Theories of Everything by Logic:

Unlock the secrets of dark matter/energy, atom model/chemical bond, homochirality/extinction, geomagnetism/earthquake, and money conservation/monetary leverage

In memory of my mentor: Master Sheng-Yen

By Wan-Jiung Hu(胡萬炯)MD PhD
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Description:

The author Wan-Jiung Hu(born1973) is a MD (National Taiwan University) and PhD (Johns Hopkins University). This book contains theories of everything in physics, chemistry, biology, geosciences, and economics. Spinity is a force to drag spacetime to rotate around central mass. Rest mass produces gravity, spinning mass produces spinity; rest charge produces electricity, spinning charge produces magnetism. Light is also gravity wave. Space has smallest unit, and time is decided by light. Lightity is dark energy. Photon emitted from galaxy expands the universe acceleratedly via light pressure. General relativity suggests mass induces spacetime curvature; charge relativity suggests charge induces spacetime torsion(vortex). There is no dark matter, and spiral galaxies (vortex) are formed due to charge relativity which replaces quantum electrodynamics. Integrating general relativity, charge relativity, and radiation tensor, we get Universe Field Theory. We can also deduct the birth and end of universe. Unified field theory can also be obtained. Integrating gravitospinity and electromagnetism, we deduct a determinative

atom model and chemical bond theory replacing quantum mechanics. In addition, I propose a new chemical bond theory according to the new atom model. Homochirality is due to co-catalysis of L-amino acids and D-sugars. Extinction is due to Milankovitch cycle. Earthquake is caused by radiation release from inner earth which explains Electromagnetism/ ionosphere anomaly and intra-tectonic earthquakes replacing plate tectonic earthquake theory. Tornado genesis is related to charge relativity. In economics, I propose money conservation and monetary leverage to explain economic bubbles. In mathematics, I propose This book is very important to earthquake prediction and tornado control. Many nuclear plants of Taiwan are located near fault areas. If huge earthquake happens, it will cause detrimental effect. I used several nights and weekends to finish this book without affecting my normal work. I am still most interested in biomedicine. I will also use my leisure time to advocate this book only because of the new earthquake theory. Both biomedicine and earthquake research can save millions of lives, so I need to advocate concurrently.

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Theory of everything in physics

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Frame dragging force is a newly identified force. Here, I rename this force "spinity" or "spinnism" because this force is generated by spinning mass. I propose here that "rest mass produces gravity, spinning mass produces spinity; rest charge produces Coulomb electric force, spinning and moving charge produces magnetism". Frame dragging effect was derived by Dr. Lense and Thirring to describe the procession of an orbiting object using general relativity[1]. Nobel prize winner Dr. LD Landau also derived orbiting object's lagrangian around central spinning mass using general relativity[2]. However, these professors didn't point out that frame dragging is actually a new basic force which has a close relation with gravity. When an object has mass, it will have gravity to attract its parts to the center. In order to overcome this continuously centripetal force, the object needs to spin to produce

centrifugal force to balance gravity. When the object spins, spinity occurs. I propose to call this new force "spinity" because it is a combination of "spin" meaning origin of this force and "ity" meaning basic force. Frame dragging means a spinning mass can drag nearby space-time to rotate around the mass, so it is actually a force which can cause peripheral smaller object to orbit around the central mass according to the basic concept of general relativity. Below is the summary of Professor Landau's derivation from general relativity:

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

(J:central mass angular momentum ,r'=unit vector, vector g direction=Jxr', vector g is spinity field)
Lagrangian

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

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

$$V = r * \omega$$

Thus,

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

(W= angular velocity of peripheral orbiting mass)

L'=F*r

Thus, spinity

$$F = \left(\frac{2G}{c^2}\right)\frac{mJxr' * \omega}{r^2} = \left(\frac{2G}{c^2}\right)\frac{mJ * V}{r^3} = \frac{SJ * j}{r^4}$$

(S=2G/c²=spinity constant, J=central mass spin angular momentum, j=peripheral mass orbiting angular momentum, r=the distance between central mass and peripheral mass,r' is unit vector, force direction=vector direction=field direction, the first equation means spinity is also an inverse square law(in N dimensional space, force /intensity is inverse proportional to N-1), the V is scalar speed not a vector here, angular speed ω is also a scalar quantity)

Considering the angle θ between orbiting object and the equator plane of central spinning mass, we should use ωcosθ to replace ω:

How do I know this formula is correct? We can actually confirm it by calculating the moon's moving away from our earth. Our moon is moving away from our earth about 3.8cm each year by using actuate laser measurement. Current tidal force theory cannot calculate the 3.8cm correctly. I think moon's moving away from earth is due to the effect of earth's spinity. Because of earth's spinity on moon, moon is accelerating in its orbiting and is moving away finally. We can use the following values:($S=2G/c^2=1.48*10^{-27}$, Earth mass=$5.9736*10^{24}$kg, Earth radius=6378km, Earth spinning angular velocity=$\pi/43200$(rad/sec), Moon orbiting period=27.5day, Angle θ=20 degree($\cos\theta$= 0.94), Moon's distance from Earth is 384399km). After we get the acceleration a, we can calculate the moving distance by using $S'=1/2at^2$(t=31536000sec=1 year). Because circumference and radius has a relation ($S'=2\pi*r'$), so $r'=S'/2\pi$. If the earth's spin angular momentum is actually rmv(derivation in the later chapter), then we get the new value 3.3cm which is very close to observed 3.8cm. Thus, the spinity formula

is correct.

$$GMm/r^2=mrw^2,$$
w=orbital angular velocity of the smaller object
$$SJmW/r^2=ma$$

The above formula doesn't disobey Kepler's third law of planetary motion: r^3/T^2=constant. Centripetal gravity balances centrifugal force due to planetary orbiting. It is because spinity is not providing centripetal force, but it provides force to maintain planets in the orbit. Spinity can solve many phenomenon observed in the universe. Spinity can explain the co-moving structure of spiral galaxies. It can well explain the ring formation in the rotating plane of huge planets in solar system such as Saturn or Jupiter. It can explain why the nine planets in our solar system are surrounding the Sun in the same direction and same plane. It can explain why the satellites in our solar system are surrounding the planets in the same direction and same plane except Triton of Neptune. Uranus has special characteristics with its 90∘ degree axis tilt. And, its ring and satellites are still rotating in Uranus's equator. It has been

postulated that an asteroid or comet hit Uranus and caused its axis tilt. Spinity can bring Uranus's ring and satellites to its new equator plane. Gravity cannot explain the phenomenon. In addition, angular velocity W is important due to the observation that small object orbital rotation is decreased when its orbital rotation angular velocity is greater than the angular velocity of the spinning central object. For example, the satellite-Phobos of Mars decelerates about 1.8m per century.

Nebula theory is the dominant theory of solar system formation. However, it faces a difficulty that Sun has only 2% angular momentum of the total solar system and Saturn and Jupiter have the greatest angular momentum in the solar system. Spinity can cause the angular momentum transfer from Sun to planets surrounding it. The Kepler's second law points out the conservation of angular momentum in the solar system, so our Sun rotates in a slow spin velocity and its spinity can be much less than that during the initial formation of solar system. Gravity always attracts smaller objects toward the center and it cannot explain

the rotation behavior around central object if only gravity exists. Spinity can explain the initial force causing the planets rotating around the Sun. After the spinity decreases to be much less than gravity, planets can still rotate around the Sun due to inertia. Because the current spinity generated by sun is really small, the second law of Kepler planetary movement is effective in our solar system. And, gravity can prevent the planets from escaping the solar system. However, the whole planetary movement equation should be:

$$GMm/r^2 + SJmW/r^2 = mrw^2 = ma$$

We can see this equation is an elliptical formula which matches our solar system. If we want to have a stable orbit movement and not a simple perfect circle, inverse square law is one of the only two possibilities. (Bertrand theorem $F(r) = -K/r^{3-\beta^2}, \beta = 1$ or 2 only). Thus, the planet movement is our solar system is following an elliptical path. However, since the spinity induced by sun is small, the planet movement path in our solar system is nearly a circle.

In addition, spinity can explain why protoplanetary disk

can be formed. Once the protostar like sun is formed and it started to spin to counteract inward gravity. The spinity of the protostar can cause the other interspace gas and rocks to rotate around it. Thus, a protoplanetary disk is formed. Then, planets are formed in the disk.

Spinity can explain why huge planets have planet rings in their equator planes such as Saturn, Jupiter, Uranus, and Neptune. Planet rings cannot be explained by gravity. Spinity can help to explain Mercury procession, Venus precession, Earth procession, and artificial satellite procession. Spinity can explain why most planets in solar system spin in the same direction as our Sun. When Sun and one certain Planet spin in the same direction, spinity from Sun and spinity from the planet is synergic. The net spinity will cause the planet to rotate around the sun. When Sun and one certain planet spin in the opposite direction, spinity from Sun and spinity from the planet is subtractive. Thus, the planets' orbiting around our Sun needs to overcome the spinity provided by the planet itself and it will take more energy to do that. Thus, most planets except

Venus spin in the same direction as our Sun. Because of spinity, the linear velocity of central spinning mass and peripheral orbiting mass will tend to be the same finally. Spinity is actually the frame-dragging effect caused by spacetime dragging due to central spin mass. This is the reason why spiral galaxy peripheral rotation velocity is equal to its central core velocity. Spinity can well explain many phenomenon in our home-Earth. Spinity can explain why earth's spinning velocity is decreasing because earth uses spinity to transmit angular momentum to our moon. Spinity can explain why retrograde satellites are more difficult to make than prograde satellites because retrograde satellites need to overcome the spinity of Earth. Flight from America to Japan takes longer time than flight from Japan to America, because retrograde flight needs to overcome our Earth's spinity. Some believe that this is due to an air flow called "Jet stream", a constant equatorial west-to-east flow. But, the formation of jet stream is actually due to earth's spinity. Spinity can explain why free falling object tends to move to east because earth has a west-to-east spinity.

Once Newton was asked that "why earth can orbit around the sun?" If there is only gravity, then all the planets will fall into the sun. Newton didn't know the answer. He said this is the God's first pushing force to let planets move around the sun. If spinity is correct, then it can perfectly explain planetary movement. Spinity will let the planets start to orbit the sun. Besides, it can accelerate the planets in the orbit to increase their orbiting velocity and subsequent centrifugal force. Once planet's centrifugal force is strong enough to balance sun's gravity, then the planet can maintain a homogenous status with a constant moving velocity. Spinnism is an absolute result of general relativity. Thus, many phenomenons such as Mercury precession can be explained. Spinity can also explain the reason of flyby satellites anomaly such as pioneer anomaly because spinity provides force to accelerate these spacecrafts which use orbiting as moving forces.

The second part of this section is to discuss linear frame dragging effect. This effect is due to the linear

momentum, and I call this new force: Impelity or Impulsity. (Derivation is in latter section)The impelity field formula is:

$$I = \frac{Smv}{r} = \frac{SP}{r}$$

The constant S is still spinity-impelity constant ($2G/c^2$). Impelity field direction is the same as linear velocity direction. This means when an object is moving in a constant momentum P, it will generate a linear frame dragging effect to let its nearby spacetime to move along with the object. If there is a smaller object nearby with a momentum p, this small object will suffer from an inbetween force to let it move along. The force is called impelity. The name impelity is derived from the term: impulse which is the linear momentum change.

$$Fi = \frac{SMVmv}{r^2} = \frac{SPp}{r^2} = \frac{SPm\omega}{r}$$

Linear frame dragging is also a determinative effect of general relativity and was predicted by Einstein. Here, I first propose its definite formula. If we view the small object's linear moving as never-endingly moving around the bigger object, the v is rω. We need to

transform speed into r*ω (omega is pseudoscalar) to maintain the impelity field direction. However, the linear frame dragging effect is a very fundamental effect as rotatory frame-dragging effect. It can be observed in our daily life. When you drive a small car in the superhighway, a huge truck drives and passes in your left side and you will feel a force to attract your small car. This will make your small car feel unstable. This is possible impelity.

Another example is the airplane's bird attack. Birds are flying very slowly with their tiny mass. However, bird attack usually causes a huge damage to airplane. It is because airplane has very high velocity and high momentum. Thus, the combined impelity between the bird and the airplane is very huge. If you throw a stone to a high speed train or high speed car in the super highway, it can also cause a severe damage. Another example is moon's orbiting. The moon is orbiting earth, but earth is also orbiting sun. When the earth is orbiting sun with mv momentum, it will let the moon within nearby spacetime also get impelity. Thus, moon will keep on accompanying our earth. The maximal

impelity field from earth is SMV/r, so the moon will acquire the same maximal linear velocity V from earth's orbiting velocity V causing spacetime moving with linear velocity V. This phenomenon can be seen in geosynchronous satellites. If there is no impelity, the geosynchronous satellites will easily lose. However, the geosynchronous satellites are the most popular and sable satellites. Moon will move along with earth is not simply due to sun's spinity, earth's spinity, sun's gravity, or mmon's centrifugal force. These effects are smaller than impelity from earth, and only impelity can explain why moon's linear velocity is the same as earth's orbiting velocity. These phenomenon all explain that there is impelity.

This is impelity.

If we combine spinity and impelity together, we can call it momentity. The name is derived from angular "momentum" and linear "momentum". This means that momentum can generate force. This is simply due to the special relativity effect of moving mass. The field direction of momentity is its vector direction.

References

1. B. Mashhoon, F. W. Hehl, and D. S. Thesis, General
   Relativity and Gravitation 16, 711 (1984)
2. L.D. Landau and E.M. Lifshitz, The Classical Theory of
   Fields (1975)

Gravitospinnism Maxwell equations

Gravitomomentism has the same characteristics as electromagnetism. In classical electromagnetism, Maxwell equations play the central roles. Maxwell equations clearly point out the relationships between electric field and magnetic field. I will check if gravity field and spinity field also have the same Maxwell-like equations. First of all, we need to define what spinity field is:

Spinity field

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

The direction of spinity field is the same as angular momentum direction of nearby huge mass.

Spinity force

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

By the definition, we can have a Lorentz force-like formula:

$$F = m(g + 1/2s\omega)$$

From the scalar potential E and vector potential A, we can give the Lorentz force-like formula as:

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

(V=orbit linear velocity of mass m)

Comparing the two formulas, we can get:

$$g = -\nabla\varphi - \frac{dA}{dt}$$

$$\frac{1}{2} * s * \omega = V * curlA$$

Thus,

$$s = 2r * curlA$$

We can use these two definitions to derive the possible gravitomomentism or gravitospinnism Maxwell-like equations:

First, gravity Gauss law:

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

(G=gravity constant, p=mass density)

This first equation has been derived previously by many researchers. Detail deduction is not provided here.

Second,momentiity Gauss law:

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

The reason for magnetism gauss law is zero (Div B=0) is because there is no magnetic monopole. However, the reason for momentity gauss law is zero (Div s=0) is because there is no momentity momopole and spinity is merely a moving effect of mass.

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We can also deduct is as below:

$$\text{Div } s = \text{Div}(2r * \text{curlA}) = 0$$

Third, gravitmomentity Faraday's law:

$$\text{Curl } g = \text{Curl}\left(-\nabla\varphi - \frac{dA}{dt}\right) = -d\left(\frac{\text{CurlA}}{dt}\right)$$

$$= -d\left(\frac{^{S}/_{2r}}{dt}\right) = \frac{1}{2dt}\left(\frac{ds * r - dr * s}{r^2}\right)$$

Fourth, gravitomomentity Ampere's law:

$$\text{Curl } s' = -uj + \left(\frac{2}{c^2}\right)\left(\frac{dg}{dt}\right) = \frac{r\nabla xs - \nabla rxs}{r^2}$$

$$\text{Curl } s = r * \left[-uj + \left(\frac{2}{c^2}\right)\left(\frac{dg}{dt}\right)\right] + \frac{\nabla rxs}{r}$$

(let S=u/4π, j=mass current density,
H*u=s'=SJ/r³,ε=2/uc²)

It is based on

$$\nabla * (\nabla xH) = -\nabla J + \frac{d\rho}{dt}$$

$$\nabla * (\nabla XH) = \nabla * \left(-J + \frac{dD}{dt}\right)$$

We can also apply this to the gravity-impelity relationship. From the above deduction, we can there is no Maxwell-like equations in gravitomomentitsm. At least, there is no beautiful linear form Maxwell-like equation. Thus, the direct linear relation of spinity and gravity is not likely.

Thus, the linear gravitomomentism Maxell equations are:
F=m(g+1/2sω)
Div g=-4πGρ

Div s=0

About gravitational wave

Maxwell used the propagation of electric field and magnetic field to derive the electromagnetic wave: light. Light is ELectric Wave Crossing MAgnetism. Since there is also interaction between gravity field and impelity field, I am curious if there is gravitomomentity wave. Einstein was also curious if there is gravity wave. Here, I will discuss this issue here.

Gravity field is:

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

Spinity field is:

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

However, gravitomomentity Maxwell-like equations should be rewritten for free space since there is no source of mass. These equations become:

$$\text{Div } g = \nabla * g = 0$$

$$\text{Curl } g = \nabla \text{xg} = \frac{1}{2dt}\left(\frac{ds * r - dr * s}{r^2}\right)$$

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

$$\text{Curl } s = \nabla \text{xs} = r * \left[-uj + \left(\frac{2}{c^2}\right)\left(\frac{dg}{dt}\right)\right] + \frac{\nabla rxs}{r}$$

Thus, we can derive the gravitomomentity wave from the free space Maxwell-like equations:

$$\nabla \text{x}(\nabla \text{xA}) = \nabla(\nabla * A) - \nabla^2 A$$

$$\nabla \text{x}(\nabla \text{xg}) = \nabla \text{x}\left(\frac{1}{2dt}\left(\frac{ds * r - dr * s}{r^2}\right)\right)$$

$$\nabla \text{x}(\nabla \text{xg}) = \nabla(\nabla * g) - \nabla^2 g = -\nabla^2 g$$

We know wave equation is:

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

The electromagnetic wave equations are:

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

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

Since the gravitomomentism equations are not linear, we cannot deduct light wave equation from these non-linear equations. It seems that there is no gravitoimpelity wave saying that gravity/impelity field is amplitude. In addition, we need to consider the energy density of the possible gravity wave. If there is gravity wave propagating in spacetime without any medium. The gravity wave will need a transmission particle called graviton. Graviton which is proposed as a spin-2 particle is never observed in nature. This is based on the second rank of energy-momentum tensor. However, electromagnetism is closely related to photon which is spin-1 particle. It is due to electromagnetic four current is first rank tensor. Here, I propose that gravity wave is actually light, too. The photon is spin-1 particle because the four energy-momentum tensor (E, P_xC, P_yC, P_zC) is also a first rank tensor. It is misled that graviton is spin2 boson because the 4x4 energy-momentum-stress curvature matrix. We should be aware that electromagnetic faraday torsion tensor is also 4x4 matrix. The four current or four energy-momentum tensor is actually the source of electromagnetism or gravitomomentism. The 4x4

matrix is actually the effect of force on spacetime. We should not mislead. Besides, massless photon can mediates electromagnetism as well as gravity in infinite range. Electromagnetic wave has Lorenz gauge:

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

The gravitational wave has also a Lorenz gauge:

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

We can see the similarity. The F means electric field or magnetic field from a 4x4 tensor. And, h can be viewed as stress terms also from a 4x4 tensor. However, these are not the actual source. The source is first rank 4 current or 4 energy-momentum.

Gravity wave means that an acceleration in spacetime will emit radiation wave propagating in spacetime. We know the Unruh-Hawking relation: T=ah'/2πck. Thus, acceleration a directly causes temperature T. The temperature T will cause radiation KT^4(Stefan's law). Thus, it fulfills the definition of gravity wave that an acceleration causes a radiation wave. Thus, light itself is also gravity wave. It can explain why gravity is transmitted in lightspeed.

Based on the book: Gravitation, the wave equation of gravitational wave is actually indistinguishable from the wave equation of electromagnetic wave. The wave equation of gravitational wave is:

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

The wave equation of electromagnetic wave is:

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

Besides,

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

The two wave equations are indistinguishable! That means the two waves are the same.

It is worth noting that gravity is caused by mass energy mc^2. Thus, the energy causes spacetime curvature. Light is also an energy. Thus, light has effective mass. The momentum of photon is E/c=hf/c. Thus, the frequency of photon is closely related to mass. In addition, the amplitude of photon is closely related to charge. I will discuss this in the later chapter.

Light is a plane wave, and it can be expressed as:

$$A(x, t) = A_0 \cos(\omega t - kx)$$

We differential the above equation by t and get:
$$V(x, t) = -A_0\, \omega\sin(\omega t - kx)$$
We differential it again by t and get:
$$a(x, t) = -A_0\, \omega^2\cos(\omega t - kx)$$
If the wave is moving a full wavelength 2π, the above equation can reduce to:
$$a(x, t) = -A_0\omega^2$$
This means the light wave is a simple harmonic oscillation wave. Since acceleration can be equal to gravity field, we can introduce the gravity field formula from gravitational energy density to see if there is a constant maximal amplitude A_0 to see if light is gravity wave.

Gravity wave and electromagnetic wave are both light(photon). The definition of gravity wave is that it can carry gravity field. Thus, light can also carry gravity field. We know the gravity plus momentity energy density is:
$$E = \frac{-g^2}{8\pi G} * 2$$
If a light has energy E=hf, its energy density is:

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

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

We combine the above two formula, and get.

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

Since the first term of the right side is planck length, we can re-write the formula as:

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

The gravity field carried by photon is in direct proportion to the square of its angular frequency. And, the displacement of oscillation is a constant called planck length. When a light is moving through spacetime, it will cause the smallest unit of spacetime(the medium) to oscillate in angular frequency ω. This oscillation causes acceleration which is gravity field. Thus, light does have gravity field. It can explain why light can be attracted by a huge mass such as black hole or star or super moon because of mutual gravity force.

We also know that spinity/impelity field s=2g/ω. Thus,

light can also carry spinity/impelity field as:

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

Thus, the spinity/impelity carried by photon is in direct proportion to its angular frequency with a constant: planck length. Thus, a photon can carry four fields including electric field, magnetic field, gravity field, and momentity(spinity/impelity) field.

Thus, light has transverse component (electromagnetism) and longitudinal component (gravitomometism). In addition, we can derive the pressure for gravitation light wave oscillation. The formula:

$$S(x, t) = S_0 \cos(\omega t - kx)$$

We differential it by dX,

$$dS(x, t)/dX = -kS_0 \sin(\omega t - kx)$$

Since this is simple harmonic oscillation, Hooke's law and Young module formula will be fulfilled.

$$F = -kX = \left(\frac{-EA}{L_0}\right)\Delta L$$

Thus,

$$\text{Pressure P} = \frac{E * \Delta L}{L_0} = \frac{E * dS}{dX}$$

(E is Young's modulus)

Thus, we can acquire pressure is the wave function. The pressure causes the unit space oscillation. Thus, we can get the form as acoustic wave equation:

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

This is the longitudinal component of light wave. (v=c for light) We will first derive the wave velocity of this equation. By Friedmann's equation with dark energy dominant universe (gamma=1) and acoustic/pressure wave-like equation:

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

And,

$$P = \rho c^2$$

(ρ is the mass density)

Thus, the light gravitational wave velocity is equal to lightspeed c. We can also derive the maximal pressure of this formula. We know the momentum density of light wave is S/c^2 and momentum = mass *velocity.

Thus, the mass density for light wave is S/v*c².

$$P = ESk = \rho c^2 l_p \omega / c$$

And,

$$v = l_p * \omega$$

Thus,

$$P = \rho c v$$

Because light wave is passing through the unit space without reflection, we need to use absorbing radiation pressure here. We put it into above formula and we get:(S=ponyting vector)

$$Pabs = \frac{S}{c} = \frac{ExB}{c}$$

Thus, I get the absorbing gravitational light pressure which is the same as radiation pressure of electromagnetism. This absorbing radiation pressure for unit space is related to electric and magnetic field.

Here, I need to explain that light wave needs amplitude (electromagnetism) and frequency(gravitomomentism) to be completed. Thus, rest charge or constant moving charge cannot generate radiation (electromagnetic wave). Acceleration(gravity field) is the strict requirement for EM radiation. We know the the

radiative electric field causing Larmor formula:

$$E_\theta = \frac{q * a_\pm}{4\pi\varepsilon c^2 R}$$

Remember that the acceleration a needs to perpendicular the coulomb field produced by q. Thus, for a light wave, it is also needed to fulfill this requirement. If the unit space acceleration is the same as light wave propagation direction. The above formula can be achieved. The unit space maximal displacement is Planck length.

The rigid requirement of acceleration for electromagnetic wave can be thought as the following. Electromagnetic wave is caused by time varied electric field and time varied magnetic field. If we first differential electric field treated as amplitude(distance) by time t, that makes a velocity term which is magnetic field. If we need to make back the electric field, we need to differential the magnetic field again with time t which makes the acceleration term. Then, it will go on and on to become a periodic cycle. Thus, an electromagnetic wave can be formed. The acceleration for electromagnetic wave must fulfill:

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

That is this perpendicular acceleration is in direct proportional to the square of wave angular velocity. So, frequency provides the acceleration for electromagnetic wave. And A_0 is the Planck length due to the simple harmonic oscillation longitudinal light wave.

