentum.

Therefore, the speed of light gravitational waves is equal to the speed of light c, and we can also derive the maximum pressure of this formula. We know that the momentum density of light waves is S / c^2 and momentum = mass * speed. Therefore, the light wave mass density is S / v * c^2.

$$P = ESk = \frac{\rho c^2 l_p \omega}{c}$$

and,

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$$v = l_p * \omega$$

thus,

$$P = \rho c v$$

Since there is zero-point energy in a vacuum, the vacuum mass energy density is not actually zero. From the above formula, we can see that light waves are analogous to sound waves, and are also pressure waves and velocity waves. Since light waves pass through a unit space without reflection, we need to use the absorbed radiation pressure. We put it into the above formula and we get the Ponyting vector:

$$P = \frac{S}{c} = \frac{E \times B}{\mu c}$$

If we know:

$$E = E_0 \cos(\omega t - kx)$$
$$B = \frac{1}{c} E_0 \cos(\omega t - kx)$$

Substitute into Poynting's light pressure equation (P=ExB/ μc), then differentiate the equation twice with respect to x and then compare the equation differentiated twice with respect to t. Therefore, I get that light is also a pressure wave. Because pressure is proportional to velocity, pressure waves can be derived into velocity waves (spinity waves) and acceleration waves (gravitational waves).

$$\nabla^2 P = \left(\frac{1}{c^2}\right)\left(\frac{d^2 P}{dt^2}\right)$$

From the above derivation:

$$P = \rho c V$$

So we can also get the velocity wave:

$$\nabla^2 V = \left(\frac{1}{c^2}\right)\left(\frac{d^2 V}{dt^2}\right)$$

Since the spinity field is twice the velocity field, we can get the spinity wave:

$$\nabla^2 S = \left(\frac{1}{c^2}\right)\left(\frac{d^2 S}{dt^2}\right)$$

Since the pressure wave is proportional to the velocity wave (spinity wave), and the velocity wave (spinity wave) is differentiated into the acceleration wave (gravity wave), then:

$$P = cos^2\theta \propto V \propto S$$
$$S = 2V$$

The gravitational waves detected by experiments are actually spinity waves, and spinity waves and gravitational waves are two sides of the same coin, because they are analogous to electric fields and current density:

$$J = \sigma g$$
$$\frac{d}{dt}(\nabla \times J) = \sigma(\nabla \times g) = 0$$
$$\nabla \times J = 0$$
$$\nabla \times (\nabla \times s) = \nabla(\nabla \cdot s) - \nabla^2 s = -\nabla^2 s$$
$$\nabla \times (\nabla \times s) = 16\pi(\nabla \times J) - \left(\frac{4}{c^2}\right)\frac{\nabla \times dg}{dt} = 16\pi(\nabla \times J) - \left(\frac{1}{c^2}\right)\frac{\nabla \times \mathrm{d}^2 s}{dt^2} = 16\pi(\nabla \times J) - \hat{\mathrm{k}} \times \left(\frac{1}{c^2}\right)\frac{\mathrm{d}^2 s}{dt^2}$$
$$s = -16\pi(\nabla \times J) = 0$$

The first differentiation removes a factor of 2 and the second differentiation removes a factor of 4, which can be used to compare Einstein's gravitational wave formula:

$$h = -16\pi T = 0$$

Einstein derived gravitational waves using weak field approximation. The derivation is briefly described as follows:

$$G_{\alpha\beta} = -\frac{1}{2}\partial_\mu \partial^\mu h_{\alpha\beta} = -\frac{1}{2}\boxdot^2 h_{\alpha\beta}$$
$$G_{\alpha\beta} = 8\pi T_{\alpha\beta}$$
$$\boxdot^2 h_{\alpha\beta} = -16\pi T_{\alpha\beta}$$

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$$\boxdot^2 h_{\alpha\beta} = 0 \ (if\ T_{\alpha\beta} = 0)$$

Einstein has another formula:

$$\frac{1}{2}\varphi_i^k = \frac{8\pi G}{c^4}\tau_i^k$$

$$\int T^{jk}\, d^3x = \frac{1}{2}\left(\frac{d^2 I_{jk}}{dt^2}\right)$$

$$h_{TT} = \frac{2G}{c^2}\left(\frac{d^2 I_{TT}}{dt^2}\right)$$

Because the differentials of the spinity field and the gravity field differ by a factor of 2, the constant 2 G/c ^{2} can be obtained, but in fact, the gravity waves measured by LIGO are spinity transverse waves. The Laplace equation of the spinity field can also be obtained from the above formula. We know $\nabla^2 s = 0$ that when the curl and divergence of the gravity field, electric field, magnetic field, and thermal field (temperature field) are zero, the inverse square Laplace equation can also be obtained. These fields are symmetric and conserved in steady- state free space, balanced and harmonic, and independent of time and path because the continuity equation is established. These force fields are also the basis of the unified field equations.