In addition, the space has a smallest unit. It should be quantized. In a famous Zeno paradox: if a turtle is 100 meters ahead of Achilles. When Achilles moves 100 meter, and the turtle can only moves 10 meters. But, when Achilles moves 100 meter, the turtle again moves 10 meters. When Achilles moves 10 meters again, the turtle again moves 1 meter. Thus, Achilles never catches the turtle. This didn't really happen in real world. The underlying principle of Zeno paradox is spacetime should be continuity which can be divided infinitely. However, since Zeno paradox never happens, it means that our space should be discontinuity. Its smallest length(unit length) is planck length. We can view spacetime as build by small boxes(pixel or grid). But, in large scale such as galaxy, the spacetime will

appear smooth and continuity to allow the validity of general relativity. Based on the above light-gravity formula, we know planck length is the smallest oscillation unit. If time or space can be divided infinitely, then light can be stopped or variable which disobey constant lightspeed. In addition, we know uncertainty principle is $Et \geq 1/2h'$ and $Px \geq 1/2h'$. If the time t or space x is infinite small, then the energy or momentum will be infinite large. This disobeys physic principles. Thus, spacetime should be quantized. Since planck length is the smallest unit of spacetime, we cannot use light pressure or Casimir force to calculate the zero point energy for this spacetime unit. Even in absolute zero, this unit has smallest energy $E=1/2h'w$ which allows the unit to oscillate in angular frequency w. This solves why current calculation for zero point energy from Casimir effect is much larger than experimental observations. Since oscillation frequency is in inverse proportion to time, the origin of time can be due to space (planck volume) oscillation. The derivation of minimal possible planck length is from the inequality of Schwartzchild radius and fermion radius in the chapter: beginning of universe.

What is time? It is still a confusing question. Einstein put time as the fourth dimension of the united spacetime. However, we still cannot understand what the actual fourth dimension of united spacetime is. Based on the above theory, time is actually the inverse of oscillation frequency of planck volume. The simple harmonic oscillation of the unit space decides the physical characteristics of time. Because time is due to space oscillation, time should be put as the fourth dimension of spacetime. In the early universe with maximal possible planck frequency from planck energy, the unit space oscillation is very frequent. The frequency is largest and the time is the shortest. The shortest time period is called planck time in the beginning epoch. It is due the the maximal photon energy passing the small early universe space with the huge photon frequency. As the universe expand, the universe background temperature decreases with the decreasing photon frequency. Thus, the time period which is inverse to frequency is prolonged. Thus, time is depended by light. When the total light density in our universe decreases to near absolute temperature

zero, the time will prolong to near maximal which will be decided only by the baseline oscillation frequency from the very small zero point energy. Thus, if we know the zero point frequency, we can know the maximal time period of our final universe. Time is not a psychological or phantom phenomenon. It is due to the unit space vibration surrounding of us. This decided the metabolism rate of bio-organism. We cannot directly observe the unit space oscillation frequency, so we use rhythmic watch, orbiting moon, or orbiting earth to link the periodic oscillation to the actual universe time: unit space oscillation. However, the earth orbiting sun may not totally reflect the prolonging unit space oscillation. Thus, the life expectancy counting as earth years will be prolonged as our real universe unit space oscillation time prolonged. The passing photon frequency causing unit space oscillation decides time. If we can travel as lighspeed, we won't be able to detect the time/frequency change of surrounding space due to the passing light (time cease). Thus, it is the reason of Einstein's time dilation phenomenon derived from special relativity.

Due to Zeno's paradox, we can also know that time also has smallest unit. Because time itself is the inverse of Planck space oscillation, Planck length is the smallest unit. And, unit space and unit time are integrated(spacetime discontinuity). Thus, the Planck time (Lp/c) is the smallest possible time unit when the light travels through the Planck length. The Planck time is also the inverse of Planck frequency(1/Fp) which is the maximal possible frequency in the early universe. Because both space and time have smallest units, the Zeno paradox can be solved.

Finally, we know that space is not ether filling jelly. Then, how can spacetime forms a curvature due to mass or forms a torsion due to charge(discussed in later chapter). I think it is also related to the unit space-Planck volume(Planck cells). The arrangement of these smallest building blocks causes the global curvature or torsion. Thus, there is no ether. But, the assembly of these Planck cells makes the spacetime curvature or torsion. When the photon reaches the peripheral of universe, it cannot be absorbed any more. Thus, there will be reflecting pressure

Pref=2hf/c. If this hf is larger than zero point energy 1/2h'w, a new Planck cell will be generated. That is the reason for space expansion.

Origin of inertia

We can examine the relationship between universal gravitation and universal momentism. I think gravity and momentism should be called gravitomomentism like electromagnetism. I propose: rest mass causes gravity, moving mass causes momentism; rest charge causes electricity, moving charge causes magnetism. Since magnetism is the effect of moving charge, I don't think there is magnetic monopole. We can examine these four fundamental force formulas:

Electricity:
$$Fe = \frac{KQq}{r^2} = \left(\frac{\mu}{4\pi}\right)\frac{qcQc}{r^2}$$

Magnetism:
$$Fm = qvB = qv * \left(\frac{\mu}{4\pi}\right)\frac{QV}{r^2}$$

Spinnism:
$$Fs = \frac{SJ\omega m}{r^2} = \left(\frac{2G}{c^2}\right)\frac{J\omega m}{r^2}$$

Impellism:

$$Fi = \frac{SPmv}{r^2} = \left(\frac{2G}{c^2}\right)\frac{Pmv}{r^2}$$

Gravity:

$$Fg = \frac{GMm}{r^2} = \left(\frac{2G}{c^2}\right)\frac{\frac{1}{2}Mc^2 * m}{r^2}$$

Thus, we can see the origin of spinnism is central mass's spin angular momentum. The origin of impellism is the object's linear momentum. The origin of gravity is central mass's half rest energy $1/2mc^2$. The whirlpool (transmission) velocity for electromagnetism fiield is c or V. Because of the interaction of gravity and momentism, they should have the same permeability constant like electromagnetism. We let the spinity-impelity permeability constant is μ_0:

$$S = \frac{2G}{c^2} = \frac{\mu}{4\pi}$$

Introduce this new constant into above formulas, we can see gravity and spinnism have similar force equations like electricity and magnetism. I assume that half of the rest mass energy is for gravitational energy

and another half of the rest mass energy is for rotational (spin) energy. We know the rotational energy is:

$$E = \frac{1}{2}I\omega^2 = \frac{1}{2}J\omega$$

If a spinning sphere such as proton or electron is spinning in lightspeed c and the spin angular momentum is J=rmv, then

$$E = \frac{1}{2}J\omega = \frac{1}{2}r\omega mv = \frac{1}{2}mv^2 = \frac{1}{2}mc^2$$

Thus, it fulfils my assumption.

Here, I will deduct why spin angular momentum is rmv for a solid sphere. The definition of angular momentum is rxp. We can treat a solid sphere as a combination of multiple layers of circles. Thus, sphere angular momentum is:

$$\int d(r_i x p_i) = \int dr \text{ x } mv + \int r \text{ x } dmv$$

Because the vector direction dr is the same as the vector direction of v in the circle, the first part of the above formula is zero.

$$\int d(r_i x p_i) = \int r \text{ x } dmv = \int r \text{ x } mdv + \int r \text{ x } vdm$$

Because the vector direction r is the same as the vector direction of dv in any given circle, the first part of the above formula is also zero. There is no cross product.

$$\int d(r_i x p_i) = \int r \, x \, v dm = R \, x \, V \int dm = R \, x \, MV$$

If particle's spin linear velocity is greater than lightspeed, it will disobey Einstein's special relativity. Thus, lightspeed c is the maximal possible spin linear velocity. Why is there spin? I think this is due to the gravity induced by mass. In nature, quarks, electrons, neutrons, protons, planets, stars, and galactic centers are all spinning. In basic particles, spinning is the result of angular momentum conservation during pair production. In large masses, automatic spin can generate centrifugal force to counterbalance the inward gravity by the mass. It also points out the close relation between gravity and spinnism.

I think spinity constant $S=2G/c^2$ is a more fundamental constant than gravity constant G. And, we let $S=2G/c^2=\mu/4\pi$ and introduce it into Einstein's general relativity:

$$Guv = \frac{8\pi G}{c^4} Tuv$$

We get:

$$\text{Guv} = \frac{\mu}{c^2}\text{Tuv}$$

Which is more simple and fundamental!
Newton found an iNertia Enabled Weight Toward
Other's iNertia and started a New Time Of Nature.
Newton's first law of motion is inertia law: rest mass
remains at rest, and moving mass remains at moving in
constant speed without extra-force. Galileo first
proposed this idea after his observation: Gravity
Acceleration Law Induces Landing Equally Objects. We
can consider the origin of inertia more deeply. Energy
conservation can explain why moving mass remains at
moving in constant speed. When there is no extra
force, a moving object will keep its velocity as a
constant V since there is no acceleration. This object
will keep on having constant energy $1/2mv^2$ due to
energy conservation. Thus, it will move forever at
constant speed V. Then, why rest mass will remains at
rest? It will need the concept of general relativity.
Inertial mass is equal to gravitational mass. According
to Einstein, mass can causes spacetime curvature. It is
like when we put an iron ball onto a water bed, there

will be a dent in this water bed. This curvature induced by mass can wrap the mass and limit its motion. That is the origin of inertia. When the object's mass is larger, it will cause more severe spacetime curvature. This curvature will further limit the object's movement. Thus, mass decides inertia.

Previous scholars used Mach principle or electromagnetism to explain inertia. Mach principle is mass there, inertia here. He thought a certain mass's inertia is decided by all other objects' gravity in our whole universe. However, every object is moving and changing the mutual distance. If Mach principle is correct, then the inertia will be changeable and not be solely decided by this object's mass. Thus, Mach principle is wrong. Some others used electromagnetism's zero point field to explain inertia. However, charge is charge and mass is mass. Charge causes spacetime vortex which won't limit the charge's movement. Thus, it is wrong to use electromagnetism to explain inertia. I think inertia is decided by the half of rest mass energy: $1/2mc^2$. When a mass is located in spacetime, there is upper half and lower half of this mass. Only the lower half induced by the half of the

mass's rest mass energy curves the spacetime and wrap the object. That is why only $1/2mc^2$ counts for gravitational energy.

In addition, since the spin angular momentum is the origin of spinity, the maximal transmission velocity of spinity should be equal to the maximal spin linear velocity of central mass. And, if spinning or linear moving is the origin of magnetism from charge, the maximal transmission velocity of magnetism should be equal to spin linear or linear moving velocity of the charge. Besides, the transmission velocity of gravity and Coulomb's electricity should be lightspeed.

The above explanation explains why rest object will remain at rest. Then, I will explain why moving object will remain moving at a constant speed without external force. We know the impelity field is i=SP/r. If an object is moving at constant momentum P, then it will drag nearby spacetime to move along with its impelity field. Thus, the nearby spacetime is also moving forward. If the spacetime is moving forward, the object within it will also move forward. If the object moves forward again, it will again let its nearby

spacetime move forward again. It is a positive feedback. Thus, this object will keep on moving at constant momentum. Thus, we say linear momentum is the moving inertia if the object is moving linearly. In the latter paragraph, I also show that there is symmetry between space and momentum. The impelity linear frame-dragging effect is the reason of conservation of momentum. This can also be applied to rotation. If the object is rotating in a constant angular momentum J, then it will generate a spinity field $s=SJ/r^2$. It means it will drag nearby spacetime to rotate along with it. If the nearby spacetime is rotating due to the object's angular momentum, the object within this local spacetime will also rotate. If the object rotates again, it will drag its nearby spacetime to rotate again. It is also a positive feedback. I also show the symmetry between angular momentum and angle. This is the reason of conservation of angular momentum. The spinity frame-dragging effect is the reason of rotatory inertia. Angular momentum is the rotatary inetia if the object is rotating. Thus, both spinning object and orbiting object will produce rotating frame dragging effect. For example, the

Uranus is not only orbiting our sun but also orbiting the orbit of Jupiter. This also makes all eight planets of sun in the same plane. Historically, I can this force spinity. But, rotatity might be a better term for it by definition. Thus, this is why moving object will remain moving at constant velocity. This solves the longtime puzzle of law of inertia.

If the impelity field is SMV/r, then the surrounding spacetime has linear velocity V to move along with the larger momentum object. The impelity will let nearby smaller object to move along with the bigger object until the smaller object has maximal linear velocity V(spacetime's linear velocity). If the smaller object's orginal linear velocity is larger than impelity field velocity V. The smaller object will decelerate until it matches the spacetime linear velocity V. So does spinity. If the spinity field is $SMRV/r^2$, the surrounding spacetime will also have a linear rotational velocity V. It will let orbiting smaller object to accelerate or decelerate until it matches spacetime's linear rotational velocity V. When the system reaches equilibrium, the smaller object's velocity v will be equal to the larger object's velocity V. The velocity V is

also the transmission velocity of spinity or impelity.

We can see the four velocity is:
$U=\gamma(c,V_x,V_y,V_z)=\gamma(c,V)$
And, the four momentum and four current is:
$P=\gamma(E/c,P_x,P_y,P_z)=\gamma(mc,mV_x,mV_y,mV_z)=\gamma m(c,V)$
$J=\gamma\rho(c,V_x,V_y,V_z)=\gamma\rho(c,V)$
For a rest frame, $\gamma=1$ and $V=0$, so we will get $U=(c,0)$. Thus, we will view the rest mass or rest charge object is moving through spacetime at the speed of light. Thus, the transmission velocity of Coulomb electrostatic force and Newton gravity(gravitostatic force) is lightspeed c. The first component c of $U=(c,V)$ stands for the rest frame velocity. However, in electrodynamics(magnetism) or gravitodynamics(spinity or impelity), the second component V stands for the moving frame velocity. Thus, magnetism, spinity, and impelity are transmitted in velocity V.

We can also look at the four force. The formula is:
$F=mA=\gamma(f*u/c,f)=\gamma(dE/cdt,dP/dt)=\gamma(d\gamma mc/dt,d\gamma mV/dt)$
Compared to force formula:

$F=dP/dt=d\, d\gamma mV/dt$

We can see in the rest frame, the transmission velocity of force is lightspeed c. This is true for gravity and Coulomb electrostatic force. However, in the moving frame, the transmission velocity of force is V. This is true for momentity and magnetism.

Here, I propose light refraction is closely related to the effect of general relativity. When photon goes through a medium, it deflects due to the mass density of the medium. From general relativity, the deflection angle is $4Gm/rc^2$. In refraction, there is Gladstone-Dale relation :(n-1)/d=constant. n is refractive index, and d is mass density. We know the linear mass density is m/r. In addition, temperature also affects refraction. The effect of temperature on refraction is opposite to the mass. This can be explained by universal lightity which is repulsive dark energy.

Rest mass causes gravity, moving mass causes momentism; rest charge causes electricity, moving charge causes magnetism. Here, I will prove momentism and magnetism are simply the special

relativity moving effect of mass and charge respectively. Thus, there is no magnetic monopole.

First, I will derive electromagnetism Lorenz force:

$$\frac{dP^1}{dt} = qU_\beta F^{1\beta} = q(U_0 F^{10} + U_1 F^{11} + U_2 F^{12} + U_3 F^{13})$$

Substituting the components of the covariant electromagnetic tensor F:

$$\frac{dP^1}{dt} = q\left[U_0\left(\frac{-E_x}{c}\right) + U_2(Bz) + U_3(-B_y)\right]$$

Using the component of covariant four velocity yields:

$$\frac{dP^1}{dt} = q\gamma\left[-\left(\frac{-E_x}{c}\right) + V_y B_z + V_z(-B_y)\right]$$
$$= q\gamma(E_x + V_y B_z - V_z B_y)$$
$$= q\gamma[E_x + (VxB)x]$$

Finally, we get Lorenz force:

$$\frac{dP}{dt} = q\gamma(E + vxB)$$

Based on Dr. French AP's derivation, we can get force transformation between reference S (x,y,z) and reference S' (x',y',z'). Reference S includes relative moving charges and reference S' includes relative static charges.

$$x = \gamma(x' + vt')$$
$$y = y'$$
$$z = z'$$
$$t = \gamma\left(t' + \frac{vx'}{c^2}\right)$$

When charge q1 is moving at V velocity (along x axis) and charge q2 is moving at W velocity and same direction (along x axis), then:

$$W' = \frac{W - V}{1 - \dfrac{V * W}{c^2}} = \frac{dx'}{dt'}$$

And momentum Py'=Py, then the force between q1 and q2 is Fy. The two charges have the same charge q:

$$Fy = \frac{dPy}{dt} = \frac{\dfrac{dPy}{dt'}}{\dfrac{dt}{dt'}} = \frac{\dfrac{dPy'}{dt'}}{\gamma\left(1 + \dfrac{Vdx'}{c^2dt'}\right)}$$

$$= \frac{\dfrac{Fy'}{\gamma}}{1 + \dfrac{V}{c^2}\left(\dfrac{w - v}{1 - \dfrac{V * W}{c^2}}\right)}$$

$$= \gamma Fy'\left(1 - \frac{V * W}{c^2}\right)$$

Since Fy'=Kq^2/r^2, we can compare this result to previous Lorenz equation. We can see the term V*W/c^2 arises during the relative movement between the two charges. This is the magnetic force. Thus, we can see magnetic force is merely the special relativity moving effect of charges. Similarly, when we consider two moving mass, we can also get:

$$Fy = \gamma Fy'\left(1 - \frac{V * W}{c^2}\right)$$

Here, Fy'=GMm/r^2. We can also find out that impelity is rised by the special relativity moving effect of two masses. If we use the gravitomonentity Lorenz force by simply using relativistic mass Ym and adjusting with factor 1/2(S=2G/c^2), we can get Fy= Ym(g+1/2s*ω). Thus, we can get the impelity formula. This is the derivation of impelity force formula. Thus, we can say momentity and magnetism are just the moving effect of mass and charge, respectively.

We can also derive impelity from the formula in the beginning of this book. The vector is:

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

Considering two objects are moving along linearly in a

distance, it can view as a small object is receiving an orbital angular momentum of the larger object. Thus, J=rmv. Then the vector becomes(vector g direction=V):

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

Then, the Langragian is :

$$L' = mc * g * v = \left(\frac{2G}{c^2}\right)\frac{MVmv}{r} = \frac{SPp}{r}$$

Thus, the impelity force is(L=F*r):

$$F = \frac{SPp}{r^2}$$

Force direction is equal to vector g direction. Here the smaller object has scalar speed v, and it is not a vector velocity. Impelity force might also be derived! The impelity potential is likely:

$$U = SP * \ln(r)$$

The field of impelity is likely:

$$Fi = \frac{SP}{r}$$

The spinity potential is:

$$U = \frac{SJ}{r}$$

The spinity field is:

$$Fs = \frac{SJxr'}{r^2}$$

Principle of flight

Despite of the invention of airplane, the underlying of flight mechanism is still unknown. Many scientists believe that Bernoulli's law is the principle of flight. However, Bernoulli's law cannot explain why all aircrafts need propellers or even jet engines for flight. Wright brothers first introduced the propellers (rotational fans) to invent the first aircraft successfully. From helicopter to airplane, all aircrafts need vortex (propellers or vortex jet engine) for flight. Here, I will explain why vortex is important in flight. Actually, vortex is the principle of flight.

Spinning plays a key role in flight. Inertia principle means rest objects tend to remain at rest. Mass is the reason of inertia. We can put a small object in a gravity field. In a gravity field induced by outside mass M, a gravitational potential:(M=mass, r=distance between center of gravity source and small object)

$$\Phi = \frac{GM}{r}$$

This gravitational potential of a mass will cause a spacetime curvature which can "fix" this mass in spacetime. This is the origin of inertia principle. It is like to put an iron ball on the water bed. There will be a "dent" of the water bed to fit this iron ball. When the small object is spinning, it will generate another potential to counterbalance the gravitational potential from the outside gravity field. It is because gravity is an inward force, and centrifugal force is an outward force. The centrifugal potential is: (spinning direction is vertical to small object radius R, ω=spin angular speed)

$$\Phi = -\frac{1}{2}\omega^2 R^2$$

Combine these two potentials, we get:

$$net\ \Phi = \frac{GM}{r} - \frac{1}{2}\omega^2 R^2$$

If we multiple small mass m and differential the above equation by r or R, we can get the net force=gravity-centrifugal force:

$$net\ force = \frac{GMm}{r^2} - m\omega^2 R$$

From the above formula, we can see the net potential is depending on the radius and rotational velocity of the object. If we multiple the formula with m (small object mass) to get the net potential energy, we can get $E=GMm/r-1/2mV^2$. We can see the similar equation in the effective potential with potential-kinetic energy transformation :$(E=GMm/r-1/2mV^2)$. If the radius (such as fan radius) is long and the rotational velocity is high, the net potential can be negative. It means there will not be a downward "dent" but an upward convex of spacetime. That is to say the small object to have a "negative mass-like" due to spinining. This negative mass causes a negative gravity-like to counterbalance the gravity field.($\pm GMm/r$) Thus, this object can then fly! An experiment was done by Dr. Eugene Podkletnov. He found that gravity directly on a rotational disk will decreased compared to normal one. This is called Podkletnov effect. This doesn't disobey general relativity's positive mass theorem in a solitary system. This interacting system causes an anti-gravity flight behavior. This is the principle of flight. That is why flying objects need spin structure.

The centrifugal potential can be only applied to the spinning mass itself, not the surrounding spacetime. All flight machines are related to spin such as jet vortex engine or helicopter's rotating wing. Magnus lifting force was long observed during golf or tennis ball spinning. Because centrifugal force is an out-expanding force and it can cancel the effect of inner-shrinking gravity, the net effective mass of a substance will be decreased by its spinning. Flying is the phenomenon to resist the gravity effect. Centrifugal force is actually the anti-gravity Magnus force. Thus, a spinning object can usually fly. I am curious if centrifugal force can cause the flattening of space-time. Further mathematical deduction or laboratory observation will solve this puzzle. This concept is important!

Universal lightity

Dark energy

Dark energy is a mystery in current cosmological research. Professor Albert Einstein originally thought the universe is static. Thus, he added a cosmological constant in his universe equation to prevent the collapse due to gravity produced by mass in universe. However, due to Professor Hubble's observation, our universe is actually expending. Based on his observation, he obtained a physic law called Hubble's law:

v=H*R (H=Hubble constant, v=recession velocity, R=comoving proper distance).

Currently, we still don't know what the reason to cause universe expansion is. A term: dark energy is given to explain the universe expansion. Dark energy is still a puzzle in Astronomy.

Radiation pressure is originally derived from Professor James Clerk Maxwell. It was derived from the momentum change of light. The formula of radiation pressure is:

$$P = \frac{\sigma T^4}{c}$$

(Rho=Stefan-Boltzmann constant=$5.67*10^{-8}$ JS^{-1}m^{-2}K^{-4}; T=absolute temperature; c=lightspeed)

The basic concept for deriving the formula is from the momentum of light: p'=E/c. When light is arriving on the surface of substance, it will cause momentum change. Thus, radiation pressure is resulted. The radiation pressure from Sun to Earth is 4.6uPa. It is a very tiny amount compared to the gravity from Sun to Earth. It can almost be neglected compared to gravity. However, we propose here that radiation also causes pressure on space-time dimension. And, due to the high temperature of all stars of universe and the fourth magnitude of radiation pressure(~T^4), radiation pressure exceeds gravity and plays a dominant role in

universe expansion. Due to the T^4 magnitude, our universe is expanding acceleratedly. Radiation pressure has greater impact on space-time dimension than gravity. Gravity is a force to cause space-time distortion. It is not a pure inward force to cause space-time contraction. Thus, we don't need to balance gravity with radiation pressure. We believe that radiation pressure is actually the dark energy.

Mach's principle pointed out there is no absolute time and space. Substance in space-time will affect the surrounding space-time. Einstein was inspired by Mach's principle and developed general relativity. There must be an outward force to cause universe expansion. Radiation pressure is the best candidate. The other fundamental forces cannot account for the large dimensional universe expansion. Strong force and weak force are mediated from particles and only work in a very short range inside the atom. Electromagnetism can be transmitted from a long distance. However, almost all the large substances are neutralized in electricity in our universe. Electrostatic force is from rest charges and magnetic force is from

moving and spinning charges. However, when there is no net charge in stars or planets, there is no electromagnetism. Thus, electromagnetism cannot be the cause of universe expansion. Radiation (Heat and Light) becomes the best candidate of the force of dark energy.

Due to the second law of thermodynamics, heat has a very close relationship with time. Entropy is always increasing from high temperature to low temperature to achieve the maximal magnitude of randomness when time is moving ahead. In addition, lightspeed is very important in space and time due to relativity. Radiation wave can cause entropy increase, and convergent wave can cause entropy decrease. Thus, we think heat and light play dominant roles in our four dimensional universe. The heat's moving arrow is very correlated with the space-time moving arrow (universe expansion arrow or cosmological arrow). It means that heat and light decides the moving of space-time. Radiation pressure is actually from heat and light. Thus, heat and light can cause space-time movement due to the mediation of radiation pressure. Radiation is

from the central substance and radiating to all the outward direction. Thus, radiation from stars or from galaxy can expend the space-time outwardly and evenly in every direction. It is very important to synchronize all the time arrows in universe. All the time arrows must be the same and have only one meaning. If radiation pressure is dark energy, then entropy arrow=radiation wave arrow=cosmological universe expansion arrow=time arrow=causal arrow. Thus, there is no contradicts in these time arrows. They can be well synchronized. Only when dark energy is radiation pressure, all the time arrows can be synchronized. Thus, radiation pressure is the best candidate of dark energy. It is also important to know that universe will cease to expand if the whole universe reaches heat death (maximal entropy). In addition, universe won't contract when it reaches heat death because radiation wave won't become convergent wave to let universe contraction and to let time arrow fly back. This concept is very important. It means that the time arrow won't be reversed to disobey the causal-effect relationship.