Here, I need to explain that light waves require electromagnetic fields and gravity fields to complete. Therefore, static or constantly moving charges cannot produce radiation (electromagnetic waves). Electromagnetic radiation requires charge acceleration (gravitational field). We know the Larmor formula for electromagnetic radiation:

$$\mathrm{E}_\theta = \frac{\mathrm{q} * \mathrm{a}_\pm}{4\pi\varepsilon c^2 \mathrm{R}}$$

Remember that acceleration "a" needs to be perpendicular to the Coulomb field generated by Q. Therefore, this requirement also needs to be met for light waves. If the acceleration per unit space is in the same direction as the light wave propagation, the above formula can be realized. The maximum amplitude displacement per unit space is the Planck length. Planck space is the medium for light wave transmission, so light waves can be generally classified as mechanical waves, which is different from matter waves, which are waves in the trajectory of particle motion. This solves the mystery of the light medium: ether.

The strict requirements for the acceleration of electromagnetic waves can be deduced from the following. Electromagnetic waves are caused by time-varying electric fields and time-varying magnetic fields. If we first differentiate the electric field as the amplitude (distance) by time t, the velocity term generated is the magnetic field. If we need the electric field, we need to differentiate the magnetic field with time t to generate the acceleration term. Then, it will continue and become a periodic cycle. Therefore, electromagnetic waves can be formed. The acceleration of electromagnetic waves must satisfy:

$$a(x,t) = -A_0\, \omega^2 \cos \omega t$$

It is this vertical acceleration that is directly proportional to the square of the wave's angular velocity. Therefore, the frequency provides the accelerated electromagnetic wave. Since the simple harmonic oscillation longitudinal light wave A_0 is the Planck length. The current theory believes that gravity waves are transverse waves. Since it is a transverse wave, if it is to propagate in a vacuum, does it need a medium similar to solid ether? Otherwise, it needs gravitons with spin 2, but no signs of gravitons have been found. Huygens once compared light to sound waves and believed that light is a longitudinal wave, because transverse waves are usually only transmitted in solids. Young proposed that light is a transverse wave because of polarization, but is it possible for light to be both a transverse wave and a longitudinal wave? First, there is an electromagnetic field oscillation as a transverse wave, but the electromagnetic field also produces a pressure wave oscillation as a longitudinal wave. Some people use photons to explain the straightness of light, but photons cannot explain why light bends in a large gravitational field instead of continuing to move straight. If the unit space is the transmission medium of light waves, this ether problem of the 20th century can be solved. In a straight space, Planck cells are arranged in a linear pattern, so light gravity waves travel in a straight line due to their simple harmonic motion. In a curved space, light gravity waves travel

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in a curved pattern due to the curved arrangement of Planck cells. In 2016, LIGO announced the results of detecting gravitational waves. The signals they detected were presented as pressure waves, which helped to prove my theory.

What is time is still a confusing question. Einstein regarded time as the fourth dimension of unified space-time. However, we still cannot understand what the fourth dimension of space-time is. Based on the above theory, time is actually the oscillation period of the new Planck volume (Lh^3). The simple harmonic oscillation of the unit space determines the physical characteristics of time. Because the cause of time is the oscillating space, time should be the fourth dimension of space-time. In the early universe, due to the extremely large Planck energy causing the maximum possible Planck frequency, the unit space oscillated violently. The frequency is the largest and the time is the shortest. This shortest time is called the new Planck time (Th) as the beginning of time. This is due to the early space of the universe where the maximum photon energy exists. As the universe expands, the decrease in the background temperature of the universe causes the frequency of photons to decrease. Therefore, the time segment becomes longer inversely proportional to the frequency. Therefore, time is determined by light. When the universe approaches absolute temperature zero, time will extend to a close maximum, and the base oscillation frequency will be determined by the very small zero-point energy. Therefore, if we know the zero-point frequency, we can know the maximum time of our final universe. Time is not a psychological illusion. The metabolic rate of biological organisms is determined by the vibration of the unit space around us. We cannot directly observe the frequency of the oscillation of the unit space, so we use the rhythm of watches, the orbit of the moon, or the periodic oscillation of the revolution around the earth to reflect the actual cosmic time: the unit space oscillation. However, the Earth's orbit around the sun may not fully reflect the extended space oscillation. Therefore, the life expectancy calculated in earth years will be extended to reflect the extended oscillation time of the actual cosmic unit space. The frequency of the photons passing through causes the unit space oscillation to determine time. If we could travel at the speed of light, we would not be able to detect the change in time/frequency of the surrounding space (time stops). This is the reason for the time dilation phenomenon of special relativity.