In order to test if radiation pressure is the dark energy, we tried to derive Hubble's law from radiation pressure. We found that Hubble's law can be derived from assuming radiation pressure is dark energy. Below is our deduction:

In this deduction, we need to assume that observable universe is the actual universe. We can imagine this from the following example. When a light is emitted from our solar system to the actual universe boundary to cause universe expansion, the time it spends is the same as a light emitted from the observable universe boundary to travel to our solar system. Thus, observable universe is the actual universe. The volume of observable universe is given by Hubble volume:

(Hubble length)

$$L = \frac{CR}{V}$$

(Hubble Volume)

$$v = \frac{C^3 R^3}{V^3}$$

(C=lightspeed, R=distance, V=universe expansion

velocity)

There is a relation between temperature and acceleration called Uuruh effect：

$$T = \frac{ah'}{2\pi kc} = \frac{ch'}{2\pi kL}$$

L is Hubble length. Thus, T is in direct proportion to V/R

Second, we assume the whole universe is a close system. Based on the conservation of energy, the total energy of the universe is constant.

Radiation pressure $P = \dfrac{\sigma T^4}{c}$

Total energy：total $E = P * v = \dfrac{\sigma T^4}{C} * v = constant$

Because Hubble volume: $v=C^3R^3/V^3$ and T is proportional to V/R

$$total\ E = \left(\frac{KV^4}{CR^4}\right) * \left(\frac{C^3R^3}{V^3}\right) = constant$$

Total energy: Total $E=KVC^2/R=constant$

Because K, C are constant

V is in direct proportion to R

Thus, we obtain Hubble's law：V＝H・R (H：Hubble

constant)

Because our universe is expanding acceleratedly, universal lightity should also explain this phenomenon. We will introduce Unruh-Hawking effect here:

$$T = \frac{ah'}{2\pi kc}$$

(T: absolute temperature, h'=h/2π, a: acceleration, k: Boltzmann constant, C: lightspeed)

This formula can be derived from Lorenz transformation, Planck's law, and Doppler shift. This equation is the necessary result of time dependent Doppler shift observed by the accelerated observer. Originally, this equation was explained that an accelerated frame in vacuum will be like to be wrapped in radiation with temperature T. Because of energy conservation, we can also explain this formula that temperature can cause vacuum acceleration.

In the one dimensional spacetime, temperature T is in direct proportion to acceleration. It means that absolute temperature T can cause accelerated expansion in either 0, X, Y, or Z axis. The formula of radiation pressure (universal lightity) is:

$$P = \frac{\sigma T^4}{c}$$

The formula is derived by JC Maxwell with Ponyting vector (Eff is from Stefan's law):

$$P = \frac{Eff}{c}$$

According to Unruh-Hawking effect:

$$T = \frac{ah'}{2\pi kc}$$

$$P = \left(\frac{\sigma}{c}\right)\left(\frac{a^4 h'^4}{16\pi^4 k^4 c^4}\right)$$

Radiation pressure is in direct proportion to the fourth power of acceleration. It means that universal lightity can cause the expansion of four dimensional spacetime. This completely fulfils the current cosmological observation. It means that radiation pressure is actually dark energy.

$$\sigma = \left(\frac{\pi^2}{60}\right)\frac{k^4}{h'^3 c^2}$$

$$\therefore P = \left(\frac{1}{960\pi^2}\right)\frac{h' a^4}{c^7}$$

Because spacetime is expanding due to light pressure, we can introduce $a=c^2/r, 2\pi r=x$ into the formula:

$$P = \left(\frac{\pi^2}{60}\right)\frac{h'c}{x^4}$$

It can be compared to Casimir force equation:

$$Casimir\ P = \left(\frac{\pi^2}{240}\right)\frac{h'c}{x^4}$$

We can see there is a close relationship between universal lightity and Casimir force. Because radiation pressure P is for four dimensional spacetime, we can divide it by 4 to get the pressure with one degree of freedom. That is the Casimir force. The attractive Casimir force is because the radiation pressure outside the two plates pushes the two plates to become closer. There is only a 4 difference between these two formulas. Let $x=c*t$, $\pi^2/60$ is stefan's factor:

$$P = \left(\frac{\pi^2}{60}\right)\frac{h'c}{x^4} = \left(\frac{\pi^2}{60}\right)\frac{h'}{tx^3} = \frac{\sigma T^4}{c}$$

We can get this light pressure-spacetime formula. $T*X^3$ is time multiplies three dimensional space, so we know spacetime is a function of temperature and temperature is a function of spacetime. There is an

inverse relation between temperature and spacetime. When our universe began, there was a maximal Planck temperature and very tiny spacetime. Because acceleration is in direct proportion to temperature, there should be an inflation period in the beginning universe. Now, the universe temperature decreases much, so the net acceleration is much slower.

What is heat? This question is always a puzzle. There are two major theories: substance theory and movement theory. Substance theory suggests that heat is a kind of substance. This substance can move from high temperature object to low temperature object to cause heat exchange. Movement theory suggests that heat is a movement. Scholars think that movement such as friction can generate heat continuously. I think neither of the two theories is correct. I will propose here that heat is actually energy and is actually photons. There is tight relation between light and heat. Heat exchange is the movement of photons from high photon density object to low photon density object. When atoms absorb heat, they can transform it into atomic rotation or vibration. Thus, some people falsely believe heat is movement. Heat is light energy, and fire

is the abrupt release of heat and light. Then, why can friction induce heat continuously? It is because heat is a function of spacetime. Thus, a continuous movement compressing spacetime can generate heat because temperature is in inverse relation to spacetime. That is the reason why friction can induce heat. In addition, since acceleration a is in direct proportion to heat energy KT due to Unruh's effect, all mechanic forces including electric force which produce acceleration for massive object will all generate heat due to the transformation of acceleration. Thus, heat energy is the final common pathway of all mechanic forces. Thus, friction can generate heat. The friction acceleration can turn into heat energy. That is the dissipation mechanism. If we remove all external forces generating mass's acceleration, the mass with acceleration will tend to stop because it can be transformed into heat. It is worth noting the heat conduction and convection mechanism. Since heat(temperature) can cause acceleration, the free electrons of solid for heat conduction and the gas or fluid molecules such as H_2O of fluid or gas for heat convection can be accelerated by heat energy. Then,

the free electron can gain mechanic energy and to collide other free electron to transmit the heat energy. Gas or fluid molecule can also do this. However, when they undergo collision, they will release energy. Thus, in an ideal gas, the kinetic energy is related its total temperature. And, oceanic circulation can be explained. Ocean flow of the Equator tends to move to the Poles. Current heat convection theory says that fluid with heat will reduce its density and rise up against gravity. However, oceans of Poles and Equators are in the same horizon. Thus, we cannot use traditional heat convection theory to explain oceanic circulation. Temperature caused acceleration can help to explain. This can apply to uni-direction heat flow: KT. However, we know the radiation pressure (Stefan's law) is T^4 and is proportional to acceleration a^4. If there is four-directional heat flow, the electrons, atoms, or molecules will undergo heat vibration. When an object is emitting out photons, it will receive a rebound momentum for the other way. This is the reason of heat vibration. And, every object is keeping on absorbing and emitting photons. That is the cause of heat induced vibration which can let the particle to

move back and forth along x,y,z axis. Here, I will mention the Carnot cycle. In this cycle, heat is always larger than the work energy. Thus, he concluded that some heat cannot be transformed into work. This is a misleading which disobeys the conservation of energy. Actually, Carnot cycle is not a heat engine; it is a heat pump. The compression of spacetime of this heat pump can generate excessive heat. Thus, the law of energy conservation can be maintained. In addition, Wien's law implies that heat is actually light.

Because the relation between acceleration and heat, we can conclude that every object with mass can radiate. Mass causes spacetime curvature (acceleration), and acceleration in turns causes heat with radiation. Based on Schwartzchild metric, there is singularity in r=0 and $r=2GM/c^2$. The latter is Schwartzchild black hole, and the former means there is a singular point in the center of mass in every object. The gravitational potential GM/r also can explain this. In the singular point r=0, radiation cannot emit out. However, at the point near r=0, there will be radiation. The more mass of an object, the more it can radiate. It

can explain why large mass such as central galaxy, our sun, and our earth can have greater amount of heat in their center. Besides, the amount of heat or radiation is in proportion to the amount of mass (acceleration $a=GM/r^2$). Thus, the heat from our inner earth is not due to the radioactive material; it is due to mass caused accelerated Unruh effect. And, the theory of star evolution may need to be revised.

Finally, I would like to talk about the thought experiment called Maxwell's demon. This thought experiment said that if a demon between two chambers can control the in and out of certain speed particles, then it can disobey the send law of thermodynamics which let organization status to always go to randomization status. I think this demon really exists. This is just bio-organism. We know cell membrane proteins or channels can let glucose come-in and let CO_2 come-out. Then, a cell can achieve an organization status instead of randomization status. This is the key difference of bio-organism and common physical objects. When a bio-ogranism dies such as cells die, the bio-oraganism will just like stone, a

common physical object. No further living will let any organization come to original entrophy arrow for randomization.

If light pressure is the dark energy which can contribute to the cosmic background radiation, it can explain the the ecliptic alignment of comic radiation anisotrophy. This phenomenon seems to disobey Copernicus principle. However, if light emitted from galaxy center becomes the dark energy, it can easily explain why the cosmic radiation is aligned to the plane of solar system or milky way galaxy.

Unruh-Hawking effect

Although many researchers have deducted Unruh-Hawking effect before, I will introduce the deduction here because it is important. When an accelerated reference frame is moving with homogenous acceleration a to a inertial reference frame, we should consider Lorenz transformation:

$$\frac{dV}{dt} = a\left(1 - \frac{V^2}{c^2}\right)^{\frac{3}{2}}$$

There is a relation between lab time (t) and proper time (T):

$$dt = \frac{dT}{\sqrt{1 - \dfrac{V^2}{c^2}}}$$

When accelerated observer with velocity V is observed by lab reference frame, V can be the function of proper time (T):

$$V(T) = c\,tanh\left(\frac{aT}{c}\right)$$

When the observer is accelerating at Z axis:

$$t(T) = \frac{c}{a}\,sinh\left(\frac{aT}{c}\right)$$

$$Z(T) = \frac{c^2}{a}\,cosh\left(\frac{aT}{c}\right)$$

Paralleling Z axis, there is a plane wave with its frequency ωk and with its wave vector k. In the resting reference frame, the frequency is ωk. According to Lorenz transformation,

$$\omega'k(T) = \frac{\omega k - kV(T)}{\sqrt{1 - \frac{V^2(T)}{c^2}}} = \frac{\omega k\left[1 - tanh\left(\frac{aT}{c}\right)\right]}{\sqrt{1 - tanh^2\left(\frac{aT}{c}\right)}} = \omega k e^{\frac{-aT}{c}}$$

（k=+ωk/c）

When moving in –Z axis,

$$\omega'k(T) = \omega k e^{\frac{aT}{c}}$$

（k=-ωk/c）

The above equations are related to the time-dependent Doppler shift. Thus, the time-dependent phase is:

$$\varphi(T) = \int^{T} \omega'k(T')\, dT' = \left(\frac{\omega kc}{a}\right) \exp\left(\frac{aT}{c}\right)$$

And the frequency spectrum is in proportion to the below formula:

$$\left| \int_{-\infty}^{\infty} dT e^{i\Omega T} e^{i\left(\frac{\omega kc}{a}\right) e^{\frac{aT}{c}}} \right|^2$$

We let $y = e^{aT/c}$

$$\int_{-\infty}^{\infty} dT e^{i\Omega T} e^{i\left(\frac{\omega kc}{a}\right) e^{\frac{aT}{c}}}$$

$$= \frac{c}{a} \int_{0}^{\infty} dy\, y^{\left(\frac{i\Omega c}{a-1}\right)} e^{i\left(\frac{\omega kc}{a}\right) y} = \frac{c}{a} T\left(\frac{i\Omega c}{a}\right) \left(\frac{\omega kc}{a}\right)^{\frac{-i\Omega c}{a}} e^{\frac{-\pi\Omega c}{2a}}$$

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T is gamma function

$$\left|T\left(\frac{i\Omega c}{a}\right)\right|^2 = \frac{\pi}{\left[\left(\frac{\Omega c}{a}\right)\sinh\left(\frac{\pi\Omega c}{a}\right)\right]}$$

Thus

$$\int_{-\infty}^{\infty} dT e^{i\Omega T} e^{i\left(\frac{\omega kc}{a}\right)} e^{\frac{aT}{c}} = \frac{2\pi c}{\Omega a}\frac{1}{e^{\frac{2\pi\Omega c}{a}} - 1}$$

We can compare the above equation with Planck's law. The Planck factor is:

$$\text{Plank factor} = \frac{1}{e^{\frac{h\prime\Omega}{kT}} - 1}$$

Then, we can get Unruh-Hawking effect:

$$T = \frac{ah'}{2\pi kc}$$

It is worth noting that photon belongs to U(1) symmetry. When did nature design photon U(1) symmetry? I think photon doesn't disappear when it touches the universe peripheral. It will keep on moving along with the circle of 3-sphere universe. This is the shape of U(1) fiber bundle. In the U(1) fiber bundle, photon momentum, energy, and all physical laws are not changed. This is U(1) local symmetry. When the

circle can rotate around the universe, the photon momentum, energy, and all physical laws are not changed. This is U(1) global symmetry.

We can look at the Unruh-Hawking effect in detail. The formula is:

$$T = \frac{ah'}{2\pi Kc}$$

Thus,1/2KT is energy per degree of freedom

$$\frac{1}{2}KT * \frac{2\pi c}{a} = \frac{1}{2}h'$$

If the period for photon orbiting a circle of our universe is 2πc/a, the above formula can be changed into:

$$\frac{1}{2}KT * t = \frac{1}{2}h'$$

I call this simple formula: temperature-time equation(T*t=h'/k) Planck once introduced the constant h'/K, but the significance of this new constant is not known. Now, we can see the meaning of this constant h'/K. According to my above deduction, Hubble constant H is E*k (k=some constant). We know that E=KT=h'/t. Thus, Hubble constant is k*h'/t, and Hubble constant is time dependent.

We consider entropy time arrow: Entropy is:

$$dS = \frac{\delta Q}{T}$$

$$S = K \ln \Omega$$

Because time t is positive and is always increasing, the temperature T is always decreasing. And then, the entropy S is always enlarging. This is entropy time arrow.

Comparing to Bohr's time-energy uncertainty principle:

$$\Delta E * \Delta t \geq \frac{1}{2} h'$$

We can see the great similarity.

We can also use the circumference formula t=2πx/c=Cr/c=X/c. (x=universe radius)Thus,

$$KT * Cr = h' * c$$

We can let h'c/K to be a constant, so there will be a relation between one dimensional space and temperature. This is called temperature-space equation. There is an inverse relationship between temperature and universe radius or circumference. We can also get the inverse relation between temperature and distance: This is 1D space-temperature equation.

$$T * x = \frac{h' * c}{K * 2\pi}$$

In addition, the energy-momentum relation of photon is E=PC. Then,

$$\frac{1}{2}KT * Cr = \frac{1}{2}h' * c$$

$$Pc * Cr = \frac{1}{2}h' * c$$

$$P * X = \frac{1}{2}h'$$

Compare to momentum-position uncertainty principle:

$$\Delta X * \Delta P \geq \frac{1}{2}h'$$

In addition,

$$Pc * Cr = \frac{1}{2}h' * c$$

$$P * 2\pi x = \frac{1}{2}h'$$

$$x \times P * 2\pi = \frac{1}{2}h'$$

Compared to angular momentum-angle uncertainty:

$$\Delta L * \Delta\theta \geq \frac{1}{2}h'$$

In summary, the summation of energy-time, momentum-position, and angle-angular momentum is

equal to 1/2h'. In these equations, there is commutative property AXB=BXA=constant. This commutative property means A and B have a symmetric relation. Thus, energy and time are symmetric, momentum and position are symmetric, and angle and angular momentum are symmetric. This finding is consistent with Noether's theorem. These equations explain conservation of energy, conservation of linear momentum, and conservation of angular momentum. This is time, space, and rotation invariance for physic laws.

By putting on the Tt and Tx relation, we can also get the radiation energy equation from Stefan's law and Unruh effect(if we don't care the unit and let Z=120π:

$$E = \left(\frac{\pi}{Z}\right)(KT)$$

(Z is vacuum impedance)
This equation explains radiation energy coming from heat energy.

Reference: PM Alsing arXiv:quant-ph/0401170v2

Charge relativity

Dark matter

It is well known that Einstein's general relativity says that mass causes space-time curvature to produce gravity. However, the relationship between electromagnetism and space-time is neglected. Here, we propose that electromagnetism is also mediated by space-time structure change. This new theory-charge relativity is going to replace current quantum electrodynamic theory (QED). QED says that electromagnetism is mediated by photon transfer and change. This description cannot explain the field (strength line of force) characteristics of electromagnetism. If electromagnetism is mediated by photon change, there will be no difference when test charge is near the central charge or the test charge is far away from central charge. According to Faraday's force line theory, test charge will receive more field force when it is approaching the central charge.

Second, I propose a new atom model saying that all electrons are orbiting in the same plane around the atomic nucleus. For example: Neon has full 8 electrons in its outer orbit, so two electrons must be in the opposite position in the orbit. It means that when one electron is in the right side of atomic nucleus, there must be the other electrons in the left side of atomic nucleus. QED says when attractive electromagnetism is mediated when two charges are releasing photos back to back. Thus, when proton and the first electron are releasing photos back to back for electromagnetism attraction, there must be the other electron receiving the photos released by protons and the second electron will be expelled out due to repulsive electromagnetism explained by QED. Third, QED is based on Schrodinger and Dirac's quantum mechanics formula, and quantum mechanics is proved to be wrong according to my new atom model. Fourth, radiation pressure is due to heat, and electromagnetism is due to charge. Heat is not equal to charge. Thus, QED claimed that electromagnetism is mediated by radiation pressure is wrong. Fifth, the most important, QED needs to use virtual photons to

explain electromagnetic attraction and repulsion. It needs to claim that virtual particles move backward in time to explain repulsion and attraction. However, virtual photons are never observed. In addition, particles should not move backward in time that disobeys the principle of causality. In addition, current Lamb shift experiment gets exact results which are very different from QED's prediction. Based on the above reasons, I will need to propose a new theory to replace QED.

One important reason for Einstein's proposing general relativity is Newton's gravity formula ($F=GMm/r^2$) implies that gravity is a force with action in distance and gravity can be mediated faster than lightspeed. This disobeys the basis principle of special relativity. However, Coulomb's electrostatic force formula ($F=KQq/r^2$) also implies that electromagnetism is also a force with action in distance and electromagnetism can be mediated faster than lightspeed. Thus, we need to propose a new theory to let electromagnetism obeys the fundamental principle of special relativity. I propose here that electromagnetism is also mediated

by space-time structure change. We know mass can cause a dent (curvature) of space-time due to Einstein's general relativity. I propose that charge can cause spiral formation of space-time structure. Because dent (curvature) can cause inertia, spiral formation by charge is not causing a central dent or curvature. However, positive charge and negative charge should have different spiral orientation in a given space-time. It means charges know that orientation of space-time 4D structure and produce two kinds of spiral formation. If two negative charges or two positive charges are approaching, the space-time spiral structure in-between the two charges are differently oriented and there will be repulsion. If one positive charge and one negative charge are approaching, the space-time spiral structure in-between the two charges are same oriented and there will be attraction. Thus, it well explains that attractive and repulsive characteristics of electromagnetism. It is worth noting that electricity is mediated by rest charge and magnetism is mediated by spinning charge. Coulomb's electricity causes open spiral with non-zero divergence, and magnetism causes close spiral with

zero divergence. Due to the non-zero divergence, spiral structure caused by rest charge should be open spiral. It means that vortex lines originate from the central object and they curve and extend to reach the peripheral boundary. The spiral structure is a three dimensional structure. It means that charge can recognize space-time orientation and causes spiral shape structure in three horizontal planes. If the space-time is defined by x,y,z axis, then the spiral structure can be found in xy plane, yz plane, and xz plane. Spiral structure itself is a plane with vortex shape. When a charge is spinning (magnetism), the direction of spiral formation will be changed to align the charge's spinning direction. Thus, it can explain why two charges with different spin direction will attract each other and two charges with same spin direction will repulse each other.

Why is torsion tensor equal to electromagnetic tensor (Faraday tensor)? We can also derive it from the definition of torsion tensor and Faraday tensor.[1] By definition, torsion tensor is:

$$T_{uv}^k = A_{uv}^k - A_{vu}^k - \gamma_{uv}^k$$

If the basis is holonomic, then the Lie bracket vanishes. It means that Y^k_uv=0. Because Coulomb electromagnetic force is conservative force, the force is path independent and is only associated with the beginning state and end state of a charge. Thus, Coulomb electromagnetic force is holonomic. Then, the torsion tensor becomes:

$$T_{uv}^k = A_{uv}^k - A_{vu}^k$$

By differentiation, form covariant terms of second rank:[1]

$$Auv = \frac{\delta Au}{\delta Xv} - \{uv, t\}At$$

Auv is extension (covariant derivative) of the tensor Au

The second term in the above equation is symmetrical in the indices u and v. Thus,

$$Tuv = Auv - Avu = \frac{\delta Au}{\delta Xv} - \frac{\delta Av}{\delta Xu}$$

By the definition of Faraday tensor, electromagnetic tensor F is equal to:

$$Fuv = \frac{\delta Au}{\delta Xv} - \frac{\delta Av}{\delta Xu}$$

Thus, Fuv=Tuv. Faraday tensor is torsion tensor. From the above equations, we see that torsion tensor is T^k_uv but the Faraday tensor is Tuv. It means that torsion tensor produces a 4D space-time vortex.

T^k_uv; k,u,v=0,1,2,3 in any reference frame(X0,X1.X2,X3) or (ct,X,Y,Z)

Thus, we can have four Faraday Tensors: T^0_uv for time vortex; T^1_uv along X with axis in YZ plane for space vortex; T^2_uv along with Y axis in XZ plane for space vortex; T^3_uv along with Z axis in XY plane for space vortex. Each T^k_uv has 6 components(T^k_01,T^k_02,T^k_03,T^k_12,T^k_13,T^k_23).

Torsion tensors produce four Faraday tensors to cause space-time vortex or space-time torsion.

From the above equations, we can get electromagnetic field tensor (F). It is also because vector Cu represents the generalized electromagnetic potential. If we say electromagnetism causes space-time structure spiral formation, then it is very reasonable to use torsion tensor to describe electromagnetic tensor since vortex lines are aligned with torsion tensor. We can find similarity because both Faraday tensor and torsion tensor are anti-symmetric tensors. Although one may argue that torsion tensor can have 24 components, I think each torsion tensor(6 components) matches each Faraday tensor(6 components; Ex,Ey,Ez,Bx,By,Bz) since charge can recognize the space-time structure orientation and give one 3D spiral structure in xy, yz, and xz planes.

By definition, $A^u=(\phi/c, A)$ and $A_u=(\phi/c, -A)$. And,

$$E = -\frac{\partial A}{\partial t} - \nabla\varphi$$

$$B = \nabla x A$$

$$\text{if } Fuv = \partial uAv - \partial vAu$$
$$F_{10} = \partial_1 A_0 - \partial_0 A_1 = Ex/c$$
$$F_{12} = \partial_1 A_2 - \partial_2 A_1 = Bz$$

And so on! We can get Ey, Ez, Bx, By are all torsion tensors. Thus, both electric field (E/c) and magnetic field (B) are torsion tensors which can cause space-time torsion!

We need to look at charge relativity in detail, Faraday tensor means it is the number of force lines from an element charge. Thus, it suggests that Faraday's force lines actually cause the spiral formation of space-time structure. The spiral space-time structure itself is actual Faraday's force line and Faraday tensor. Thus, I propose the charge relativity formula here to explain the relationship between charge and space-time. Recently, there is a new theory called Einstein-Cartan-Evans theory to unite gravity and electromagnetism. It also assumed that electromagnetic tensor is torsion tensor. However, it thought that electromagnetism is caused by spin. In my opinion, spin doesn't cause electromagnetism. Mass spin causes spinity which in turns causes space-time rotation. In addition, spinity

caused by spin is closely related to gravity since they have the same permeability constant. Electromagnetism should cause space-time spiral structure formation!

In astronomy, dark matter theory was proposed because there is huge discrepancy between Virial mass calculated by dynamic law and mass estimated by light-to-mass ratio. The total amount of mass in spiral galaxies cannot explain why the peripheral galaxies can rotate around the central galactic core in such high speed. If we consider the electromagnetism attraction between galactic core and peripheral stars, we can explain why spiral galaxies can gather together to rotate. Thus, dark matter is not needed any more. Besides, all particles (fermions) have mass and corresponding gravity acceleration. Due to Unruh-Hawking effect, acceleration will cause temperature. Then, Stefan's law will let all objects with temperature to radiate photons. Dark matter by definition is a mass without emitting photons, and it is impossible to have such matter. In the Milky Way galactic core, some researchers suggested there is huge amount of proton

cloud, so there should be strong electromagnetic attraction between peripheral galaxies with large amount of electrons and central galactic core with large amount of positrons. No matter there is antimatter in galaxy core, the key point is that central galaxy and peripheral galaxy have opposite charges. One may argue that why the same charge of protons won't repulse each other. It is because the very strong gravity field due to huge mass in galactic center maintains these charges. Charge relativity can also explain why spiral galaxies are spiral shaped. In elliptical galaxies, there are not assumed dark matter existing. It is because there is no electromagnetism in elliptical galaxies. Thus, elliptical galaxies are not spiral shaped. Current density wave theory to explain galaxy's spiral shape is wrong. Because of charge relativity, the electromagnetism causes spiral galaxies to have open spiral shapes. In elliptical galaxies, the amount of dark matter is estimated fewer. It is because the dominant force of elliptical galaxies is gravity. The effect of electromagnetism is less in elliptical galaxies.