We know that space is not a jelly-like ether. So how can spacetime curvature or torsion be formed (discussed in the following chapters)? I think this also involves the unit space: the new Planck volume (Planck cell). The arrangement of these smallest structural units leads to large-scale curvature or torsion. Therefore, there is no ether. However, these new Planck cell arrangements make spacetime bend or twist. When a photon reaches the outer periphery of the universe, it cannot be absorbed. Therefore, reflection pressure will appear. If the frequency of this light is higher than the zero-point energy 1 / 2h'w is larger, a new Planck cell will be generated. This is the reason for the expansion of space. Light waves are also gravitational waves, which can explain why electromagnetic waves are no-source fields (electric field divergence is zero), because the field source is actually the gravitational field (gravitational field divergence is not zero), and light waves with gravitational fields also explain why light is attracted by massive celestial bodies.

Finally, I would like to explain why non-inertial systems have imaginary forces. I would like to propose a hypothesis that an accelerated object will cause Planck cells that are linearly arranged in spacetime to produce a corresponding reverse acceleration field, similar to the principle of action and reaction, just as a compressed spring in simple harmonic motion will produce a rebound force (according to the concept of vacuum zero-point energy, that is, the energy density in a vacuum is not zero, Hooke's law still applies). Therefore, while causing centripetal acceleration, centrifugal acceleration is also generated, or in free fall motion, upward acceleration is generated. In addition, simple harmonic motion can also correspond to circular motion at a constant rate to explain the situation of weightlessness. According to the principle of conservation of energy, objects in nature have two basic properties: inertia and elasticity. Inertia represents the property of an object resisting changes in its state of motion, corresponding to kinetic energy; while elasticity represents the property of an object resisting changes in shape, corresponding to potential energy. To further explain this concept, we can compare the buoyancy generated by a liquid to the restoring force of a spring.

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For example, when a ball enters water, it will be half submerged and half floating, and it will be subject to the reaction force of the water, which is similar to the gravity exerted by the ball on the water, that is, F=G. The magnitude of these two forces is equal and the direction is opposite. As another example, imagine a free-falling charged particle (such as a free-falling apple in the macroscopic world), which will compress the Planck space in free space downward, causing elastic force (Planck space will experience simple harmonic motion when light passes through it). This space is regarded as an ideal elastic body, which is continuous, completely elastic, isotropic and uniform. In this case, we can apply D'Arenbert's principle of virtual work , which is similar to the first law of thermodynamics. According to the conservation of energy, in an equilibrium system (whether dynamic or static), the total change in work is zero: $\delta W = F * \delta r = (f + I) * \delta r = 0$.

Hooke's Law:

$$F = -kx = ma$$

The acceleration of imaginary force in space is:

$$a = -\omega^2 x$$

f of the above-mentioned charge particle is equal in magnitude and opposite in direction to the reaction force I of its compressed linear arrangement Planck space: f - ma = f + I = 0. Therefore, the above-mentioned virtual work principle holds. The so-called imaginary inertial force of Newton is actually the reaction force of this compressed Planck space. The same situation can also be found in the elevator thought experiment described by Einstein in the equivalence principle. However, if the charge particle is stationary on the ground, its gravity F = mg is not zero. But in this case, the downward gravity will not compress the elastic force of the ground to cause deformation, and the positive force is upward, equal in magnitude to the gravity, and opposite in direction, that is, f + I = 0. Even if the virtual displacement is not zero due to small deformation (δ r ≈ 0), the virtual work principle still holds. Einstein's elevator thought experiment also has a similar description. When the electron orbits the nucleus, the nucleus generates a centripetal force f on the electron, and the revolution of the electron in free space causes the compressed linear arrangement Planck space to generate a reactionary centrifugal force I, at which time f + I = 0. At this time, x=r, and substituting the imaginary force acceleration into the above formula, we can get the centrifugal acceleration.

The action and reaction forces of Newton's third law of motion are valid in both inertial and non-inertial frames, but Newton's first and second laws of motion are valid only in inertial frames. For example, when someone observes an apple falling to the ground, this observation is in an inertial frame, so only f = mg can be observed, and Newton's second law of motion is valid. Similarly, when someone observes the stationary ground and apple, this observation is also in an inertial frame, so it can be observed that the apple remains stationary, and Newton's first law of motion is valid. And f + I = 0 can also be applied to the relationship between the Coriolis force and the Coriolis acceleration force. Substituting x=2r into the above equation for the imaginary force acceleration, we get the Coriolis acceleratio . Note that the Coriolis force is closely related to the rotational force, so it is twice. Similarly, based on the conservation of energy, the principle of virtual work can derive the Lagrange equations. The principle of virtual work is applicable to non-conservative forces and is more fundamental than the principle of least action.

In addition, the concept of normal force is supplemented. According to the special theory of relativity, an absolutely rigid body does not exist, so the deformation between two objects will cause an elastic normal force. However, the so-called dynamic friction and static friction are actually proportional to the weight of the object (in most cases). For example, when moving a table, emptying the drawer can make it move parallel, thereby reducing the weight of the table and thus reducing friction. The conversion of friction into heat can be explained by the Unruh-Hawking effect. Friction is actually mainly related to the gravitational force between substances, and less to the electromagnetic force. Current theories believe that friction comes from the electromagnetic attraction between substances, while the normal force comes from the rebound elastic force caused by the deformation of the object. However, the causal relationship between that statement is unclear. (μ : dynamic or static friction coefficient)

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$$F \propto \mu * mg$$

Finally, the relativistic acceleration four-vector can be used to examine whether the charge emits electromagnetic radiation in the gravitational field- the acceleration four-vector:

$$\mathrm{A} = \left(\gamma^4 \frac{a \cdot u}{c}, \gamma^2 a + \gamma^4 \frac{a \cdot u}{c^2} u\right)$$

When the acceleration a=0, such as being stationary on the ground (u=c at this time) or in a constant velocity coordinate system, or in a co-moving reference frame u=0, like a free fall observer, or in a constant rate circular motion a perpendicular to u, the dot product of acceleration and velocity is zero. At this time, the acceleration four vectors are:

$$\mathrm{A} = \left(0, \gamma^2 a\right)$$

Let's look at the four energy-momentum vectors:

$$\mathrm{P} = \left(\frac{E}{c}, p\right)$$

The four-dimensional acceleration time term is zero, which actually corresponds to the energy term of the energy-momentum four-vector being zero. In these cases, the moving object does not release energy, that is, electromagnetic energy. This instant co-moving reference frame is an instant static reference frame, so the electrons in circular motion at a constant rate orbiting the nucleus will not emit radiation at all and finally fall into the nucleus. We can use this four acceleration vector operation to solve the charge radiation paradox in the gravitational field. If a mass that is even stationary in free space, such as the core of a galaxy(velocity u=c), then the four-acceleration time term is not zero and radiates energy. In this case, the acceleration of the gravitational field continues to shrink inward without pushing the external space to cause elastic force.

If a free fall changes at any time due to space, the acceleration generated instantaneously in Planck space will continue to be generated and disappear, and the force generated by the acceleration of Planck space cannot stop the free fall. In addition, the rest mass of free space has the gravitational energy of the gravitational field due to the curvature, such as the energy of the core of the stationary Milky Way, which is equal to the maximum kinetic energy (complete inertia):

$$E = \frac{1}{2} M c^2$$

This is also called gravity cause, which will be described in the following chapters. This gravity wave sine wave has a formula comparable to AC voltage. If the gravity wave can induce gravity similar to AC. If there is a simple harmonic gravity wave:

$$a(x,t) = -l_p\, \omega^2 \cos(\omega t + kx + \varphi)$$

Integrating the gravitational field acceleration with respect to x gives the gravitational potential V:

$$V(x,t) = -l_p\, \omega c sin(\omega t + kx + \varphi) = V_0\, sin(\omega t + kx + \varphi)$$

Similar to Ohm's law, the mass flow I (μmass resistance) can be obtained:

$$I(x,t) = \frac{V_0}{\mu} sin(\omega t + kx + \varphi) = I_0\, sin(\omega t + kx + \varphi)$$

Then the effective power P (P=VI):

$$P_e = \frac{\omega}{2\pi} \int_0^{2\pi/\omega} \frac{1}{2} V_0 I_0 \left(1 - \cos 2\omega t\right) dt = \frac{\mu I_0^2}{2}$$

Effective gravitational potential:

$$V_e = \sqrt[2]{\frac{1}{T} \int_0^T V(t)^2\, dt} = \frac{V_0}{\sqrt{2}}$$

Effective mass flow :

$$I_e = \sqrt[2]{\frac{1}{T} \int_0^T I(t)^2\, dt} = \frac{I_0}{\sqrt{2}}$$

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The above is an analogy of alternating current to the sine wave of gravity. This deduction is because electromagnetic waves can induce alternating current. Whether gravity waves can actually do the same has yet to be verified experimentally. Light waves can generate acceleration fields, i.e., force, which can also explain why ultraviolet light has greater destructive power.

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