In the beginning of spiral galaxies, the Coulomb

interaction between proton group (future galactic core) and electron group (future peripheral stars) causes an electromagnetic field. Proton-electron groups can also be two opposite charge groups. The core group is made of multiple spinning charges such as protons. Spinning charges will cause magnetic fields. If these spinning charges cannot completely cancel out each other, there will be a net magnetic field generated. Then, the electron group in the future peripheral galaxy will tend to rotate around the matter core group due to the torque induced by the central magnetic field. The charge between proton and electron is opposite. If the magnetic field of central galaxy core is N-S, the magnetic field of peripheral galaxy becomes S-N. Then, the magnetic field due to the orbiting of peripheral galaxy and the spinity of peripheral galaxy will cause the central galaxy core to spin for N-S direction to align the magnetic field from peripheral galaxy. Then, a co-spinning spiral galaxy is formed. That is why peripheral stars rotate in the same direction as galactic core. Because the spinity and magnetic field of milky way galactic core, our sun in the spiral arm also started to spin along the peripheral

stars orbiting. As long as our sun started to spin, it would also affect planets such as earth to spin due to the effect of spinity. Thus, this can explain the phenomenon why most planets, sun, milky way, and milky way galactic core are spinning in the same direction. Indeed, because charge can induce spinning whirlpool, all spiral galaxies are rotating with huge angular momentum.

In elliptical galaxies, there is much more mass and much less charge(one single charge). If there is pure mass without charge, this elliptical galaxy will be near a perfect sphere. If there is still minor charge, this elliptical galaxy will be near an ellipse. This is due to:

$GMm/r^2 + KQq/r^2 = ma$

And, that is why spiral galaxies are usually an elliptical spiral. Because there is no electromagnetism induced angular momentum, there is no spin or rotation in the elliptical galaxies. Thus, there is only irregular movement in the elliptical galaxies.

In spiral galaxies, there are galaxy rotational curve problems. If gravity is the only force in spiral galaxy, then the orbiting velocity of peripheral stars should be less if the stars are far from the galactic center:

For elliptical galaxies without electromagnetism and rotation, Kepler's third law:
$GMm/r^2 = mrw^2$

If there is also electromagnetism, then the formula becomes:
$(GM+SJw)m/r^2 + (KQ+uQV/4\pi)q/r^2 = ma$
If the rotation speed reaches constant and gravity is trivial, the formula is :
$KQq/r^2 = mrw^2$

Then, the Kepler's third law of planetary motion needs to be changed. That is why the peripheral stars can maintain high orbiting velocity. Why the orbiting velocities of peripheral stars are equal to the spinning speed of galactic center? We can use universal spinity and magnetism to explain it. Due to the universal spinity and magnetism, there are angular momentum

transfers. The angular momentum from the central galaxy needs to be transferred to the peripheral stars. Thus, the stars' orbiting velocities are equal to galactic center's spin velocity. Thus, the spiral galaxies can maintain the co-spiral structures.

We can recheck the Coulomb electricity:

$$\text{Electricity} = \left(\frac{\mu}{4\pi}\right)\frac{Qc * qc}{r^2}$$

We can see there is a c^2 in this equation. It means the transmission velocity for electricity is lightspeed. According to the potential theory, Coulomb electricity is the interaction between Qc/r and qc/r. Thus, the total force is $kQc*qc/r^2$. Thus, electricity is not a force with action at distance anymore!

In addition, this theory can explain why our sun's magnetic field is spiral shaped. The sun's magnetic field is called "Parker Spiral" and is an open spiral structure. This shape of magnetic field was thought to be influenced by solar wind release. However, I think the real reason is that our sun has charge that is different from usual planets without charges in solar system. Thus, sun's electromagnetism causes space-time spiral

structure. This new theory can also explain why spiral galactic magnetic fields are aligned to its spiral arms. It is because the galaxy's electromagnetism causes space-time spiral shape structure to aggregate peripheral stars to rotate. Thus, the galaxy's magnetic field is perfectly aligned to its spiral arms.

Currently, there is an experiment which can fully support my "charge relativity".[2] When light is passing a strong magnetic field in vacuum, there is optic rotation. Thus, it can be explained that light is passing through a torsion space-time affected by the strong magnetic field. Thus, the path of light is rotated. Optic rotation means there are angle rotation of light when the light is passing through electric field (Pockels effect, $\theta=kEd$) or when the light is pasing through magnetic field (Faraday effect, $\theta=kBL$). Because the electromagnetism can cause spacetime torsion, it is very reasonable to observe these optic rotation effects. Recent Lamb shift experiments also pointed out the defect of QED.[3] The recently measured proton size is also contracted to QED prediction. There is no satisfactory theory to explain this phenomenon

currently.

Reference

1.Einstein A The foundation of the general theory of relativity Annalen der Physik 49,769 (1916)

2.Zavattini E. et al. Experimental observation of optical rotation generated in vacuum by a magnetic field Phy Rev Lett 96,110406 (2006)

3.Pellegrin P et al. Lamb-shift measurement in hydrogenic phosphorus Phy Rev Lett 49,1762 (1982)

Universe field equation

Curvature and Torsion are two major basic components of differential geometry which stands for gravitospinnism and electromagnetism, respectively. In fact, physic is geometry.

Torsion tensor is：
$$T(x, y) = \nabla_x Y - \nabla_y X - [x, y]$$

And torsion satisfies
$$\Theta = d\theta + \omega \wedge \theta$$

Curvature tensor is:
$$R(x, y)z = \nabla_x \nabla_y Z - \nabla_y \nabla_x Z - \nabla_{[x,y]} Z$$

And curvature satisfies
$$\Omega = d\omega + \omega \wedge \omega$$

We can use curvature form and torsion form to restore curvature and torsion. If there is a point u in $F_x M$, then

$$T(x, y) = u[2\Theta(\pi^{-1}(x), \pi^{-1}(y))]$$
$$R(x, y)z = u[2\Omega(\pi^{-1}(x), \pi^{-1}(y))][u^{-1}(z)]$$

And, Bianchi identities link torsion and curvature in geometry. If cyclic sum is G, then

$$G(R(x, y)z) := R(x, y)z + R(y, z)x + R(z, x)y$$

The First Bianchi identity：

$$G(R(x, y)z) = G[T(T(x, y), z) + (\nabla_x T)(y, z)]$$

The Second Bianchi identity：

$$G[(\nabla_x R)(y, z) + R(T(x, y), z)] = 0$$

Thus, torsion tensor and curvature tensor can be linked together.

In my previous article, I proposed that radiation pressure (universal lightity) is the best candidate of dark energy which causes universe expansion. Because gravity, electromagnetism, and lightity are all mediated by space-time, the three fundamental forces can be united in one equation. I call this a Grand-unified Field Theory.

In electroweak theory, electromagnetic radiation is a U(1) group. The electromagnetic radiation can also be expressed by a rank-2 tensor:

$$\mathrm{Tuv} = \frac{\delta \mathrm{Au}}{\delta \mathrm{Xv}} - \frac{\delta \mathrm{Av}}{\delta \mathrm{Xu}}$$

(Au and Av are electro-vector potentials)

We can see that radiation emitted from the galaxy or charge center are moving out via a spiral (vortex) shape. Then, the radiation will reach the peripheral of universe and circulate the universe. The net effect of electromagnetism is to be spirally convergent in a certain point in space-time. However, the net effect of electromagnetic radiation is to be spirally divergent in the peripheral space-time. Thus, these two fundamental fields cancel each other. There are two possibilities about the cancellation of these two fundamental forces. First, when the charge is annihilated in galaxy, the common sequel is neutron production from proton due to nuclear fusion. The net product is a photon and the spacetime vortex from the original charge such as proton is vanished. The generated photon can produce energy-momentum tensor via radiation pressure. It means that net effect of electromagnetism and lightity is equal to zero. Second, when the charge is present in galaxy, the charge will suffer from gravity field acceleration. Thus,

this charge will still have thermal radiation due to this acceleration. This thermal radiation can radiate out along with the 4D spacetime vortex line due to electromagnetism. This explains why every charge can radiate as it is above absolute zero temperature. The electromagnetic potential of the electromagnetic field and the radiation-lightity field is the same-retarded potential. According to the field tensor formula, these two tensors still cancel each other out. The net effect is still zero.

In summary, we can list the three major tensors by definition:

Gravitospinity tensor by Einstein:

$$-\text{Guv} = -\text{K} * \text{Euv} = \text{Ruv} - \frac{1}{2}\text{g}_{uv}\text{R}$$

Faraday(electromagnetic) tensor

$$\text{Fuv} = \frac{\delta \text{Au}}{\delta \text{Xv}} - \frac{\delta \text{Av}}{\delta \text{Xu}}$$

Temperature-lightity tensor

$$\text{Tuv} = \frac{\delta \text{Au}}{\delta \text{Xv}} - \frac{\delta \text{Av}}{\delta \text{Xu}}$$

by U(1) Abelian group

Because lightity is out-expanding force and electromagnetism is inward force. The two forces should cancel each other. Because both F^k_uv and T^k_uv can cancel each other in the 4D space-time, the total net effect of these two in the new field equation is zero.

Similar to Einstein's universe field equation (-Guv=Ruv-1/2g_uvR), I propose:

$$Guv + Fuv - Tuv$$

$$= -\left(Ruv - \frac{1}{2}g_{uv}R\right) + \left(\frac{\delta Au}{\delta Xv} - \frac{\delta Av}{\delta Xu}\right)$$

$$-\left(\frac{\delta Au}{\delta Xv} - \frac{\delta Av}{\delta Xu}\right)$$

$$Guv + Fuv - Tuv = -\left(Ruv - \frac{1}{2}g_{uv}R\right)$$

It is worth nothing that the original Einstein field equation is derived from Bianchi identity with vanishing torsion. Since the Fuv and Tuv cancel each other, the net effect of torsion is vanished. Einstein

provided the relativity of Energy, INertia and SpaceTime. Einstein's field equation is only valid with vanished torsion. Thus, Einstein's deduction is reliable and correct.

Due to Einstein's deduction in his book: the meaning of general relativity:

R=g^uvRuv and g_uv*g^uv=4 in four dimensional space-time

Introduce this, we can get:

$$Ruv = Guv + Fuv - Tuv$$

$$Ruv = Guv = K * Euv = \left(\frac{\mu}{c^2}\right) Euv$$

(Ruv=Ricci-Riemann curvature tensor; means sphere surface)

Guv is "G"ravitospinity tensor, Fuv is "U"(1) "F"araday electromagnetic tensor, Tuv is u(1) "T"emperature-lightity tensor. It is worth noting that Einstein originally introduced a cosmological constant in his Einstein field equation because he assumed that our universe is a static universe. However, Hubble observed that our universe is actually accelerated expansion. Thus, the

item of cosmological constant should be omitted. Professor Friedmann omitted this cosmological constant in Einstein field equation, and he found the solutions of this equation means our universe is either expanding or contracting. This fits the observation of our expanding universe.

Ricci flow is a concept used by Grigori Perelman to prove Poincare conjecture. In fact, the formula of Ricci flow is identical to Einstein field equation:

$$\text{Ricci flow} = \text{Ruv} - \frac{1}{2}\text{g}_{uv}\text{R}$$

By the characteristics of Ricci flow, positive Ricci curvature can contract to a point and negative Ricci curvature can expand in terms of Einstein manifold (Ricci=constant*metric g_uv).

Since

$$\text{Ruv} - \frac{1}{2}\text{g}_{uv}\text{R} = -\text{K} * \text{Euv}$$

Energy-momentum tensor

$$E_{uv} = \rho U_u U_v - pg_{uv}$$

(ρ=mass density, Uu or Uv=velocity, p=pressure=radiation pressure, g_uv=metric tensor) Since radiation has both characteristics of mass(E=mc^2) and charge(EM radiation), it should has one tensor included in mass-like energy-momentum tensor and the other tensor included in charge-like temperature-lightity tensor.

Thus,

$$\text{Ricci flow} = R_{uv} = G_{uv} = K * E_{uv}$$
$$= K * (\rho U_u U_v - pg_{uv})$$

When mass is dominant than radiation, $\rho U_u U_v$ is greater(>>) than pg_uv. Then, the positive Ricci curvature will contract due to Ricci flow. When radiation is dominant than mass, $\rho U_u U_v$ is less(<<) than pg_uv. Then, the negative Ricci curvature will expand to its maximum. This formula can prove our universe is radiation dominant expanding universe.

Thus,

$$\text{Ricci flow} = \text{Ruv} = -K(pg_{uv})$$

Radiation pressure P is $\sigma T^4/c$ which is in proportion to the fourth power of acceleration. Our universe is accelerated expanding!

G mediates space-time curvature, F mediates space-time spiral shape (spiral convergence), and T mediates space-time spiral expansion. G and F cause matter to gather together. It is a new universe field equation. The initials of G, F, T stand for first stage "G'rand-"U"nified, 'F'ields, 'T'heory.

Currently, standard model is a successful theory to describe fundamental forces and related particles. It successfully predicts the masses of Z and W particles. It united electromagnetism, weak force, and strong force in the equation: U(1)xSU(2)xSU(3). Currently, U(1) is quantum electrodynamics(QED) mediated by photon transfer. However, I proposed that QED is wrong and photons are the actual mediators of radiation pressure. Thus, U(1) should be radiation pressure(universal lightity) which can explain the Casimir force. Thus, the new U(1)xSU(2)xSU(3) unites dark energy, weak force,

and strong force. The basic structure of the unification is not changed. U(1) is still a gauge theory mediated by one dimensional photon boson. SU(2) is also a gauge theory mediated by W+, W-, and Z bosons(3 dimensional=2^2-1). SU(3) is also a gauge theory mediated by 8 gluon bosons(8 dimensional=3^2-1). Thus, the new standard model equation is given by:

Lagrangian

$$L = \int \left(\frac{1}{y^2}\right) Y_{uv} Y^{uv} + \left(\frac{1}{w^2}\right) tr W_{uv} W^{uv}$$
$$+ \left(\frac{1}{g^2}\right) tr G_{uv} G^{uv}$$

1. With A U(1) gauge field Y with coupling y (weak hypercharge or weak U(1))
2. An SU(2) gauge field W with coupling w (weak SU(2) or weak isospin)
3. An SU(3) gauge field G with coupling g (gluons or strong color)

In the above equation, photon is y, W/Z particles are w, and gluons are g. The traces (tr) are over the SU(2) and SU(3) indices hidden in W and G respectively. The two-

index objects are the field strengths derived from W and G the vector fields.

This equation is standard model with new meaning. After this modification, the advantage is preserved and the disadvantage is avoided in the new standard model. W and Z particles' masses can still be accurately predicted. But, the detailed equations and deductions need further efforts. Fundamental forces mediated by particles can be beautifully presented in one equation: U(1)xSU(2)xSU(3).

For SU(2) and SU(3):

Standard model is according to Yang-Mill theory:

$$Fuv = \partial uAv - \partial vAu - [Au, Av]$$

From above article, I also united the fundamental forces mediated by space-time. Those are radiation pressure (dark energy), electromagnetism, and gravitospinity. Electromagnetism causes space-time vortex (torsion tensor) and gravitospinity causes space-time curvature (curvature tensor). In addition, radiation pressure (dark energy) is time arrow and causes space spiral expansion. This equation is given by:

G+F-T=R

G mediates space-time curvature (gravitospinity and radiation pressure), F mediates space-time spiral shape (electromagnetism), and T mediates space-time spiral expansion (radiation field strength). Q.E.D.

Pair production

It is well known that gamma ray can be transformed to electron and positron pairs during head-on collision with the other gamma ray or atom nucleus. During the process, energy should be conserved. Each electron or positron has the same rest mass energy: 511kev, so the total rest mass energy is 1022kev. Thus, the initial one beam gamma ray should be 1022 kev. Or, each gamma ray beam for head-on collision should be 511kev. In photon-nucleus pair production, the energy of gamma ray is 1022kev. In order to fulfill the conservation of energy, the equation is:

$$E = hf = 2mc^2$$

(E=energy, h=planck constant, f=wave frequency, m=rest mass of electron, c=lightspeed, $2mc^2$=particle+antiparticle rest mass energy)

The above equation matches the experimental observation. However, it is important to point out something is missing during the energy transformation. Each photon has not only frequency but also amplitude which constitutes the EM wave energy density eE^2. In addition, charged particles have their electrostatic energy. Thus, it is reasonable to postulate that EM wave density eE^2 is transformed to charge electrostatic energy. Only by doing that, total energy is conserved during pair production. Thus, the initial EM wave energy density should be the same as charge energy density after pair production.

The initial EM wave total energy density is $S=eE^2$ including both magnetic and electric field components. (S=energy density(energy per unit volume), e=electric permeability constant, E=electric field)

EM wave total energy density

$$S = \frac{1}{2}\left(\epsilon E^2 + \frac{B^2}{\mu} \right)$$

B=E/c, Thus, total S=eE^2

It is worth noting that energy density (J/m^3) is equal to force per unit area (N/m^2) which is used to derive the equation later.

Electron is a small conductive sphere. Its charges should be equally distributed on the surface of sphere. Thus, it is more reasonable to assume the electron should be like a hollow ball. Thus, the electrostatic energy of electron should be:

$$E = \left(\frac{1}{2}\right) \frac{KQ^2}{r}$$

The net force for unit charge on the sphere surface is:

$$F = \left(\frac{1}{2}\right) \frac{KQ^2}{r^2}$$

The electrostatic force of electron is:

$$dF = Edq$$

$$E = \frac{kq}{r^2}$$

$$dF = \frac{kqdq}{r^2}$$

$$F = \left(\frac{1}{2}\right)\frac{kq^2}{r^2} = \left(\frac{1}{2}\right)\left(\frac{\mu}{4\pi}\right)\frac{c^2q^2}{r^2} = Fe$$

According to Biot-Savart law, the magnetic field is:

$$dB = \frac{\mu}{4\pi}\int\frac{Idl}{r^2}$$

For a spinning electron, the current I is QV/2πr, and the total length L is 2πr. Thus, the magnetic field produced by a spinning charge is:

$$B = \left(\frac{\mu}{4\pi}\right)\frac{qv}{r^2}$$

So, the magnetic force of electron is:

$$dF = Bdqv$$

$$B = \left(\frac{\mu}{4\pi}\right)\frac{qv}{r^2}$$

$$dF = \left(\frac{\mu}{4\pi}\right)\frac{qvdqv}{r^2}$$

$$F = \left(\frac{\mu}{4\pi}\right)\frac{q^2v^2}{r^2}$$

Electron is spinning in lightspeed, then:

$$F = \left(\frac{\mu}{4\pi}\right)\frac{q^2c^2}{2r^2}$$

$$(v = c = \text{constant})$$

The magnetic energy of a point sphere charge should be:

$$E = \left(\frac{1}{2}\right)\frac{KQ^2}{r}$$

For unit charge, total force is magnetic force plus electrostatic force:

$$\text{Net } F = Fm + Fe = \frac{kq^2}{r^2}$$

Since energy density is equal to the force per unit area, the energy density of the hollow electron sphere should be:

$$S = \left[\frac{KQ^2}{r^2}\right] \div (4\pi r^2)$$

Thus, the initial energy density is equal to aftermath energy density:

$$S = \epsilon E^2 = \left[\frac{KQ^2}{r^2}\right] \div (4\pi r^2)$$

Thus,

$$E^2 = \left(\frac{KQ}{r^2}\right)^2$$

In addition, we can also find out the particle's gravity filed and its link to its radiated wave gravity field.

$$S = \frac{g^2}{4\pi G} \quad = \left[\frac{GM^2}{r^2}\right] \div (4\pi r^2)$$

Thus,

$$g^2 = \left(\frac{GM}{r^2}\right)^2$$

Thus, when a fermion radiates, its radiation wave's electric field and gravity field is the same as the original particle's electric and gravity field.

Thus, we can predict that the wave amplitude for generating proton-antiproton or neutron-antineutron should be different. Although proton and neutron have the same mass, the wave frequency for generating proton-antiproton or neutron-antineutron should be the same. However, proton-antiproton requires more energy to be synthesized.

In the second part of article, I would like to deduct particle size during pair production. I will show that particle size is depending on its mass, lightspeed, and planck constant.

Due to the conservation of angular momentum, the angular momentum of photon is equal to the angular momentum of particle plus antiparticle. We know the angular momentum of photon is h':

$L_0 = L_1 + L_2$
(L0:photon angular momentum, L1:particle angular momentum, L2:antiparticle angular momentum;
L1=L2)
$L_0 = 2L_1 = h'$
Thus,
$L_1 = L_2 = 1/2h'$
Thus, all fermions have spin angular momentum $1/2h'$

There is relation between photon angular frequency and wave frequency.

$W_0 = 2\pi * f$

(f=wave frequency)

During pair production, $hf=2mc^2$. Thus,

$$W_0=(4\pi*mc^2)/h$$

There is energy conservation after pair production. Half of the rest mass energy contributes to the gravitational energy. Half of the rest mass energy of particle (anti-particle) contributes to the spin energy: (W_1=particle spin angular velocity)

$$1/2mc^2=1/2IW_1^2$$

Spin angular momentum

$$S=IW_1=1/2h'$$

Thus,

$$mc^2=SW_1$$

$$W_1=(4\pi*mc^2)/h=W_0=W$$

Photon angular frequency is equal to particle (antiparticle) angular spin velocity:

Since energy-momentum relation is:

$$\left(\frac{E}{c}\right)^2 - p^2 = (mc)^2$$

In addition, the four velocity:

$$\|U\| = \sqrt{|U^u U_u|} = c$$

It means that the norm of magnitude of the 4-velocity of a rest massive object is always exactly equal to lightspeed c. All rest massive objects can be thought of as moving through spacetime at lightspeed c. So, fundamental particles like electrons are spinning in lightspeed. Thus,

C=r*W (C=lightspeed, r=particle radius, W=angular velocity of spin)

Thus,
Electron radius r=h'/2mc (see reference)
Electron diameter D=h'/mc

Because the anugular momentum for a massive fermion is rmv, the spin will becomes 1/2h' for fundamental particles(v=c). Thus, the origin of spin is from radius, mass, and velocity. This can solve the proton spin crisis. Originally, researchers thought the

proton spin is from the spin of quarks. However, they found the discrepancy of quark spins and proton spin. Thus, the proton spin should be acquired from the gluons which acquire majority of mass for the proton. In the later chapter, I will discuss how gluon acquire mass from higgs mechanism.

The proton is a positive charge. Its magnetic moment is from the total charge(pole strength multiply length). Because proton is fermion, its three quarks should be arranged in the following pattern due to charges.

+-+
Or
SNS
NSN
Because the net total charge is +1(+3/3), the magnetic moment for proton is (+3/3)*r

The neutron is a neutral charged particle. Its magnetic moment is from the rotation of neutron particle itself. Its three quark alignment should be:

-+-

Or

NSN

SNS

The magnetic moment of neutron is from the rotating negative quarks of it. Thus, its net magnetic moment is -1/3*2*r=-2/3*r. It is worth noting that all three quarks in proton or neutron are spinning in the same direction. Thus, the net magnetic moment ratio between proton and neutron is 3/2=1.5. That matches the experimental observation. It explains the spin crisis problem.

Here, I will also like to discuss the characteristics of nuclear force. The nuclear force is mediated by neural pion which is made of U$\underline{U}$ or d$\underline{d}$. The alignment of neural pion should be:

+

-

Because there is no net spin or angular momentum for

pion, there should be anti-alignment spin for magnetic moment of the two quarks. And, the rotation direction of the two quarks is the same. The neutral pion is:

S
N
N
S

Thus, if one proton and another neutron are aligned up-and-down in the same spin direction like:

+   (proton)
+   (neutron)
Is
S
N

N
S

In the middle of proton and neutron, we can see a neutral pion can be inserted inbetween. Thus, the proton and neutron can be linked by a pion. It can

explain the vertical tensor component of nuclear force.

We can also look at the horizontal alignment of the two quarks in neutral pion. It is:

+-
Or
NS
SN

If two protons or two neutrons (opposite spins) are sit side-by-side in the horizontal direction, its arrangement is:

-    +
Or
S   N
N   S

We can also insert the neutral pion inbetween the two protons or two neutrons. Thus, it can also explain the tensor component and spin dependence of the horizontal alignment of nuclear force.

Here, I would like to introduce a concept about spin angular momentum four vector. The vector is:

$(h',J_x,J_y,J_z)=(rmc)^2$

Due to the spin invariance, $rmc=1/2h'$. Thus, $r=h'/2mc$. We can also derive basic particle's diameter. Then,

$(h')^2-J^2=(1/2h')^2$, so

$$J = \frac{\sqrt{3}}{2}h'$$

We call J the total spin angular momentum for a basic particle.

Besides, we can also derive the diameter of photon. Since the angular momentum of photon is h', the first item of spin angular momentum four vector. And, based on the equation of angular momentum:

$$h' = rxp = \frac{rxE}{c} = \frac{rxhf}{c}$$

We can get $r=\lambda/2\pi$. This is the radius of photon. Thus, the diameter of photon depends on its wavelength. The circumference of photon is λ. Photon goes straight. We can use this to revise current scattering theory. The scattering of radiation is depending on a size

parameter:

$$\alpha = \frac{R}{\lambda/2\pi}$$

If alpha<<1, this is Rayleigh scattering. If alpha=1, this is Mie scattering. If alpha>>1, this is geometric scattering such as Compton scattering. Thus, the alpha factor is depending on the scattering particle radius R and the photon radius $\lambda/2\pi$. Comparing the size of scattering particle to photon, we can get different scattering pattern. For example, Compton scattering,

$$\frac{\lambda'}{2\pi} - \frac{\lambda}{2\pi} = \frac{h}{2\pi mc}(1 - \cos\theta)$$

We can see the scattering pattern is also depending on photon radius $\lambda/2\pi$ and electron's radius h'/2mc.

Besides, since the photon spins one 2π circle at its wavelength λ. The angular velocity of photon is actually its angular frequency W(=$2\pi f$). Thus, the maximal linear spin velocity of photon is
V=R*W=($\lambda/2\pi$)*($2\pi f$)=c=lightspeed
And, photon energy E is its spin angular momentum h' multiplies its angular velocity W. (E=h'W)

So, there is relation between Compton wavelength (h'/mc) and particle size. My deduction is well correlated with experimental observation. A theory suggested that Higgs mechanism gives all particle mass, and I think that theory is incorrect. I think all masses are transformed from wave frequency during photon-photon pair production. In the early universe, the space-time dimension is quite small, so there are much higher chance for photon-photon pair production to generate particles with masses and charges.
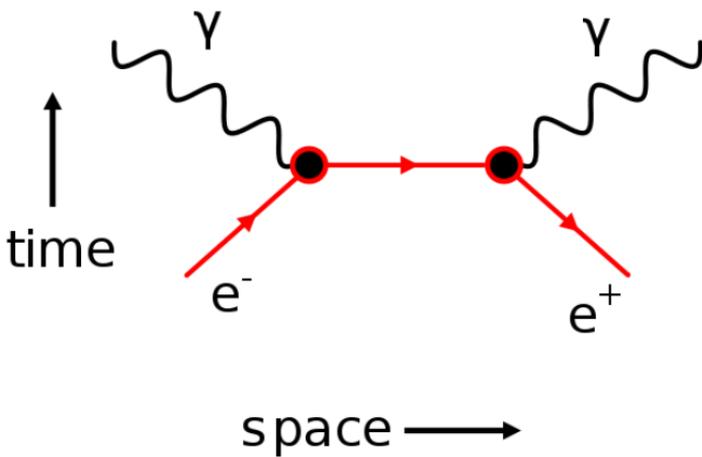
The greatest achievement of Dirac's quantum mechanics is that he derived the spin magnetic moment of electron. However, I think quantum mechanics is wrong. The formula of electron spin magnetic moment can successfully explain the Zeeman effect. We can also use the above concept to derive electron's spin angular momentum rmv.

A method to derive magnetic moment of electron is by treating the electron sphere as a small magnet:
M=P*l
For electron north pole, the magnetic strength is +p which is equal to the magnetic strength –p of electron's south pole. The total magnetic strength of electron is QV.
Either pole magnetic strength P=1/2QV=|+p|=|-p|
Distance l of two pole is 2r
Thus, magnetic moment is QVr

Finally, I will try to solve the mystery of number 137. 137 is suggested a coupling constant for electromagnetic interaction. However, it is poorly understood why it should be 137. Here is the fine

structure constant:

$$\text{Alpha} = \frac{KQ^2}{h'c} = \frac{1}{137}$$

Since the particle radius for electron or proton is r=h'/2mc. Thus, the fine structure constant is changed to be:

$$\text{Alpha} = \left(\frac{KQ^2}{2r}\right) \div (mc^2) = \frac{1}{137}$$

Thus, we can see that alpha is a ratio between electron/proton's electrostatic energy and their rest mass energy mc^2. Thus, it is why 1/137 is the coupling constant of electromagnetic interaction. Here, I want to incorporate Higgs mechanism, strong interaction, and weak interaction in the pair production model. Thus, we can try to explain why basic particles have discrete mass and charge. During the photon collision, two gamma beam with Higgs can generate massive Z particle, massive W+W-pair, and glueballs.

P+P->H->ZZ->fermion+anti-fermion(quark+antiquark)

During photon collision, two photons can be stopped in order to interact with Higgs boson. It is also true for photon-nucleus synthesis. It is because that photons with two equal and opposite momentums can let them cease or one photon beam stopped by the obstacle of atom nucleus. Only when photon stops, it can interact with Higgs boson. Photon is itself's anti-particle. Thus, photon collision is equal to photon-antiphoton annihilation. During the self interaction of photon particles, symmetry breaking happens. Then, massless Z boson obtain the mass from Higgs boson and become two massive Z bosons. Because Z boson is very unstable, it can easily decays into a fermion-antifemion pair such as quark-antiquark, especially meson such as pion.

P+P->H->W+W-
>electron+positron+neutrino+antineutrino

Another kind of gamma photon collision happens, two

photons can interact with one W boson pair (W+ boson and W-boson). It is also because that massless W boson acquires mass form the Higgs boson via Higgs mechanism. W boson is also a very unstable particle. It can easily decays into lepton plus neutrino. Thus, the W+W- pair will decay into electron-positron pair plus neutrino-antineutrino pair. Since neutrino and antineutrino usually travel near lightspeed, we may only detect positron and electron pair. That is why we can observe electron-positron pair production during gamma gamma photon collision or photon-nucleus collision. Not like the synthesis of Z boson described above, the amplitude of these two gamma photons should be large enough to make the W boson or subsequent lepton to have charge. W+ or W- boson has one unit basic charge. Thus, it can decay into electron, muon, or tau particles. All of these leptons have one unit charge because W boson has one unit charge only. In addition, larger mass muon or Tau can decay into smaller mass electron due to the decay model. Large mass particle is unstable. In addition, electron-positron synthesis needs least energy in the interaction with Higgs, so there are more abundant

electrons and positrons. Because Higgs boson has discrete mass, the basic particles from Higgs mechanism also have certain value of mass. However, the mass of Higgs still needs to be decided by LHC. It is worth noting that we can use two 511kev gamma rays to generate one positron-electron pair. It is less than the energy required for generating W+W- pair. However, due to principle of uncertainty, energy can be borrowed from vacuum and be returned back. Thus, after the annihilation of neutrino-antineutrino pair, the borrowed energy is returned. Thus, energy conservation is still kept. It is worth noting that W boson can also decay into quark-antiquark pair such as pion which is important QHD mediator for atomic nucleus.

The decay of W pair or Z pair generates fermion particles. Photon and photon collide with high speed and near elastic collision happens. Thus, single W or Z boson from Z pair or W pair are separated not fused. It individually decays to fermions. It is important to know that the neutrinos are mainly from the massive W or Z bosons. In the original standard model, scientists

thought neutrinos should be massless. However, if neutrinos are actually from the degradation of massive W or Z bosons, they should have mass.

P+P->H->quark-glueball->neutron-antineutron or proton-antiproton

In higher energy photon collision, even glueball can be interacted with higgs mechanism. Thus, glueball can generate nucleon such as proton or neutron via QCD theory mechanism such as quark-gluon plasma. Massive gluon can be generated after getting mass from Higgs boson. More gluon can form into glueball including quarks. Then, neutron-antineutron pair can be generated from the glueball. It is reasonable because gluon has no charge. However, proton-antiproton can also possibly be generated. If free neutron is generated, it can easily decay into proton via weak interaction with releasing one W- boson. Thus, proton has also one unit of charge. Other larger mass hadrons can also be generated via this mechanism. However, larger mass hadrons are unstable, and they can easily decay into proton or neutron which has the

smallest mass.

We can infer there is opposite mechamism:

e+e - -> W+W-->H->P+P

e+e - -> Z+Z->H->P+P

proton+antiproton->gluon+gluon->H-->P+P

neutron+antineutron->gluon+gluon->H-->P+P

The collision is near inelastic collision since the fermion cannot move with lightspeed. In these reactions, the elimination of particle and antiparticle pair generates W, Z boson or Gluons. Then, W boson, Z boson, and gluons will return their mass to the Higgs boson to generate Higgs boson. Higgs particle may be generated by W+W- annihilation, ZZ annihilation, or gluon-gluon fusion. That is why LHC uses this mechanism to search for Higgs particle. This paper explain all the pair production and annihilation process. So we unite four fundamental forces: strong force(gluon), electroweak force(P, W, Z boson, charge), and gravity(Higgs, mass).

Finally, I would like to discuss about the CPT-G symmetry of pair production or annihilation. During this process, symmetry usually occurs. These symmetry include charge conjugation(C-symmetry), parity

symmetry(P-symmetry), time symmetry(T-symmetry), and rotation symmetry(G parity symmetry). We know in the weak interaction, there is CP violation. That is charge conjugation and parity symmetry are violated during weak interaction such as beta decay. Here, I propose here that charge conjugation and parity symmetry are actually the same thing. During the pair production, the opposite(right or left) one dimensional space orientation (r or –r) of the matter and anti-matter gives them opposite charges. Thus, I say the sign of charge is depending on their space orientation during pair production. Based on charge relativity, positive and negative charge produces just opposite spacetime vortex(clockwise or counterclockwise). Thus, we see CP is usually coupled.

As for T symmetry, during pair production, matter and antimatter are generated due to the time symmetry. As Richard Feynman's suggestion, matter is produced in the positive time arrow(+t), and anti-matter is produced in the reversed time arrow(-t). That is anti-matter is time reversal product(time backward). Thus, due to time reversal or not, matter and anti-matter are

given opposite lepton number or baryon number. This is important because anti-matters disobey our current one directional time arrow. Thus, anti-matters are very unstable and have very short life time. Anti-matters will disappear in a very short time because they disobey causality(temporal relationship). That is the main reason why matter is much more greater than anti-matter in our universe. Thus, in galaxy, antimatter cannot easily be found. It is because anti-matter cannot survive in our universe's positive time arrow.

The final symmetry is the G parity. This is the symmetric relation of rotation. A concept called isospin explains this symmetry. Proton and neutron has the similar characteristics except the charge. Thus, proton and neutron are involved in rotational symmetry. Pions are also involved in this symmetry. Thus, if we combine these above findings together, we can get a new RST symmetry which is Rotational symmetry, Space symmetry, and Time symmetry. And, based on the symmetries, we can modify the Feynman diagram.

Reference

KokHawKonghttp://www.greatians.com/physics/mass/pair%20production.htm:derivation of electron size

Birth and end of universe

Birth of universe

The current mainstream theory of universe creation is "Big Bang" theory. It is thought that our universe began with a great explosion and started to expand. This theory is supported by several observed facts. First, our universe is actually expanding. In fact, our universe expands acceleratedly. It suggests that the universe was started from a tiny point and it expands to current volume. It seems to keep on expanding in the future. Second, there is background cosmic microwave radiation. There is 2.73 K radiation in universe which is not related to earth or sun rotation. Based on calculation, there will be 3-5 k background black-body radiation if the beginning of universe has billions K temperature. Thus, it suggests that there was high temperature in the beginning of universe. According to these two major reasons, Big Bang theory

is the most accepted universe creation theory. However, there are some unsolved problems in universe creation that is not explained by Big Bang. Since I propose that universal lightity (radiation pressure) is the actual cause of universe expansion, I will use this concept to further discuss universe creation.

In Stephen Hawking's theory, he thought that universe is from a black hole evaporation. His theory deduction is intact, and a black hole can emit radiation to finally lose all its information. This is the inevitable results of Unruh-Hawking effect. The problem is that there is black hole information lost paradox. We know a black hole can have at least three information: charge, mass, and angular momentum. If the final form of black hole evaporation is heat radiation, where is the charge, mass, and angular momentum information going? And, how about other bosons like gluons or W/Z particles? In the later chapter, I propose a unified field theory incooperating electromagnetism, gravity, spinity/impelity, heat, and light altogether. Thus, due to Unruh-Hawking effect, the black hole acceleration

transforming into heat can also mean the transformation of electricity, magnetism, gravity, spinity(angular momentum), impelity(linear momentum) into heat and light. In the more general form of this equation, we can also explain gluon or W/Z particle radiation. Thus, the information is not lost. This solves the black hole information lost paradox. There is black hole as well as black hole radiation. And, there is still conservation of information. It doesn't disobey the Liouville theorem. Black hole is unlikely happening in the beginning of universe. If the original unit space-Planck cell is a black hole, there is no outside space allowing black hole radiation going for this Planck cell to expand. Thus, the length of Planck cell must be larger than the Schwartzchild radius.

Thus, in the beginning universe, a maximal Planck mass must have a size to prevent black hole formation. If a stable black hole is formed in the beginning of universe, no universe synthesis will happen. Besides, the singular point in the middle of a black hole will let all physics laws to be invalid!

Then, what really happened in the beginning of universe? Here, I will propose a theory which is more likely. I call it "Ab Adam-Eve" theory. Our universe was actually created by avoiding black hole formation. "Ab" in Latin language means "from". "Adam" and "Eve" are the first man and woman respectively created by God according to Bible. In order to explain my theory, I need to introduce the concept of plank scale here. My theory is there was a particle named "Adam" and an anti-particle named "Eve" in the beginning of universe. Both "Adam" and "Eve" are in the scale of Plank mass. If "Adam" or "Eve" exceeds the scale of Plank mass, gravity singularity will occur to form a black hole. Thus, there was a maximal mass allowed for "Adam" and "Eve". In Chinese Taoism, the origin of nature is due to "Ying" and "Yang". We can also call "Adam" as "Yang" or "Eve" as "Ying". In the two primordial particles, "Adam" has positive charge and "Eve" has negative charge. In the Plank scale of the beginning minimal spacetime volume, "Adam" and "Eve" collided each other. Then, a great particle-antiparticle annihilation occurred. This process is the actual "Big Bang". The

great annihilation created the Plank scale of the maximal temperature. According to radiation pressure (universal lightity: $P=kT^4/c$), the universe started to expand. The space-time began to expand.

The formula of Planck mass is:

$$Mp = \sqrt{\frac{h'c}{G}} = 2.176 * 10^{-8} \text{kg}$$

It is due to the primordial mass size(radius) must exceed Schwarzschild radius to avoid black hole formation:

$$\frac{h'}{2mc} \geq \frac{2Gm}{c^2}$$

Thus,

$$Mp \leq \sqrt{\frac{h'c}{4G}} = 1.088 * 10^{-8} \text{kg}$$

In addition, the primordial mass has Planck charge in this Planck epoch. Planck charge formula is:

$$Qp = \sqrt{\frac{h'c}{K}} = 1.88 * 10^{-18} \text{coulomb}$$

We can say the Planck particle "Adam" has positive Qp and antiparticle "Eve" has negative Qp.
In addition, the minimal possible Planck length is the diameter of the Planck mass:

$$Lp = \frac{h'}{2mc} = \sqrt{\frac{h'G}{c^3}} = 1.616 * 10^{-35} \text{meter}$$

After the primordial particle-antiparticle pair annihilation, the mass energy totally transformed into radiation energy. This is high energy situation, and It did not simply form two opposite radiation rays. This annihilation can produce multiple bosons and fermions as well.

$$Mp * c^2 = K * Tp$$

The Planck temperature which is the maximal temperature of universe is then:

$$Tp = \sqrt{\frac{h'c^5}{GK^2}} = 1.417 * 10^{32} \text{K}$$

The Planck time is defined by the duration that formed radiation passed the Planck length at the Planck epoch:

$$t_p = \frac{Lp}{c} = \sqrt{\frac{h'G}{c^5}} = 5.39 * 10^{-44} \text{sec}$$

Planck time and Planck length are the smallest unit of our universe spacetime at Planck epoch. And, Planck temperature is the maximal highest possible temperature in our universe. The Planck frequency from Planck energy is the maximal possible energy and frequency for the earliest/smallest time in the beginning universe. It is worth noting the Einstein's hole argument here. Einstein's general relativity shows that spacetime cannot exist without matter. Leibniz also proposed the relative spacetime and Leibniz equivalence. A single spacetime point is meaningless. Thus, the two plank mass-charge(matter-antimatter) within the plank space is the original-most universe. The plank volume/size exists because it needs to allow the existence of the primordial mass-charge. Hawking thought the universe is from a black hole. I don't think this is true because this implies that the beginning of

the universe is just from a singular spacetime point without mass. Based on the hole argument, this will disobey the determinism or causality. And, this singular point space won't exist because no matter exists. In addition, the time within the early-most black hole is only imaginary or meaningless. Thus, our universe is not from a black hole. It is from two primordial charge-mass sitting in Plank space. Based on our above calculation, we can see the Plank volume/length is totally depend on the size of Plank mass. Thus, the early-most space is dependent on mass. The time started after the primordial matter-antimatter annihilation with light pressure generation. Actually, the early-most universe is from a situation (like Tai-Ji) which avoided the black hole formation.

Due to Unruh effect and radiation pressure (universal lightity), the universe started to expand acceleratedly:

$$P = \frac{\sigma T^4}{c}$$

$$T = \frac{h'a}{2\pi cK} = \frac{h'c}{2\pi xK}$$

The cosmic inflation theory explains why our universe is flat, homogeneous, and isotropic. Due to the above formula, the highest Planck temperature caused the maximal acceleration to expand the initial universe. This period fulfills the inflation theory. When the universe started to expand, the universe radius x kept on increasing. Since the universe radius x is inverse proportional to temperature T, the acceleration caused by temperature could be lower. Thus, the inflation speed in early universe started to become lower. It is worth noting that heat is transformed into outward acceleration in our universe. It is not acceleration is transformed into heat. The one direction universe arrow is time arrow, entropy arrow, and radiation arrow. In addition, since the spacetime in the initial universe is so small, the chance of radiation head-on collision is very high to form all the mass and charge which are seen in our universe. Then, you may doubt who made the two primordial masses. The primordial masses may be made by particle-antiparticle pair production by using two radiations or one radiation with $1.855*10^{43}$Hertz head-on collision. This radiation frequency is called Planck frequency which is the

theological maximal possible radiation frequency. However, this is the maximal possible theological deduction. Since the particle's radius is equal to reduced Compton wavelength, it highly suggests that the two Planck charge-masses are made from two radiation rays. Mass and charge were united in the radiation ray. Frequency of radiation was transformed into mass, and amplitude of radiation was transformed into charge. The original radiation period was the grand unified status. After the Planck charge-masses are formed, charge and mass are separated. Charge (electronuclear) causes spacetime torsion, and mass causes spacetime curvature. After the further pair production and annihilation, weak force and strong force are separated from the electromagnetic force. This is the sequence of the birth of all the fundamental forces. According to Godel's incomplete theorem, we cannot completely deduct how the primordial mass-charge was formed. Thus, we need to assume that God's(Buddha's) hand involved in the creation of universe.

Here, I also want to discuss about the concept of zero

point energy. According to the Einstein-Stern formula:

$$E = \frac{hf}{e^{\frac{hf}{kT}} - 1} + \frac{hf}{2}$$

We can see when the absolute temperature is zero, there is a minimal residual energy. This state is the earliest universe when Adam-Eve particles exist. It is the minimal energy needed to maintain the minimal spacetime to let the Ying-Yang particles exist. This is zero point energy. We can also find out absolute zero can never achieve because there is always zero point energy. And, based on Unruh-Hawking formula:

$$\frac{1}{2} KT * 2\pi = \frac{1}{2} hf$$

The half photon energy (zero point energy) is the minimal kinetic energy per degree of freedom. And,

$$KT * 2\pi = hf$$

We can see a relationship between KT and hf. We can view KT as a radius increase and hf as a circumference increase during spacetime expansion. Thus, there is a relation like x=2πr.

In addition, the imaginary time is not possible. Based on Euler's formula:

$$e^{ix} = \cos x + i \sin x$$

Thus,

$$e^{2\pi i} = 1$$

And, the imaginary time based on definition is:

$$i * t = \frac{h'}{kT}$$

Thus,

$$2\pi i = \frac{hf}{kT}$$

We put this into Einstein-Stern formula above. Then,

$$E = \frac{hf}{e^{\frac{hf}{kT}} - 1} + \frac{hf}{2} = \infty$$

Thus, if the imaginary time exists, the energy needed is infinite large. That means imaginary time is not possible. There is only real time, no imaginary time.

End of universe

After the discussion of the birth of our universe, we will discuss about the end of universe. The dominant factor deciding the fate of our universe is universal lightity (radiation pressure).

$$P = \frac{\sigma T^4}{c}$$

$$T = \frac{h'a}{2\pi cK} = \frac{h'c}{2\pi xK}$$

Combing the above two formula:

$$P = \left(\frac{\pi^2}{60}\right)\frac{h'c}{x^4} = \left(\frac{\pi^2}{60}\right)\frac{h'}{tx^3} = \frac{\sigma T^4}{c}$$

Currently, our background cosmic radiation is 2.73K. In the end of universe, the absolute temperature will be approaching zero temperature. Although absolute zero temperature is impossible to reach due to third law of

thermodynamics, it is still highly possible that the universe will be near 0.0000001 K degree to approach so called "heat death" epoch. If it is true, then the spacetime of universe will be approaching infinite large due to the above formula:

$$T^4 \propto \frac{1}{tx^3}$$

Thus, there is no doom day for our universe. Our universe will approach near infinite large. Both space and time will be near infinite large. In addition, we need to exam if our universe will really approach "heat death". We need to find out what causes galaxy to radiate first. Spiral galaxies are the dominant galaxies in our universe. Spiral galaxies have both charge and mass. Due to Larmor equation, charge will radiate if there is acceleration:

$$\text{Power} = \frac{a^2 Q^2}{6\pi\epsilon c^3}$$

The gravity field is actually acceleration due to the relativity equivalence principle. Thus,

$$a = \frac{GM}{R^2}$$

Combing the above two formula, we can get:

$$\text{Power} = \frac{2KG^2Q^2M^2}{3c^3R^4} = 4\pi R^2 \sigma T^4$$

In spiral galaxies, there is unlikely loss of charge and mass. The charge and mass will be conserved in spiral galaxies if the emitted radiation is due to the gravity acceleration of rest charge in galaxy center.

In the elliptical galaxies, the radiation is due to the strong gravity field acceleration from huge mass. We can also apply the Unruh-Hawking effect:

$$T = \frac{ah'}{2\pi cK}$$

Thus,

$$\text{Power} = 4\pi R^2 \sigma T^4 = 4\pi R^2 \sigma (\frac{ah'}{2\pi cK})^4$$

In massive galactic center:

$$\text{acceleration a} = \frac{GM}{R^2}$$

If there is such mechanism, the radiation emitted from both elliptical and spiral galaxies will be lasting forever. In addition, if we put the relation of acceleration and temperature (Unruh effect) into the above equation,

we can find out the direct proportional relation of electromotive force and mechanic acceleration (Stewart-Tolman effect) as well as the direct proportional relation of electric potential and temperature (Thermoelectric effects such as Seeback effect). We can link Larmor formula to Stefan's law.

$$\text{Power} = \frac{a^2 Q^2}{6\pi\epsilon c^3} = 4\pi R^2 \sigma T^4$$

And, the surface electric potential of a sphere is V=KQ/R. In addition, we can introduce a^2 instead of T^2 in the right side of the above equation.

In addition, the planck charge is:

$$Q_p = \sqrt{4\pi h' c \epsilon}$$

Thus, we can link heat energy(temperatute) to electric potential(voltage) with a constant: planck charge:

$$KT \propto Q_p * V \propto a(g)$$

There is a direct relation between absolute temperature or acceleration and electric potential(voltage). It means that electric potential and temperature/acceleration can be mutually transformed.(Thermoelectric effect or Piezoelectricity) This also explains the physical meaning of planck charge. We can rearrange the equation as:

$$\frac{2\epsilon V^2 a^2}{3c^3} = \sigma T^4$$

If we want to transform the above equation into field, we can divide the right and left side of the equation by $4\pi R^2$. (R=field distance=radius). Then, the above equation will become:

$$\frac{E^2 a^2}{6\pi c^3} = \frac{\sigma T^4}{4\pi \epsilon R^2}$$

If an accelerated charge can radiate as Stefan's law, the photon then will have four fields(gravity field, spinity/impelity field, electric field, and magnetic field). In photon, there is direct relation of electric field and magnetic field(E=CB) and a direct relation of gravity field and spinity/impelity field(g=a=1/2ωi). So, we can also put magnetic field and spinity/impelity field into the above equation. Thus, we can link the temperature field(heat field) in the right side to the gravity field, spinity/impelity field(angular momentum and linear momentum), electric field, and magnetic field in the left side by this equation via light/radiation. A photon can be generated with amplitude(E & B) and frequency(g & i) with the Stefan's law σT^4.

$$\epsilon E * B * I * G = \frac{6\pi\sigma}{t(^r/_R)^3} * T^4$$

Photon is important for the beginning and end of our universe. This equation can explain a particle such as proton, electron, or neutron which has mass-gravity field and then have temperature. The temperature radiation in four dimensional space-time causes electric field, magnetic field, gravity field, and impelity field which can make a photon. This equation can also explain the mutual transformation between light and heat. The volume V can be thought as our universe total volume, so this equation can explain the transformation of light to universe background temperature.

In above case, we consider photon radiation by fermion particle absorbing heat energy. We can also consider other boson radiation as well such as gluon and W/Z particle. We just replace the electric field and magnetic field by Yukawa field in the above equation. With strong interaction coupling constant g-s, gluon can be emitted from the heat absorbing fermion. With

weak interaction coupling constant g-w, W/Z boson can be emitted from the heat absorbing fermion. We just need to put mass term in the Yukawa field for them. Coulomb potential for the photon is just the modified special case Yukawa potential with zero mass of photon. Thus, this equation can also include strong and weak force.

Higgs and meson bosons can also be radiated from fermions absorbing heat energy. We can also use generalized Yukawa potential-field instead of electromagnetic field in the above equation to explain Higgs and meson(pion etc) radiation. There is also mass term and gravity field for higgs boson and meson boson. Although Higgs and pion has zero spin, they can still have linear impelity field. Thus, the above equation also explains the radiation of higgs and mesons.

We then can look at the fermion for the equation. Larmor formula is still valid in rest charge or slow moving particle compared to lightspeed. It explains how the particle (fermion) such as charge can transform its four fields into heat. And, then heat can

be transformed into radiation(boson). Neutron has no charge but it still have gravity and acceleration. Thus, its acceleration can be transformed into heat first. And then, its heat still can be transformed into radiation. kT^4/c is also radiation pressure. Light wave's longitudinal component: sound wave like pressure wave is also included. This equation is the united field equation.

However, the universe Ricci tensor is:

$$Ruv = -K(-\rho U_u U_v + p g_{uv})$$

When the light pressure p decreases due to temperature drop, the net energy momentum will approach zero. Then, our universe will cease expansion. But, we know the energy is the function of spacetime and spacetime is the function of energy based on the light pressure-spacetime formula. Galaxy mass is conservative. Thus, mass will keep on contracting spacetime. Then, contracting spacetime will generate energy(radiation). Because everything has mass and acceleration, absolute temperature zero cannot be achieved. Mass cannot be changed, but photons can be generated forever. Even the universe

temperature drops to near absolute zero due to universe expansion(consumption of pre-existing radiations), more and more new photons can still be emitted from galaxies to overcome the magnitude of gravity contraction. So, our spacetime will expand to near infinity large(space) with infinity long(time). It is likely the galaxies will be ever shining forever!

Here, I will try to deduct light-to-mass ratio and Tully-Fisher relationship for galaxy here, especially for spiral galaxy. The typical luminosity-mass ratio for galaxy is L->M and the Tully-Fisher relationship is L->V^4. The luminosity formula is:

$L=4\pi R^2\sigma T^4$

In rotating star or galaxy, we know the spinity formula:

$F=SJm\omega/r^2=SMV^2/r^2=ma$

And, we know Larmor formula:

$P=Q^2a^2/6\pi\epsilon c^3->4\pi R^2\sigma T^4$

If the spinity acceleration in provides the acceleration for the rotating spiral galaxy core, then a->MV^2/r^2.

Thus, $T^4->Q^2*a^2/R^2->Q^2M^2V^4/r^4R^2$. And, we know ration pressure induced luminosity relation is:(Due to radiation pressure gradient is the momentum transfer)

$L \rightarrow T^4 r^4 / M$

We put the above T^4 relation into the second relation. Then, we get:

$L \rightarrow Q^2 M V^4 / R^2 \rightarrow Q^2 M \omega^4 R^2$

(Q is charge, M is mass, V is max rotational velocity, ω is max angular velocity, and R is the galaxy radius)

We can also view R as the distance between the galaxy and our earth, so the adjusted luminosity formula can be obtained. Thus, we get the Tully-Fisher relationship and the mass-to-light ratio!

Here, we can see if radius R is smaller, then the light-to-mass ration L/M is larger. When there is a smaller star or galaxy, the luminosity L is proportional to M^2 to M^6. This can help to explain why there is L/M ratio change due to the size of galaxies or stars.

Finally, I would like to discuss about the final destiny of our universe. We should know the Einstein's twin paradox first. According to time dilation formula: $dt' = \gamma dt$ (γ is Lorenz factor), the twin brother traveling in spacecraft will be younger than his the other twin brother. It is because the moving velocity in the spacecraft has time dilation effect. Thus, the time

passed much slower in spacecraft. If the spacecraft is moving near lightspeed, then the twin brother in the spacecraft will not get old or he could live for a very long time.

Then, we can think about our light pressure-spacetime formula. (T^4->$1/tX^3$)The formula explains that light pressure cause our universe(spacetime) to expand. The universe time is slower and slower. When the universe temperature is dropping to near zero and the total mass in our universe is few, then there will be a great time dilation effect. It is likely because light pressure effect (dark energy) is much greater then gravity effect now. The universe time may be approaching to infinite large. This is similar to the effect of the above twin brother in the spacecraft. People at that time will have a very long life expectancy. Besides, galaxies will still be shining forever based on the above deduction providing more and more energy. Because stars also have gravity acceleration and subsequently temperature, stars like sun will also keep shining. Radiation will be kept on releasing from the stars. Even a planet like Earth or Saturn will also generate heat in their inner core continuously. Here, I will like to point

out the concept of center of mass. The gravity about center of mass formula is:

$$F = \frac{GMm(r_{cg}-r)}{|r_{cg} - r|^3}$$

We know gravity acceleration is g=F/m. The r_{cg} is the center of mass(=0) and the r is the distance. Thus, the gravity acceleration will be larger inside the mass. That is the reason why inner stars or planets have strong acceleration and temperature. Currently, we don't know how supernovae get radiation energy to explode when it suffers from core collapse. When a supernovae collapses, the diameter shortens and the net gravity acceleration increases(a=GM/r^2). We know the acceleration is proportional to temperature due to Unruh effect, so the supernovae will acquire again the radiation pressure to explode(p=kT^4/c). This can also apply to sonoluminescence.

Theory of everything in chemistry

Determinative atom model

The most accepted atom model currently was proposed by Dr. Bohr and by Dr. Schrodinger and Dr. Dirac subsequently[12]. However, many phenomenon cannot be explained by Bohr's atom model. He used Coulomb electric force as the centripetal force to explain the rotation of electrons around nucleus. Another very important basic forces, magnetic force and frame-dragging force (spinity), were neglected and not included in his atom model. In Schrodinger's atom model, there are problems limiting the formation of correct atom model such as principle of uncertainty, Schrodinger's cat, and EPR paradox[345]. In this study, a new determinative atom model is proposed to explain atomic phenomenon and to solve above puzzles.

According to a previous important research by Professors Ostuka T and Tajima N, proton group and neutron group are packed separately and rotating collectively in the nucleus status [6]. This phenomenon

can also be confirmed by the semi-empirical mass formula from liquid-drop nuclear model:

$$Eb = \alpha(v)A - \alpha(s)\frac{A^2}{3} - \alpha(c)\frac{Z^2}{A^{1/3}} - \alpha(a)\frac{T^2}{A}$$
$$+ \delta(A, Z)$$

In the asymmetric term T(which is neutron-proton isospin difference N-Z, the difference of neutron numbers and proton numbers will decrease the nuclear binding energy. This can be explained only when protons and neutrons are packed separately. If they are packed together, there will be no difference in the binding energy. Thus, there are proton subplace and neutron subplace in the nucleus. It is worth noting that magnetic moment of proton is +14*10^-27 J/T and the magnetic moment of neutron is -9.7*10^-27 J/T. Electron also has a negative magnetic moment, so neutron is like electron in the aspect of magnetic moment. Positive sign means any proton's magnetic moment is parallel to its spin, and negative sign means any neutron's magnetic moment is antiparellel to its spin. Thus, when protons (proton line) and neutrons

(neutron line)rotate in the same direction, there will be an repulsive magnetic force between them. However, there is an attractive nuclear force mediated by pion between neutron and proton. In addition, we know the strong force is represented by Yukawa potential which is related to charge. The formula is:

$$V(r) = \frac{-g^2}{r} e^{\frac{-r}{d}}$$

(d: mediator particle diameter=h'/mc, g:coupling constant)

The pion particle mediates the nuclear force between neutrons and protons. This is the reason why proton group and neutron group attract each other in atomic nucleus. In addition, pion interaction also happens between proton and proton or between neutron and neutron. It explains why neutrons in nucleus won't decay into protons. There is a spin dependent (tensor component) and charge independent in this nuclear force. If the two nucleons stand up-and-down with same spin, there is an attractive nuclear force between. That is the reason why neutron group and proton group can rotate collectively in the same direction.

I propose that the arrangement of protons and neutrons in atomic nucleus should be in two lines like:

+-+-+-+-+-+-   Protons
+-+-+-+-+-+-   Neutrons

+ means clockwise spin and – means counterclockwise spin. Because there are Coulomb repulsive electrostatic forces between protons, only protons with opposite spin can stand in a line. Thus, there is no net force(Coulomb electrostatic force balances spin magnetic forces). It is also true for neutrons. Because neutron has magnetic moment, only neutrons with opposite spin can attract each other to stand in a line. In addition, because of the Coulomb repulsive forces between protons, protons won't be form a sphere-like structure and they can only make a line. And, neutron's magnetic forces between each other also prevent neutron sphere formation. However, if there are too many neutrons, the gravity between neutrons still will let neutrons to tend to form a sphere-like structure. Besides, in a heavy nucleus, there are more neutrons needed to have enough magnetic moment compared

to proton groups. This is especially important in an atom with an even-odd nucleus. Neutron excess is important to maintain the stability of atom. Nuclear magnetic moment is also important in electron orbiting. Between proton and neutron, there is nuclear force mediated by pion. Besides, if there is a proton-sphere with some protons hidden in sphere center, the net charges of protons will be canceled out due to screen Coulomb effect. Thus, the two line arrangement is the most reasonable arrangement. If the nucleus is static such as in an even-even nucleus, it is like a prolate rugby shape. If the proton line and neutron line is rotating in an even-odd, odd-odd, or odd-even nuclei, the nucleus will be like an oblate moon-cake shape. This new nuclear model solves the mystery of atomic nuclear shape. Because there is an unequal magnetic moment between neutron and proton, there will be a net nuclear magnetic moment. In order to combat this intrinsic magnetic moment, the nucleus will start to rotate with the short axis as the rotational axis due to the conservation of angular momentum. The nucleus won't rotate along its long axis because of the characteristics of meson mediated nuclear force

and the direction of nuclear magnetic moment. Nuclear rotation must generate two opposite directions with opposite magnetic moments for the outer electrons. If there is even-even nucleus, we can see the balanced spin-antispin of protons and neutrons will generate no net magnetic moment and no nuclear spin(angular momentum). If there is an unequal magnetic moment between neutron and proton in even-odd, odd-odd, or odd-even nucleus, there will be a net nuclear magnetic moment corresponding to the extra neutron or proton or unbalanced proton-neutron pair. In order to combat this intrinsic magnetic moment, the nucleus will start to rotate with the short axis as the rotational axis due to the conservation of angular momentum (Barnett/Einstein-deHaas effect). The generated rotating magnetic moment is opposite to the intrinsic nuclear magnetic moment.(u=qJ/m). In even-odd, odd-odd, odd-even nucleus, the net angular momentum or net nuclear spin is not zero since the nucleus is rotating.

The nuclear shell model is the current popular nucleus model. However, I think it is not correct. If nucleons are

forming a circle, then the centrifugal force generated by these protons or neutrons will let them to accelerate to move out the nucleus. Besides, the nuclear shell model cannot include odd protons/neutrons in a circle because of Coulomb repulsion between nucleons with same spin. The shell model also precludes the newly added nucleons due to its close circle characteristics. And, opposite protons in the shell model will not both attract outer electrons due to electric shield effect. The opposite protons in a circular shell can also repel each other to make the shell model unsable. In addition, the atomic nucleus is compact due to Rutherford's experiment. Thus, nuclear shell model is wrong.

The mass of neuron and proton is almost equal. In light atom, proton mass numbers are equal to neutron mass numbers. Thus, proton group angular momentum should be equal to neutron group angular momentum when they have same numbers.

Frame dragging force (spinity) is a newly identified force. I propose here that "rest mass produces gravity,

spinning mass produces spinity; rest change produces Coulomb electric force, spinning and moving charge produces magnetism". Frame dragging effect was derived by Dr. Lense and Thirring to describe the procession of an orbiting object using general relativity [7]. Nobel prize winner Dr. LD Landau also derived orbiting object's lagrangian around central spinning mass using general relativity[8]. I propose to call this new force "spinity" because it is a combination of "spin" meaning origin of this force and "ity" meaning basic force. Frame dragging means a spinning mass can drag nearby space-time to rotate around the mass, so it is actually a force which can cause peripheral smaller object to orbit around the central mass according to the basic concept of general relativity Below is the summary of Professor Landau's derivation from general relativity[78]:

$$\text{Spinnity } F = \frac{SJj}{r^4}$$

(S=2G/c^2,J=central mass spin angular momentum,j=peripheral mass orbiting angular momentum)

Considering the angle θ between orbiting object and the equator plane of central spinning mass, the formula can be adjusted into:

$$F = \frac{SmJ\omega\cos\theta}{r^2} = ma$$

However, because neutron or proton has very tiny mass (~10^-27kg), the spinity produced by neutrons or protons is very tiny compared to electromagnetism. However, the frame dragging force produced by nucleus can help the electrons to orbit around the nucleus in the middle plane of proton group rotation and neutron group rotation. In addition, gravity produced by nucleus will let light electrons to orbit around the nucleus.

Bohr's atom model only considered about Coulomb electrostatic force. However, since both proton and neutron have magnetic moment, the magnetic forces generated by proton or neutron cannot be neglected. Since proton and neutron are rotating in the same

direction but they have opposite sign of magnetic moment. Thus, they can generate opposite magnetic field for electrons in the orbit. Because the opposite magnetic fields from proton and neutron, the only possibility that electrons won't be affected by external magnetic force to cause acceleration is that electrons are in the middle plane of protons and neutrons rotating plane. Only when electrons rotate in the middle plane, the atom can maintain stable. The magnetic moments generated by neutrons or protons rotation can also help the electrons to rotate around the nucleus in the middle plane of protons and neutrons rotation. The net force including magnetic force and frame-dragging force from the proton and neutron is:

$$F = \frac{uQV_pqV_e}{4\pi r^2} - \frac{uQV_nqV_e}{4\pi r^2}\left(-\frac{SJj}{r^4}\right)$$

Thus, we know that all electrons are rotating in the middle plane of protons and neutrons rotation. This is due to the following formula:

$$\tau = mXB$$

$$F = \nabla(m.B)$$

When nucleus spin, the spinity of the nucleus(minor component) and the magnetic moment of neutrons will let the electrons to rotate around the nucleus with proton group's rotation direction. Besides, the magnetic moment of protons can let the electrons to rotate around the nucleus with opposite direction as protons' rotation direction. Thus, it can explain the two direction of electron standing waves explained later. The torque induced by protons or neutrons can let the electron's orbit to align with protons or neutrons magnetic field. Electromagnetism causes a spacetime spinning whirlpool. The force induced by protons or neutrons can accelerate the electrons to let them have enough orbiting velocity to have enough centrifugal force to compete with protons' Coulomb electrostatic force. Finally, the Coulomb electrostatic force, magnetic force, and centrifugal force will reach a balance. There is a standing wave in electron's movement. Besides, the magnetic force from protons will balance the magnetic force from neutrons and the nucleus spinity. And, there is no net acceleration for the electron. The electron can maintain in a

homogenous position.

According to Bohr's deduction, electrons are rotating around protons because protons provide electric force as centripetal force. And the centripetal Coulomb force is equal to centrifugal force produced by electron's orbital rotation movement. Viewing from an inertial reference frame, we find that there is a centripetal force during electron's orbital rotation. However, we know the example of general relativity's equivalence principle. Thus, the centripetal force observed from inertial reference frame is actually a centrifugal force acted on the electron itself (acceleration reference frame). In order to maintain the electron's orbit, the centripetal Coulomb force must be equal to the centrifugal force due to electron's orbit movement. There is a misleading that centrifugal force is fictious force. The acceleration of orbiting or spinning is a=dV/dt. And, dV=Vdθ, so a=V*dθ/dt=V*w. Angular velocity w is not a vector, so the acceleration direction is the same as V. When the orbiting or spinning acceleration continues, the orbit tends to be enlarged. Thus, there seems to be an outward force which is so-

called centrifugal force. The balance of centrifugal force and Coulomb's force is very important because the electron's net acceleration then is zero. Thus, the electron won't radiate energy and fall into nucleus. We can deduct net inward/outward force: Net Fio.

$$Fc = \frac{KQq}{r^2}$$

(K=Coulomb constant=9*10^9, Q=proton charges, q=electron charges, r=distance between electrons and protons)

$$Net\ Fio = \frac{KQq}{r^2} - mr\omega^2 = \frac{KQq}{r^2} - m\frac{V^2}{r} = 0$$

(W=electron's orbital angular velocity)(7)

When angular momentum is quantized, then the formula is given following:

$$r = \frac{nh'}{mV}$$

(n=major quantum number, h'=reduced planck constant=1*10^-34, m=electron mass, V=electron orbital linear velocity)

Thus, we can get:

$$\frac{KQq}{r} = mV^2$$

$$\frac{KQq}{nh'} = V = Ve$$

For example: In hydrogen atom with n=1(innermost orbit) and Q=q=1.6*10^-19coulomb, the value Ve becomes:

Ve=2.3*10^6m/sec

Thus, electron orbital linear velocity is less and close to light speed (3*10^8m/sec).

Even the largest atom's electron linear velocity is smaller than lightspeed. For the atom118, the Ve becomes (Q=118q and n=1):

Ve=118*2.3*10^6=2.7*10^8m/sec

It is worth noting that the largest atom be possibly formed is Feynanium (Z=137). Due to my modified Bohr atom model, the electron velocity will exceed light speed if atomic number is greater than 137. Based on Dirac equation, the largest atom should have Unseptinum z=173. It is wrong because Dirac equation is wrong.

Total energy emitted from orbiting electron is:

$$\text{Total E} = (\frac{-KQq}{r^2} + m\frac{V^2}{r})r + \frac{1}{2}mV^2 = \frac{1}{2}mV^2$$

$$= \frac{13.6ev}{n^2}$$

This is seen in a simple Hydrogen Bohr atom. In a more complicated atom, the following formula must be obeyed:(Coulomb electrostatic force, magnetic force, and centrifugal force are in a balance). But, in a static nucleus, there is no magnetic term.

$$\frac{KQq}{r^2} \pm \frac{\mu Q_{m1}q_{m2}}{4\pi r^2} = mr\omega^2$$

It is important to compare my atom model to Bohr model. When the electron absorbs photon energy, it can increase its kinetic energy. Then, the linear velocity of the electron will enhance, and then the centrifugal force mV^2/R will increase to let the electron to jump to the outer orbit. The energy gap is $\triangle E = Ef-Ei = hf = 1/2mVk^2$. The orbiting frequency of the electron in the outer orbit is equal to absorbed photon frequency:

f=1/T. However, when the eelctron is in the outer orbit, there is force imbalance that centrifugal force is not equal to Coulomb electrostatic force. So, the electron will start to radiate with frequency f due to acceleration. Later, the electron will fall back to the original inner orbit due to reduced centrigual force. It is like $mgh = KQg/r_1 - KQq/r_2 = 1/2mVk^2 = hf$. The potential energy can be exchanged to kinetic energy or photon energy. The new atom model can also explain the Rydberg formula.

Magnetic force plays an important role in the new atom model. In this new atom model, electric force and magnetic force are serving as two balanced force to control electron movement.

According to Coulomb's magnetic law, the magnetic force induced by two spinning charges is:

$$Fm = \left(\frac{\mu}{4\pi}\right) * qVs * \frac{qVs}{r^2} = \left(\frac{K}{c^2}\right)\frac{q^2}{r^2}Vs^2$$

If the paired electrons are spinning in the opposite direction, the magnetic force between them is

attractive.

We can deduct net in-between force Fib:

$$\text{Net Fib} = \text{Fc} - \text{Fm} = \left(1 - \frac{Vs^2}{c^2}\right)\frac{Kq^2}{r^2} = 0$$

(Vs=electron spin linear velocity)

Electron spin velocity (Vs) is light speed to overcome the repulsive electric force. Thus, the net force between the two electrons is close to zero. Because the two paired electrons spin in the different direction, they can be coupled together like two small magnets. However, the tiny balanced spinity and gravity between the two paired electrons will keep the two paired electrons to keep in the same orbit position. The same orbit position is also kept from the electro-repulsive force from other electrons in the orbit. Because the paired electrons need specialized spin direction, it is more difficult to pack them compared to unpaired electrons. In addition, nucleus' small spinity will let electron to tend to rotate around nucleus spin first. Thus, it can explain Hund's law why unpaired electrons are arranged in an atom first.

It is also worth noting that a paired electrons(size 10^{-13}m) with opposite direction in the orbit are in the same position compared to the long distance of atomic nucleus($>10^{-11}$m). Even the two electrons have opposite spin, this paired electron unit has no net magnetic moment output for the nucleus. Thus, there is no magnetic force between paired electron and the nucleus due to the electron spin. Especially in the even-even nucleus, there are even numbers of protons and even numbers of neutrons. Thus, the paired nucleon arrangement will let no spin induced nuclear magnetic moment to generate. Then, the even numbered paired electrons in the orbit are in a balance position. In the atom with even-even no net spin nuncleus, electrons are still in the middle plan of neutron or proton groups' rotating plane. It is because the plane is the rotating plane for neutrons' or protons' magnetic moment. Thus, atoms with even-even nucleus are more stable. And, there is no net acceleration for the electron.

Pauli's exclusion principle is saying that no two electrons have the exactly the same quantum number.

If two electrons are in the same position, their spinning direction must be different. However, Pauli's exclusion principle suffers from EPR paradox even the principle is effective. The EPR paradox is saying that: If we move away one of two paired electron to a far away distance. If we check one electron's spinning direction, the other electron's spinning direction can be decided at once. Thus, it disobeys the principle of locality of physics. In this new atom model, we infer that two electrons are in the same orbital position rotating around the nucleus. In addition, one electron is a little bit left of the electron orbital rotational plane and the other one is a little bit right of the electron orbital rotational plane.

Electron spin will let them become a small magnet. The spinning direction can decide the direction of magnetism. Thus, the two electrons have different spinning direction, so they can couple together as two small magnets. Thus, EPR paradox is solved. The different spinning direction of two electrons is because they use it to couple each other in the same orbital position. If the two electrons are separated, the

spinning direction of the two electrons will be changed. It can explain why Pauli's exclusion principle is effective.

From Bohr's deduction:

$$E \text{ total} = \frac{Re}{n^2} = \frac{-13.6eV}{n^2}$$

From the Etotal equation, we can infer that the relationship between radius and major quantum number (n). When n=1, r is called Bohr radius(r=1^2). When n=2, r=2^2=4 Bohr radius. When n=3, r=3^2=9 Bohr radius. When n=4, r=4^2=16 Bohr radius. We can also infer the radius of electron rotation. Form inner to outer orbit, the radius should be like 1, 4, 9, 16, 25, 36. Two electrons can be in the same orbital position. The circumference is 2πr, so the magic numbers can be predicted: 2, 8, 8, 18, 18, 32, 32. It is because that one paired electrons are arranged in a 2π distance, and then another paired electrons are arranged in resulting π distance. It is worth noting that electron can propagate in standing wave. The formation of standing wave is due to opposite propagating wave with same

frequency and amplitude. For examples: In 2π distance, electrons are rotating in clockwise direction (n=2 orbit, totally 8 electrons). In subsequent final π distance, electrons are rotating in counterclockwise direction and in the same plane (n=2 orbit, another 8 electrons). It is because only this can let formation of standing wave. Thus, there is no energy loss and atom can be extremely stable. Current quantum mechanics model assume standing wave formation, but it didn't have two equal waves propagating in opposite direction. Thus, current quantum mechanics theory cannot generate standing wave actually. Thus, we can explain the origin of diamagnetisim. For example, Ar with its electron configuration: 2,8,8. In n=2 orbit with two nodes, Argon's electrons are both rotating in clockwise direction and counterclockwise direction. Thus, there is no net magnetic moment generated by these orbiting electrons. So, Argon is generally diamagnetic. It can also explain why there is only 2 electrons in n=1 orbit. In the n=1 orbit, only a round circle wave can be formed. Thus, if there are two waves propagating in opposite direction. These two waves will collide each other to prevent to form a

standing wave. Thus, in n=1 orbit, electron wave can only propagate in single direction. Because electron movement is like transverse wave, there is a node in pi distance of electron wave. Thus, electrons can be located in pi or 2pi distance. However, packing in pi distance may not be used in an atom. For example, Gold atom (Au) 's electron configuration is 2,8,18,18,32,1. In the n=2 orbit, only 8 electrons are packed once. Electron's movement wavelength should match orbital length. It should be noted in n=1 orbit, the minimal length of n=1 orbit is just 2π. Thus, only one paired electrons can be packed in n=1 orbit. The standing wave produced by paired electrons in n=1 orbit is just a full circle. In n=1 orbit, packing electrons in pi distance is not allowed. It is worth noting that one paired electrons are located in the node of the standing wave. The paired electrons are receiving opposite and equal force from other electrons located in the right side and left side of the paired electrons. Thus, no net force and no net acceleration are generated. My atom model can also explain why Al (2,8,3) atom radius is less than Li(2,1) atom radius. Although Li atom has less orbiting electrons, both Li

atom and Al atom's outer orbit electrons are in the n=2 orbit which can maximally include 8+8 electrons. Thus, it is not surprising that Li atom radius is slightly larger than Al atom radius since the outer unpaired electron of Li receives less Coulomb attractive force from the Li nucleus. This phenomenon cannot be explained by quantum mechanics.

It is worth noting that the status of multiple electrons in the same orbit. Because of the Coulomb repulsive force, all electrons in the same orbit will repulse each other to maintain equal mutual distances in the same orbit. There is no net Coulomb repulsive force and acceleration. It is because each electron or one paired electrons can have equal and opposite Coulomb force from its two sides. Thus, electrons in atomic orbits are stable.

For many-electron atoms:

$$\text{Total E} = \frac{(Z - j)^2 Re}{n^2}$$

The number Z is the total proton numbers in any given many-electron atom. The number j is the total electron

numbers of any given many-electron atom without the valence electrons. Because the inner shell electrons provide an obstacle for valence electrons to obtain protons' electrostatic force, the inner shell electrons should be subtracted during total energy calculation. After doing this, the centrifugal force from valence electrons' orbital movement is still balanced with the centripetal force from the net proton charges. The estimated total energy for many-electron atoms is quite accurate. It is worth noting that electrons will expel each other in the valence orbit. Thus, the valence electrons in the outer orbit remain in the electric balance situation. We can use this formula to calculate individual electron in different orbit position. It means that this new atom model is also suitable for many-electron atoms.

According to the previous researches, four "quantum numbers" have been identified in atom model. Our new model is also consistent with the four quantum numbers. The first major quantum number is used above to describe the electron radium. The second angular momentum quantum number could be

explained by the degree of ellipse orbits of our new atom model. The magnetic quantum number m should be replaced because electrons are rotating in the same plane. Thus, it is not necessary to quantize space of electron orbiting. The four spin quantum number s is because electron is spinning in lightspeed c and the radius of electron is h'/2mc. Our new model has the advantage without the disadvantage of quantum mechanics.

Because electron's linear velocity is near lightspeed, we should use relativity to adjust the energy formula. Thus,

$$E = mc^2 * \left[\frac{1}{\left(1 - \frac{V^2}{c^2}\right)^{1/2}} - 1 \right]$$

$$\frac{v}{c} = \frac{alpha * Z}{n}$$

This formula is very similar to Dirac's formula. I think Dirac's formula is only an approximation. Actually, electron spin won't affect the radiation spectrum. My

energy formula is the correct exact answer.

Here, I would also like to explain why Klein-Gordon equation derived by Schrodinger equation is correct in many atomic experiments. It is not because Schrodinger equation is correct but because there is screened Coulomb potential. In many electron atoms, we need to consider screen effect of non-adjacent electrons at same orbit. The Klein-Gordon equation is:

$$\left[\nabla^2 - \frac{m^2 c^2}{h'^2}\right] \varphi(r) = 0$$

, which can be derived from relativistic version of Schrodinger equation:

Here, I don't want to derive it again. If we consider the concept of screened Coulomb potential, we can still get the Klein-Gordon equation.
The screened Coulomb equation function is:

$$[\nabla^2 - k^2]\varphi(r) = \frac{-Q}{\epsilon}\delta(r)$$

$$\varphi(r) = \frac{Q}{4\pi\epsilon r}e^{-kr}$$

$\delta(r)$=infinite if r=0 or $\delta(r)$=0 if r><0

Since the distance between non-adjacent electrons are not zero

Thus,

$$[\nabla^2 - k^2]\varphi(r) = 0$$

$kr=r/r_0$

Since electron diameter=h'/mc=r_0

$kr=r/(h'/mc)=(mc/h')*r$

Thus, k=mc/h'

Thus,

$$\left[\nabla^2 - \frac{m^2c^2}{h'^2}\right]\frac{Q}{4\pi\epsilon r}e^{-mc/rh'} = 0$$

Using my atom model, I can still derive Klein-Gordon equation. The solution of Klein-Gordon equation is very similar to Dirac equation. Because Klein-Gordon equation is very successful in many atomic experiments, it is assumed that Dirac equation and Schrodinger equation are correct. However, it is not so. The satisfactory experimental results can be merely due to the screened Coulomb potential of non-adjacent electrons.

(r=10^{-11}meter, $r_0=10^{-13}$ meter)

$e^{r/r_0}=10^{-44}$ which is really small compared to usual Coulomb potential.

Thus, the force between two non-adjacent electrons in the same orbit can be neglected.

Electron radius:

r=h'/2mc

Electron diameter:

D=h'/mc

We can also use the concept of Compton scattering to obtain particle radius. The Compton scattering equation is:

$$\lambda' - \lambda = \frac{h}{mc}(1 - \cos\theta)$$

During scattering, there is a phase delay which is the difference between input wave and output wave. It means the delay that photon is passing through a particle sphere. The phase delay is:

$$\frac{2r(n - 1)2\pi}{\lambda}$$

r is particle radius, n is refraction index. When photon is going straight through the particle, the input angle θi=0

$$n = \frac{\sin \theta i}{\sin \theta r} = 0$$

It means that there is no refraction. Thus, the phase delay during Compton scattering is:

$$\frac{4\pi r}{\lambda} = \frac{\Delta\lambda}{\lambda} = \frac{\lambda' - \lambda}{\lambda}$$

Comparing the Compton scattering equation, we let:

$$4\pi r = \frac{h}{mc}$$

Thus,

$$r = \frac{h'}{2mc}$$

So, there is relation between Compton wavelength (h'/mc) and particle size. My deduction is well correlated with experimental observation.

Thus,

$$r * mc = \frac{1}{2}h'$$

Comparing to Heisenberg's position-momentum uncertainty principle, we can view mc as the invariance of momentum:

$$\Delta X * \Delta P \geq \frac{1}{2}h'$$

We can find out the great similarity! We can see a natural limitation for particle size based on the principle of uncertainty. When the $\triangle P$ exceeds mc, then the uncertainty of energy exceeds mc^2. Then, this is enough energy to create another particle of the same type. Thus, the particle size(radius) must have a limitation:

$$\Delta X \geq \frac{h'}{2mc}$$

Thus, the size of particle must exceed h'/2mc, the reduced Compton length. Thus, a basic particle's size(diameter) must be greater than h'/2mc. Thus, a old theory saying electron's classical radius is:

$$r = \frac{e^2}{Kmc^2} = 2.8 * 10^{-15} \text{meter}$$

This is much less that the reduced Compton length of electron. This means the classical electron radius is

wrong. The classical electron radius is based on the assumption that the size of electron must has its mass completely due to electrostatic potential energy. This is a wrong assumption. Mass and charge are two different entities. Thus, reduced Compton wavelength is actually the diameter of electron. It is also true for proton and neutron. Both proton and neutron's diameter is their reduced Compton wavelength. Their diameter is equal to and should not be less than their reduced Compton wavelength.

My atom model can also successfully explain Zeeman effect. There is no need of electron spin quantization. Following is my deduction:

$W=U*B=(Ua+Ub)*B$

For orbital magnetic moment:

$Ua=Uo*J$ $(Uo=q/2m, J=nh')$ (h' is plank constant)

For spin magnetic moment:

$Ub=Us*S(Us=q/m, S=Iw)$ (r=electron radius, m=electron mass, v=electron spin speed)

J is proximally 10^{-34}

$m=10^{-31}kg$, $v=lightspeed=10^8 m/s$

If r=around 10^{-13}meter, there will be spin-orbit

coupling. (electron spin angular momentum $S=Iw=1/2h'(r=h'/2mc,v=c)$; this explain why electron spin is quantized) Thus, Zeeman effect is observed. It is worth noting that classical electron radius (10^{-15}meter) is underestimated. Thus, my deduction should be correct.

Quantum mechanics hypothesizes that electron's phase velocity is not equal to group velocity. However, there is no dispersion phenomenon in atom. Thus, how can we say electron wave's phase velocity is different from electron wave's group velocity. Actually, I think electron's group velocity is exactly the same as electron's phase velocity. If we accept the fact that electron group velocity is phase velocity, then Schrodinger and Dirac equation has severe defects. The principle assumption of Schrodinger and Dirac equation is that electron wave energy can be described by Plank law:

$E=hf$ (f=electron wave frequency)

According to DeBroglie's hypothesis, the matter wave wavelength is:

$\lambda=h/p$, $p=\gamma mv$

Thus, $E=hf=hv/\lambda=\gamma mv^2$

According to Einstein's special relativity, the total energy of a moving mass is:

$$E = \gamma mc^2$$

We can see the discrepancy of these two equations. Electron moving speed is not equal to lightspeed c. Electron wave energy cannot be described by $E=hf$. How about the situation of rest electron? Then,

$$E = hf = h*0 = 0$$

That is totally disobeying special relativity's result for rest particle $E=mc^2$. Even we use the Dirac equation, we still get wrong result $E=\pm mc^2$. The negative energy is totally wrong. If the particle is electron, the total rest energy should be $E=KQ^2/r+mc^2$. Thus, quantum mechanics causing rest energy=0 will disobey classic electromagnetism, relativity, charge conservation, mass conservation, and energy conservation. It is totally inconsistent with previous established physics theories.

Thus, Schrodinger and Dirac equations underestimate electron's total energy. The $ihd\Psi/dt$ of Schrodinger and Dirac equation is from the assumption $E=hf=h'w$. The basic assumption of Schrodinger and Dirac equation is

totally wrong. Thus, quantum mechanics is totally wrong! Different situations use different equations.

Based on the Lorenz invariance of four momentum:
$$E = \sqrt{(mc^2)^2 + (pc)^2}$$
When rest mass m=0 such as in photon:

E=pc=hc/λ=hf=h'w

When rest mass m is not zero such as electron:

m=E/c^2=p/v Then pc=Ev/c,

E=γmc^2

In addition, it is proved recently that Heisenberg's matrix mechanics is not equal to Schrodinger's wave equation. Thus, there is inconsistency between Heisenberg's formula and Schrodinger's formula. This is a major defect in quantum mechanics. And, an important phenomenon called Bremssttrahlung suggested that electron can emit continuous electromagnetic radiation with continuous emission spectrum. It is directly against Schrodinger's and Dirac's equation saying that electron only has discrete energy. In Schrodinger's equation, the symbol Ψ2 is defined as probability or wave amplitude. However, Ψ is actually used in Schrodinger's equation and it is a

complex number. Ψ is not Ψ2. How can a complex number describe probability wave amplitude in Schrodinger's equation? Quantum mechanics is wrong!

Heisenberg's principle of uncertainty said that we cannot predict the exact electron position in the atom because photo will interfere with electron's orbit. Then, Dr. Schrodinger proposed his atom model by using wave probability function. However, the probability has severe limitation. It causes a paradox like Schrodinger's cat that saying the strangeness and logical problems of the quantum mechanics. And, it is very difficult to imagine electrons can really rotate in strange orbital shapes such as dumbbell or double donut from Schrodinger's atom model. It is more reasonable that electrons are rotating in a circular or ellipse shape. Quantum mechanics needs Copenhagen interpretation saying that wave function collapse during observation. It says that subject's measurement affects object's physical law and fact (positivism). It is not realism and is not truth. Because the wave function collapse Copenhagen interpretation cannot be accepted by most scientists, there are other quantum

mechanics interpretations such as Consistent histories, Many worlds, Ensemble interpretation, Decoherence, Conciousness causes collapse, Objective collapse theory, Many minds, Quantum logic, Bohm interpretation, Incomplete measurement, and Relational quantum mechanics. These theories attack each other and none of them is generally accepted in scientific world. I think none of them including Copenhagen interpretation is correct. In addition, quantum mechanics is required to assume absolute and discontinuous time which should be discarded according to special relativity. Quantum mechanics treats space and time separately and differently (differentiate once or twice), not treating space-time as a four dimension structure. Quantum mechanics is also allowed to disobey conservation of energy which is the most fundamental law of physic. Besides, Dirac spinor has no geometry meaning. This new atom model proposed here let the atom go back to the classical physics. Principle of uncertainty is a limitation of observational physics, but it cannot be viewed as a law to governing real atom orbit. I believe this new atom model will provide an important insight into the

current physics.
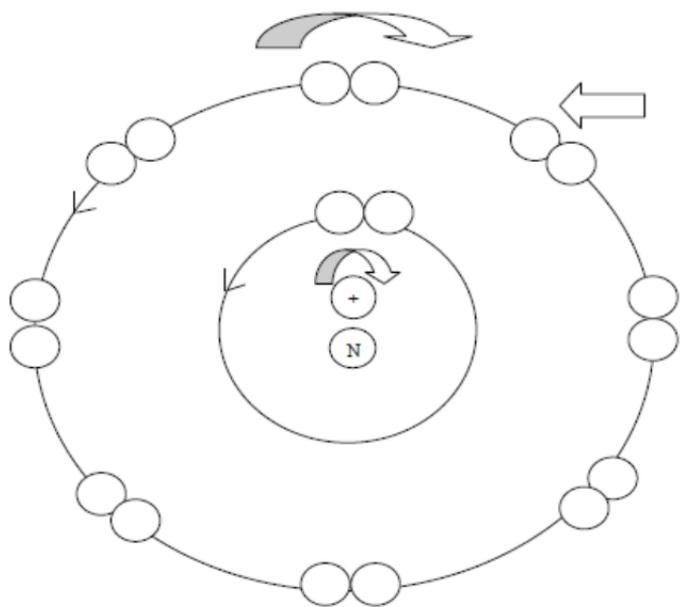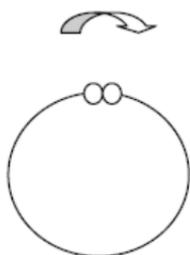
N=1
2e

$N= 2$

$8 + 8$ electrons

$N= 3$

$18+18$ electrons

$N= 4$

$32+32$ electrons

Two standing Waves move in opposite direction!

References

1. N. Bohr, Nature 92, 231 (1914)

2. N. Bohr, Philosophical Magazine 26,1 (1913)

3. W. Heisenberg, Zeitschrift fur Physik 43,172 (1927)

4. A. Einstein, B. Podolsky, and N. Rosen Phys Rev 47:777 (1935)

5. D.J. Griffiths, Introduction to Quantum Mechanics (2nd ed) (2004)

6. N. Tajima &T. Otsuka, Phy Rev C 84,064316 (2011)

7. B. Mashhoon, F. W. Hehl, and D. S. Thesis, General Relativity and Gravitation 16, 711 (1984)

8. L.D. Landau and E.M. Lifshitz, The Classical Theory of Fields (1975)

The Nature of Chemical Bonds

Then, I would like to discuss this new atom model and its relation to chemical bonds. Quantum mechanics has its own way to explain the chemical bond formation. This new determinative atom model can explain chemical bond formation better. There are two major chemical bond formations in this new atom model. Traditional chemistry called them ionic bond and covalent bond. In traditional covalent bond, electrons can be "shared" in the two adjacent atoms by forming a quantum molecular orbit. I think this concept is

incorrect. In this new model, the distinguishing of these two bonds should be revised. First, chemical bond can be formatted that recipient atom accept redundant electrons from donor atom. For example: NaCl. There is an additional electron in the outer orbit of Na atom. And, there are 7 electrons in Cl's n=2 orbit. Thus, the additional electron of Na atom will go into the outer orbit of Cl atom when these two atoms are approaching. This can explain the origin of Octet rule by Dr. Lewis because the full n=2 orbit needs 8 electrons. Then, the electron donor Na atom is relatively positive and the electron recipient Cl atom is relatively negative. Thus, Na atom and Cl atom can bind each other. We can also see the example of O=C=O(CO_2 molecule). Each of the two O atom donates two electrons to the central C atom, so the central C atom can have a full 8 electrons in its outer orbit. It is worth noting that all the 8 electrons in C atom's outer orbit must rotate in the same horizon of C atom. Thus, each of the O atom should be in the same horizon as C atom when they donate two electrons to the C atom. This can explain why CO_2 molecule is linear in shape. In my new atom model, there is no pi

bond nor delta bond nor sigma bond. There is neither molecular hybrid orbit nor hyperconjugation. Atoms are in the same plane is only because all the final electrons of recipient atom should be all in the same horizon to orbit the central recipient atom. Thus, it can explain why all double bond and triple bond always formed in the same plane.

In the second mechanism of chemical bond formation, atom and atom can form a link by one paired electrons with opposite spin direction. The two electrons are attracted by equal force by the two linking atoms and are in the central position between the two linking atom nucleuses. We can see this chemical bond structure of a simple H_2 molecule in the following graph:
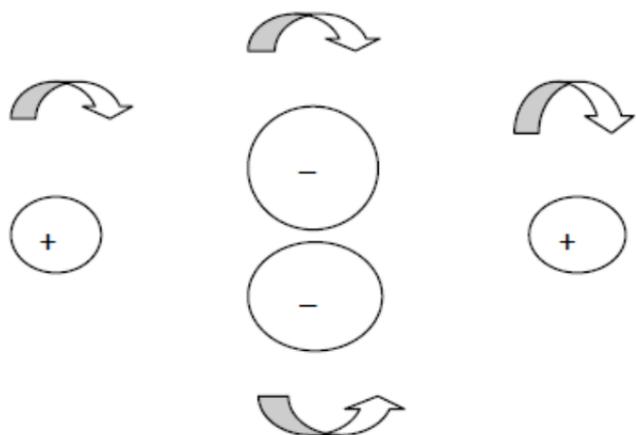
The paired electrons are in the middle of the two protons from two hydrogen atom. The paired electrons have opposite spin direction. Thus, their Coulomb static repulsive force cancels out their attractive magnetic force.

And, since the two protons provide equal but opposite direction of Coulomb attractive forces for the two electrons, the two electrons can stay in the middle position. One electron receives the both-side equal attractive magnetic forces from the two protons, and the other electron receives the both-side equal repulsive magnetic force from the two protons. And,

the spinity field direction from one proton is the opposite spinity field direction from the other proton. There is no net spinity on the paired electrons. In addition, the two protons also provide equal but opposite-direction attractive gravity. All the basic forces are in a balance. Besides, static electron won't have photo-electric effect. Thus, the paired electrons between the two protons won't easily get outside photon energy to move. Thus, it can maintain a stable chemical bond. This is a simple H2 molecule. In a more complicated molecule such as CH4, the paired electron position is dependent on the relative Coulomb force of C atom and H atom. Besides, the paired electrons are an unit and there is no magnetic moment output from the paired electrons for the two nucleus due to a long distance. And, the paired electrons are not orbiting. Thus, there is no outside magnetic force. The paired electron has no net acceleration due to no net external force. This paired electrons also have an opposite spin, so they can form a pair by using attractive magnetic force to balance repulsive Coulomb electrostatic force.

The new atom model can also explain other chemicals

such as CH4 by the second chemical bond mechanism.. In this molecule, each H atom donating one electron and the central C atom donates four unpaired electrons. Each electron of the C atom can make a pair with the one electron from each H atom to make a chemical bond. Totally, four chemical bonds will be formed. Then, according to VSEPR theory, all the four H atoms will repel each other. Thus, the CH4 molecule will become a pyramid shape with 109 degree bond angle. It can help to explain why CH4 has a not 90 degree bond angle. You may ask why CH4 cannot be formed in a plane by 4 H atom's donating 4 unpaired electrons to the central C atom. Because 109 degree is larger than 90 degree, the pyramid shape is more favorable than planar shape due to VSEPR theory. It is worth noting that only one paired electron with opposite spin direction can be formed between two adjacent atom nucleuses. It is because electron radius (10^-13meter) is larger the proton or neutron radius(10^-15meter). Thus, there cannot be four electrons or six electrons between the two linking atomic nucleus. That is why double bond or triple bond must be formed in the same plane by donating

redundant electrons from donor to the outer orbit of recipient to fulfill octet rule. However, there are a few exceptions. For example, the stable H_2^+ ion. There is only one electron between the two adjacent H atoms. The one electron is attracted by both H atomic nucleuses by Coulomb force. Thus, this ion can still be formed. However, the frame dragging force generated by this single electron cannot be balanced. Another example is He_2^+ ion. There are totally three electrons with one unpaired electron and two paired electrons in He_2^+ ion. The paired electrons are belonging to one He atom. The one unpaired electron forms the chemical bond of the two He atom. Thus, He_2^+ is paramagnetic. Thus, both the bond order of H_2^+ and He_2^+ is 0.5. My atom model can easily explain strange molecule such as CH_5^+, CH_6^{2+}, B_2H_6, $Al_2(CH_3)_6$, or $B_6H_7^-$. They are called three center two electron or four center two electron compounds. It is because there is only one single electron to form chemical bond between adjacent atomic nucleuses.

We can also explain the C_2H_4 molecule. We can rewrite this molecule $2HCCH_2$. There is a double bond

between the two C atoms. As we said above, double bond must be formed in the same plane. Thus C=C is in the same plane. In addition, the two H atoms for one C atom donate two electrons. In this one C atom, it fulfills the octet rule for its outer orbit. Thus, both two H atoms and this C atom are in the same plane. In the other C atom, each of the H atom forms a chemical bond with two paired electrons with the C atom. We know the frame dragging force formula is F= SJmWcosθ/r^2. And, we need to know that only proton part of the atomic nucleus can attract electrons. Since C=C is in the same plane, the proton parts of these two C atoms are also in the same plane. Thus, when the two H atoms form a chemical bond with the second C atom, they must be also in the same plane with this second C atom. It is also due to the VSEPR theory. If the other two H atoms are in the same plane, the bond angle will be 120 degree and 180 degree. If the two H atoms and the adjacent C atom want to form a pyramid-like shape, the bond angle will be less than 120 degree and 180 degree. Thus, pyramid-like shape is not likely. This can explain why C2H2 molecule is a planer molecule. It can also be

explained why benzene C6H6 is a planer molecule.

Thus, we don't need molecular hybrid orbit, or pi bound/sigma bond/delta bond to explain the shape of a molecule. There is no hyperconjugation, so the bond rotation barrier of ethane is totally due to steric hinderance. We can also use this new atom model to explain why O2 molecule is paramagnetic. The Lewis format of O2 is O=O. In my prediction, there are full 8 electrons in one O atom. In the other O atom, there are four unpaired electrons which cause O2 paramagnetism. In one single O atom, there are two paired electrons and two unpaired electrons. When two O atoms are meeting each other, the fastest way to make one O atom to fulfill the octet rule is to transfer the two paired electrons from donor to recipient atom. Thus, one O atom has four paired electrons and the other O atom has four unpaired electrons. We can also predict the structure of NH3. The N atom has five electrons which include one paired electrons and three unpaired electrons. When, the three H atoms are meeting N atom. Each of the unpaired electrons of N atom will go to form a

chemical bond with each unpaired electron from the H atom. Thus, the NH3 structure is a pyramid shape. It is due to the pre-existing electron configuration of N atom, the new NH3 molecule is not a planer molecule.

We can explain the hypervalent molecules which cannot be explained by Lewis octet rule such as PCl5, SF6, or PO4^3-. There are ten electrons around central atoms which cannot be explained by Lewis octet rule. Their existence is a long term paradox. In each P atom, there are five unpaired electrons. Thus, it can formed five chemical bonds (one paired electrons with opposite spin direction) with each Cl atom donating one unpaired electron. So does SF6. Due to VSEPR theory, all the Cl atom or F atom will repel each other to form a tetragonal or octahedral structure. It is also the same for phosphate. P=O can form a double bond in the same plane(P atom donate two electrons for O atom to let O atom to fulfill total eight electrons in O atom's outer orbit). In addition, the three unpaired electrons of P atom can form the second type of chemical bond with the other three O atoms. Thus, phosphate can form a tetrahedral structure. The

perplex of hypervalent molecules is solved.

Here, I would also like to talk about the origin of chemical polarity. The chemical polarity can be originated from the nature of chemical bond. For example: NaCl. An electron from the Na atom is donated to the outer orbit of Cl atom to make full 8 electrons. Then, Na atom loses one electron to become Na^+, and Cl atom gets an electron to become Cl^-. So does HF. In the NaCl molecule, this causes the chemical polarity inside the molecule. In the other type of chemical bonding such as CH_4, C atom provides 4 unpaired electrons to bind with 4 H atom providing one electron each. Finally, it forms a pyramid structure. Both C atom or H atom gains one extra electron and there is symmetry of this CH_4 structure, so there is no chemical polarity for CH_4. In other example such as $CO_2(O=C=O)$, the central C atom gets 4 unpaired electrons from the two O atom. Thus, the central C atom should be negative. However, the CO_2 molecule is linear, so the right side dipole cancels out the left side dipole. The net chemical polarity of CO_2 is still zero. Finally, we can look at the molecule $O_2(O=O)$ and $N_2(N\equiv N)$. Currently, scientists think these two

molecules are non-polar. However, by my new chemical bond theory, one O atom donates two electrons to the other O atom to form 8 full electrons in its outer orbit. And, one N atom donates three electrons to the other N atom to form 8 full electrons in its outer orbit. Thus, there is a gain or loss for the O atom or the N atom. Thus, O_2 is $O^{2+}O^{2-}$ and N_2 is $N^{3+}N^{3-}$. In my model, I predict that O_2 and N_2 molecules have chemical polarity. A new research confirms my hypothesis. A laser induced extra electric field can cause the molecular alignment of N_2 or O_2 molecule. Even the laser is removed, this alignment can also revive. This suggests that my model is right.[1]

My atom model can also be used in several aspects in modern chemistry. First, metal's color can be explained. Based on my atom model, Au (gold) configuration is 2,8,18,18,32,1. It has 2 electrons in n=1(r=1) orbital, 8 electrons in n=2(r=4) orbital, 36 electrons in n=3(r=9) orbital, 32 electrons in n=4(r=16) orbital, and one single electron in n=5(r=25) orbital. Thus, when the single electron jumps from n=5 to n=6 orbital, it gives out the golden color. No S or D orbital

in quantum mechanics is needed.

Second, transitional metal's structure can be explained. Here, I will use four acceptors of one complex to be an example to explain their structure difference. One is pyramid, and the other is square planar. For example:$[Ni(CN)_4]^{-2}$ is a square planar. Ni configuration is 2, 8, 8,10 based on my atom model. Thus, Ni^{2+} is 2, 8, 8, 8. It has 8 (=2*4) unpaired electrons in the outermost orbit. Remember that all electrons are in the same plane. And, CN^{-1} provides two unpaired electrons for binding. Thus, each Ni^{+2} with each CN^{-1} will form 2 chemical bond in the same plane of Ni atom. Since this is a double bond, these bonds can only be formed in the same plane. In the n=4 orbit of Ni atom, there are totally 16 electrons in the outermost orbit. And, the CN^{-1} group will expel each other to achieve a maximal distance between them. Thus, the resulting structure will become square planar. $[CoCl_4]^{-2}$ is a pyramid. Co configuration is 2,8,8,9 in my atom model. Co^{2+} is 2,8,8,7 or 2,8,15. It has 7 unpaired electrons in the outermost orbit. Co^{2+} doesn't use the 7 unpaired electrons for binding to

CL^-1. And, CL^-1 provides two paired electrons for binding. Since Co^2+'s 7 unpaired electrons are not for binding, chemical bond between Co and Cl is not restricted to Co atom's plane. All Cl^-1 will expel each other to form a 3D pyramid structure. And, since [CoCl_4]^-2 still has 7 unpaired electrons, it is ferromagnetic. You can play this with other metal which can form square planar structure such as Pd^2+(2,8,18,16); Pt^2+(2,8,18,32,16); Au^3+(2,8,18,32,16). They all use 16 unpaired electrons for binding to form a square planar in n=4 orbit.

Third, my atom model can also explain band structure. You only know a concept called metallic bonding. In metallic bond, strong positive charged nucleus attract few(one or two) electrons to form bond. For example, Cu, Ag, Au all have one free electron in the outermost orbit. Similar to H2+ molecule, the only one free electron forms the chemical bond between two metal atoms. However, this single electron receives only weak Coulomb attractive force from the metal atom since there are a lot inner electrons cancel the

attractive force. In addition, the single free electron is easily affected by external force or external radiation (photoelectric effect). Thus, the single electron is freely movable and is called free electron. When external electric current is applied, the free electrons can conduct electricity. Thus, it can explain why metal is conductive. We can also explain why diamond is non-conductive and graphite is conductive. Each C atom from the diamond uses four unpaired electrons to bind other unpaired electrons from other four C atoms to form a pyramid shape structure. There are one paired electrons in each chemical bond and the electrons receive strong Coulomb attractive force from the two adjacent C atoms. Thus, this kind of chemical bond is very stable. No free electron is generated. Thus, diamond is non-conductive. However, in graphite, only three electrons from each C atom are used to bind other three adjacent C atoms to form a tri-polar shape structure flat layer. Within the layer, this kind of chemical bond is formed by one paired electrons. Between layer and layer, one single electron is used for chemical bonding for different layers. This single electron is very similar to the free electron of metals. It

is mainly 2D hexagonal, and it can be easily peered between layers. Thus, graphite is conductive. This new atom model can well explain the conductivity of different molecules! My atom model and chemical bond theory can replace the current electronic band structure theory. There is no need of conduction band or valence band. The most important concept is the single free electron!

Finally, I would like to discuss about quantum chemistry. The principle of quantum mechanics was used by Drs. W. Heitler and F. London to explain the formation of H2 molecule. However, they didn't get the true exact value of H2 bonding energy and they only got approximation. Using quantum mechanics wave function to explain atom-atom binding is wrong. Here, I will propose a new mechanism to explain atom-atom binding. For example, there are two H atoms. One H atom is near resting status, and the other H atom is linearly moving. Once the second H atom is approaching the first H atom, the orbiting electron of the second H can collide with the orbiting electron of the first H atom. After the collision, these two

electrons can be moving together to form a chemical bond between the two H atoms. It is worth noting that the collision is complete inelastic collision, so there will be energy loss during the electron-electron collision. But, it must fulfill the conservation of linear momentum. The two bumped electrons can then move together if their spin direction is opposite that magnetic force cancels the Coulomb repulsion force between them. And, the two H atoms will then move together to form a stable H2 molecule. We need to know that the coefficient of restitution of the two collide electrons should be zero. In addition, there will be a specific angle between the two electrons and the bonding energy released by H2 molecule formation is a fixed value. This mechanism can also be used to explain more complicated molecule formation.

I strongly suggest to use this new determinative atom model to replace Schrodinger and Dirac's quantum mechanics. In addition, further researches are required to confirm and extend this new atom model.

Here, I also want to revise the superconductivity BCS

theory based on my new atom model. The current BCS theory suggests that attraction force from the interaction between electrons and the vibrating crystal lattice(Phonons) can cancel out the Coulomb repulsive force between two electrons to form a Cooper pair. The concept of Cooper pair is correct. However, the attractive force between the two electrons is due to the opposite spin induced magnetic force, not phonon lattice interaction. Once a pair of electrons with opposite spin is formed, it can explain the superconductor Meissner effect: the expulsion of a magnetic field from superconductor. This effect is similar to diamagnetism. However, normal substances' diamagnetism is due to opposite orbital electron standing waves such as many noble gases. These orbiting electrons are not free electrons and they cannot transmit electricity. However, a Cooper pair of free electrons can transmit electricity. We can use this new theory to explain mercury's superconductivity. Hg is 2,8,18,18,32,2. If the outermost 2 electrons become a pair, mercury can be a superconductor. It is also true for MgB_2. Mg is 2,8,2 and B is 2,3. If MgB_2 is formed as B-Mg-B, we can see each B still has two outermost

electrons. They form two Cooper pairs to generate superconductivity. The same principle can be applied to liquid Helium. Liquid helium has one pair of electrons in its outer orbit. Thus, it can form a Cooper pair to generate superconductivity. This is also true for high temperature superconductors such as YBaCuO complex. These high temperature superconductors usually has CuO_2 layers for superconducting. If CuO_2 is formed as O-Cu-O, then there is one pair of electrons can form a Cooper pair to generate superconductivity. It is worth noting that temperature rise will increase lightity between electrons to separate the Cooper pair and it will cause randomized spin direction of the paired electrons. Thus, low temperature is needed for the characteristics of superconductivity. However, if we know the exact mechanism of superconductivity, we can find out more high temperature superconductors. We know the covalent bond energy is 150-400KJ/mol, ionic bond energy is also 150-400KJ/mol, and metallic bond energy is 50-150KJ/mol. From above, we know the metallic bond is weaker because of the larger size of metallic atom and only one or two outermost electrons for binding. The original distinguishing of

covalent bond and ionic bond should be changed. For example, HCl is called polar covalent binding. In fact, its bond is the same as NaCl, and both H and Na donate one electron to the Cl atom. Besides, the higher bonding energy of triple bond and double bond than single bond can also be explained. In a O_2 atom(O=O), one O atom donates two electrons to the other O atom to make full eight electrons in the second O atom's orbit. Then, the O=O becomes $O^{2+}=O^{2-}$. If there is one single bond between a given O-O, there is only $O^{1+}-O^{1-}$ and we can see the strength is weaker due to the relative polarity. Because of higher polarity, triple bond length is shorter than double bond length and double bond length is shorter than single bond length. N_2 is an example of triple bond. It is $N^{3+}\underline{\equiv}N^{3-}$, and we see liquid nitrogen is a polar molecule.

We can also look at the mechanism of resonance in chemistry. Current theory use the concept of resonance the explain the equal bond length of the left side or right side of O-O=O or O=O-O of O_3 molecule. Based on my chemical bond theory, the central O atom receives total three electrons from the other two O atoms to make a full octet electron configuration in its

orbit. Thus, the effective nuclear charge of the central O is 6-8=-2. And, both the left side O atom and right side O atom have the same effective nuclear charge 6-2=+4. Because of the same effective nuclear charge of both sides, the bond length is the same. That is the true reason for the so-called "resonance". The same principle can apply to other molecular with "resonance" like benzene, N_2O, SO_3, or NO_3. Hyperconjugation theory saying the interaction of sigma and pi bond was proposed to explain the anomeric effect. This effect is seen in R-Y-C-Z molecule such as D-glucopyranose. Y and Z are electronegative atoms such as O atom. This effect can be simply explained by the two electronegative atoms repelling each other when they are near. In addition, hyperconjugation theory cannot explain acetals.
Reference
1. J Huang J Phys Chem A 110,10179 (2006)
Heat expansion and phase transition

It is well-known that heat will cause substance expansion and cold will cause substance contraction. However, the underlying mechanism is still unknown.

The current theory suggests that atom or molecule vibration due to heat is the actual reason of heat expansion. It suggests that vibration can enlarge the distance between atom and atom and finally enlarge the volume of the object. However, this theory has a severe defect. Heat vibration has random motion, and it is not possible that the vibrations of atoms or molecules are synchronized. Actually, heat vibration will still keep the unit in the same position with merely oscillating. Thus, heat vibration cannot cause constant volume expansion. Here, I propose that universal lightity (radiation pressure) is the actual cause of heat expansion.

Thus, the radiation pressure will be larger if the temperature of the substance is higher. The radiation pressure will be smaller if the temperature of the substance is decreasing. When there is extra-heat, the radiation pressure between atom and atom will increase, the increased radiation pressure will work on the vacuum space between the two atoms to expand it. Totally, the whole volume of the object will be increased. On the other hand, if there is cold, the

radiation pressure between atom and atom will decrease, the decreased radiation pressure will affect the vacuum space between the two atoms to contract it. That is why heat causes expansion and cold causes contraction. By using this concept, we can deduct the heat expansion law. It is important to know that light pressure acts on spacetime itself to cause spacetime expansion!

According to the fist law of thermodynamics, the increased heat energy should be transformed into work:

$\triangle E = P * \triangle V$

W=P*V=constant

Since $\triangle E = N * K * \triangle T$ (K=Boltzmann constant), $P \propto \frac{1}{V}$

N is total atom numbers of substance. Thus,
$N * K * \triangle T = 1/V * \triangle V$
Thus,
$\alpha * \triangle T = \triangle V/V$
α is volumetric thermal expansion coefficient
In the above formula, we can see that heat induced

radiation pressure is the actual reason of thermal expansion or cold contraction. However, the thermal expansion coefficient can be varied between different substances. However, in the same substance, the thermal expansion coefficient is the same. The linear heat expansion formula is:

$\alpha * \triangle T = \triangle L/L$

This equation can be differential by time dt in both right side and left side:Then,

$\alpha * dT/dt = (dL/dt)/L = V/L$

If the thermal expansion velocity V is constant and average expansion time t=L/V, then,

$dT/dt = (1/\alpha)*(1/t)$

Based on heat equation, we set temperature T as four vector: (t,x,y,z), then,

$dT/dt = k*D^2 T$

The parameter k is called thermal diffusivity. By definition, k=K/Cv. K is thermal conductivity, and Cv=volumetric heat capacity. Compared the above two equations, we get k*α=constant. Thus, the thermal diffusivity k is inverse proportional to heat expansion coefficient α. The thermal conduction coefficient K (W/mk) is also inverse proportional to heat expansion

constant α. The heat capacity Cv is in direct proportion to thermal expansion coefficient α.

Here, I will prove that thermal expansion coefficient is just another form of specific heat capacity. When we heat a substance, we can get its heat change:

$$\Delta H = m * Cm * \Delta T$$

We know that thermal expansion coefficient:
α*$\triangle$T=$\triangle$L/L
Thus,

$$\Delta H = m * Cm * \frac{\Delta L}{L\alpha}$$

We know L is inverse proportion to temperature T and temperature T is proportion to acceleration a due to Unruh-Hawking effect. Thus,

$$\Delta H = m * Cm * \frac{\Delta L}{L\alpha} \cong m * T * \Delta L * \frac{Cm}{\alpha}$$

$$= ma * \Delta L * \frac{Cm}{\alpha} = F * \Delta L * \frac{Cm}{\alpha}$$

Since F*X=W(force*distance=work), so delta H should be equal to F*deltaL. Thus, the ratio Cm divided by α should be a fixed constant(=1 if we put all related

constant from Unruh effect). That means specific heat capacity and thermal expansion coefficient is the same thing.

This relation can also be seen in Gruneisen's formula: parameter $r=\alpha*Kt/Cv*\rho$. Here, we can also see thermal expansion coefficient α is in direct proportion to heat capacity Cv and mass density ρ. And, thermal conduction coefficient Kt is in direct proportion to heat capacity Cv and mass density ρ.

For example, diamond heat conduction coefficient is 900-2300. Its heat expansion coefficient is 1. The heat conduction coefficient for copper is 401, and copper's thermal expansion coefficient is 17. The heat conduction coefficient for water is 0.6, and copper's thermal expansion coefficient is 69. We can see the larger the thermal expansion coefficient, the fewer the thermal conduction coefficient.

Based on the above derivation, we can link thermal conductivity, thermal expansion coefficient, heat capacity all together.

When a light or heat wave passes a substance, it can be reflected, refracted, or absorbed. It is refracted more when it is reflected or absorbed less. I think refraction is actually the reason of heat conduction. If light or heat wave is absorbed or reflected by the atoms or electrons of a substance, it cannot be transmitted forward. In a substance without free electron, atomic nucleuses are relatively fixed, so heat is not transmitted via direct contact. Currently, this conduction is said by vibrating phonons from quantum mechanics. But, phonons with such characteristics should be bosons not fermions such as electrons or atomic nucleus in a real substance. And, vibration itself needs energy to keep on vibrating. Thus, heat or light wave is not transmitted via phonon vibration. Refraction is related to substance density and temperature. And, refraction coefficient is the combination of electric and magnetic permeability constants for a certain substance. Diamond refraction index and its density are high, so it has greater heat conduction coefficient compared to other non-metals. Its heat conduction coefficient is even more than silver

or copper. These factors decide thermal conduction as well as refraction.

Heat capacity:

$$C = \frac{\Delta Q}{\Delta T}$$

$$\Delta Q = NK\Delta T$$

Thus, there is a close relation between heat capacity and Boltzmann constant. In addition,

$$\triangle E = \Delta Q = \frac{1}{V} * \triangle V$$

$$C = \frac{1}{V} * \triangle V \div \Delta T$$

$$\alpha \triangle T = \frac{\triangle V}{V}$$

$$C = k1 * \alpha = k2 * k$$

(k1,k2=some constant, thermal capacity C level is related to Boltzmann constant and thermal expansion coefficient)

I will also like to talk about convection. Hot air is lighter than the cold air. It is thought to be due to density. However, in an O2 molecule, the position of nucleus

and electrons are relatively fixed. Thus, density is not the reason. The substance weight is decided by inward gravity field due to mass and outward radiation pressure due to temperature. Thus, heated air will be lighter. It can help to explain Peng's effect why heated solid is lighter than cold solid. It can also help to explain Mepmba effect. Mepmba himself also agreed that convection is the reason why hot water freezes first.

After we know the reason of thermal expansion, we can know the actual reason of phase change of matter. We know every substance has four types of phases: solid, liquid, gas, and plasma. In the plasma phase, positively charged protons are separated from the negatively charged electrons. If we heat a substance, the radiation pressure between atom and atom or between molecule and molecule will increase. In solid phase, the heat is the smallest amount, so the distance between atom and atom is very short. The Coulomb attractive force between atom and atom (between one atom's nucleus and its adjacent atom's electron or the force is due to chemical bond formation between two

atoms) is large, so the atoms have minimal or no free movement. That is called solid phase. When we give more heat, the radiation pressure between atom and atom becomes higher. Then, the Coulomb attractive force becomes less. Atoms and molecules can move or rotate more freely. That is called liquid phase. If we give more heat, the radiation pressure is even higher. The Coulomb attractive force between atom and atom becomes minimal or zero. Thus, atoms and molecules can move freely completely. This is called gas phase. When we give maximal heat, the radiation pressure is high enough. Then, the protons in atomic nucleus and the electrons in atomic orbits can be separated due to the high radiation pressure between them. There will be free movable charges. This is called plasma phase. Current theory thinks that thermal vibration causes the four types of phase change. However, thermal vibration cannot counter balance the attractive Coulomb force between atom and atom. Only the repulsive radiation pressure can counter balance the attractive Coulomb force. Thus, we can use this theory to perfectly explain the transition of four phases of matter. Radiation pressure plays a key role. In addition,

we can help to explain the third law of thermodynamics. Because of Unruh effect, mass with gravity field acceleration always have temperature. Thus, absolute zero is impossible to achieve.

Ion association and Ideal gas law

Here, we will look more detail to find out the interaction between Coulomb force and Casimir force (universal lightity). First of all, we can consider the ion association in liquid. For example: there is balance in distance between Na^+ and Cl^- in the NaCl solution. This

pair of cation and anion is called ion association. We know the time average numbers of cations and anions in element volume by the Boltzmann principle:

$dN_+ = N_+ e^{-Z+e\Phi/KT} dV$

$dN_- = N_- e^{+z+e\Phi/KT} dV$

Then, we can know the distance between Na$^+$ and Cl$^-$ during ion association.

$$r = \frac{e^2}{8\pi\epsilon KT}$$

We know the Coulomb attractive energy is:

$$E = \frac{e^2}{4\pi\epsilon r}$$

Thus,

$$E = 2KT$$

During ion association, there is a balance between the attractive Coulomb force and repulsive Casimir force. Thus, there is a constant distance r between the ion pair. The repulsive Casimir energy is depending on Boltzmann constant K and absolute temperature T. I propose here there is an important interaction

between Coulomb electric force and Casimir force. When there is an interaction between two opposite charges, there are attractive Coulomb force and repulsive Casimir force between them.

Here, I get a new equation E=2KT. I call this kinetic energy of a molecule. This equation is suitable for both gas and liquid. Compared to the original E=3/2KT, I will deduct the new formula later by considering ideal gas. By kinetic theory in ideal gas, the net energy is:

$$Px = \frac{NmV_x^2}{V}$$

Considering four velocity:

$$V^2 = V_0^2 + V_x^2 + V_y^2 + V_z^2$$

Thus,

$$V_x^2 = \frac{1}{4}V^2$$

Thus,

$$PV = \frac{1}{4}NmV^2 = nRT = NKT$$

And, kinetic energy of a molecule Ek is 1/2mV²

$$\frac{1}{2}N\left(\frac{1}{2}mV^2\right) = \frac{1}{2}N * Ek = NKT$$

Thus,

$$Ek = 2KT$$

Compared to the above ion association formula, we get the same equation. The original Ek=3/2KT should be replaced because it didn't consider four velocity in our four dimensional spacetime. Considering the four degree of freedom in our 4D spacetime, the kinetic energy per degree of freedom is:

$$\frac{1}{4}Ek = \frac{1}{2}KT$$

The equation PV=nRT can be used both in gas and in liquid. In liquid, the law of osmotic pressure is also PV=nRT. Thus, we also get the free kinetic energy of solvents is also E=2KT. Both in liquid and in gas phase, atoms or molecules are freely movable, so the kinetic energies of atoms or molecules are important.

Two Four Force

In modern chemistry, there is a puzzle to solve the interaction force between adjacent neural atoms. There is equilibrium between the attractive Coulomb force and the repulsive Casimir force. The net force

considering the repulsion and attraction is Van der Waals force. An empirical formula suggesting the interaction potential is called 6-12 potential which is totally decided by experimental observation not by theoretic proof. In addition, the nature of Van der Waals force is still a puzzle. The most important problem in modern chemistry is the large molecule such as protein structure prediction. Even the 6-12 potential strategy is the most successful method to predict protein structure, the 6-12 potential still cannot perfectly and accurately predict protein tertiary structure. I propose here that Van Der Waalss force is actually the repulsive universal lightity with the attractive Coulomb force. In addition, I will propose 2-4 force to replace the 6-12 potential. By offering this new theory, I hope this new strategy can help in better large molecule structure prediction.

The 6-12 potential (Lennard-Jones potential) is:

$$V = \frac{A}{r^{12}} - \frac{B}{r^6}$$

A and B are certain coefficient which is varied between different substance. R is the distance between the

adjacent neural atoms. The r^{-12} is repulsive term, and the r^{-6} is attractive term. However, there is no successful theory to explain the origin of r^{-12} repulsive term and r^{-6} attractive term. Here, I am proposing a new force formula:

$$F = \frac{A}{r^4} - \frac{B}{r^2}$$

In calculus, these two formulas will have very similar graphical curves. Thus, this new 2-4 force can fit the previous experimental observations. The r^{-2} attractive term is representing the attractive Coulomb force(KQq/r^2). Another minor attractive gravity is also r^{-2}(GMm/r^2). The r^{-4} repulsive term is representing the repulsive Casimir force. The formula can be similarly transformed into a potential term in calculus. There is only a difference of distance r in the two formulas. By seeing this formula, we can know why the new force formula is named 2-4 force.

It is obvious that the Coulomb force formula is $F=KQq/r^2$. Thus, it is easy to explain the r^{-2} attractive term in the new formula. When two natural atoms are adjacent, the positive polarity from one atom can attract the negative polarity from another atom.

During the protein folding to form tertiary structure, we need to consider the interaction between two close neutral atoms in spite that there is no direct chemical bond between them.

In my previous paragraph, I propose that there will be repulsive Casimir force between two like charges. The Casimir force per unit area is :

$$P = \left(\frac{\pi^2}{60}\right)\frac{h'c}{r^4}$$

This is perfectly fit the second term of my 2-4 force model. Many studies showed the Van Der Waals force is actually repulsive Casimir force plus attractive Coulomb force. Many studies also showed that the Van Der Waals force is temperature dependent.

Acid-Base mechanism and ion solution

Then, I will use my new atom model and chemical bond theory to explain the acid-base mechanism and ion solution behavior. According to Arrhenius acid-base definition, acid is the H^+ provider and base is the OH^-

provide. According to Bronsted-Lowry definition, acid is the H^+ provider and base is the H^+ acceptor.

We consider an acid: HCl. Cl atom has 7 electrons in its outer orbit. According to my chemical bond theory, H atom gives Cl atom one electron to let Cl have eight electrons in its outer orbit. Then, the compound is H^+Cl^-. When the H^+Cl^- compound is a solution, the H^+ can be attracted by the negativity of H_2O and leaves the original HCl compound. And Cl^- ion get all eight electrons in its outer orbit to form a stable electron configuration(standing wave). In addition, the generated H^+ proton is also a stable structure in solution. This explains the spontaneous formation of acid in solution.

Then, we can consider the formation of base. We can take NaOH as an example. The NaOH can be expressed as Na^+OH^- in solution. Here, I propose that the central O atom already gets one electron from Na and the other one electron from H to form a stable octet structure. Na and H just attach the central O atom. And, the distance of Na-O is larger than O-H since Na

size is larger. Thus, Na is more easily than H to leave the central O atom if the Na^+ is attracted by the negative part of H_2O. When the Na^+ leaves the original NaOH compound and gives up one electron to the adjacent O atom, the O atom can get one electron from Na and another one electron from H atom to have full eight electron configuration (standing wave) in its outer orbit. This can succesuly explain Lewis octet rule. The generated OH^- is a diamagnetic chemical which match previous observation. Then, the new OH^- will become a compound with stable electron configuration in solution. This stability explain why H^+(acid) and OH^- (base) can successfully exist in solution. NH_3 is another example. $NH_3+H_2O->NH_4^++OH^-$. So, it can also generate stable OH^- . We can also apply the principle to Lewis base. H^- and F^- are both Lewis base because both of them have stable octect structure.

Besides, we can then decide the acid strength of different acids. HBr is a stronger acid then HCl. It is because Br has larger atom size then Cl. Thus, the H atom can more easily leave Br atom to dissociate to

become acid. Thus, HBr is a stronger acid. HNO_3 is a strong acid. However, it also have OH structure inside. Its structure can be expressed as O_2N-O-H. Here, the –OH- has two paired electrons to form two linear bonds on both sides. Thus, this O atom is not a stable octet structure (standing wave). And, the stable H^+ is more easily to dissolve. Thus, OH^- cannot be generated from HNO_3. $HClO_4$ is a very strong acid. CH_3COOH is a weak acid. It is because that $HClO_4$ has more electronegativity and more easily to dissolve H^+ proton. Finally, we can know why HCN is also a weak acid. The H-C$\equiv$N is actually a linear structure. The central C atom already gets three electrons from N atom and one electron from H atom. Thus, the C atom already get stable full eight electron configuration. More importantly, the lone-pair of N atom can attract the H^+ to inhibit its leaving. Thus, HCN is a weak acid. H_2O is also a weak acid as well as a weak base. It can dissolve into H^+ and OH^-. However, there are hydrogen bonds between H_2O and H_2O. Because the H of another H_2O molecule will attract O atom and expel the two H atoms, the H_2O is a bending linear structure. There are not planar octet electrons around O atom. Then, we

can solve the H_2O structure in solution. And, it is only a weak acid or weak base.

We can also apply this principle to ion solution. If a chemical NaCl is dissolved in water. It is because the electron from Na atom is transfer to Cl atom to let Cl atom to have full eight electron configuration. The electro-negativity part of H_2O pulls away Na^+ atom, and the electron-postivity part of H_2O pull away Cl^- atom. Thus, Na^+ as well as Cl^- ions are formed.

Characteristics of elements

By using my atom model, I can predict the characteristics of chemical elements. Diamagnetic elements such as Argon have all paired electrons in the

orbit. Thus, the orbiting characteristics of these paired electrons cause diamagnetism. Diamanetism results from the Einstein-Barnett effect. The external magnetism causes an opposite angular momentum as well as opposite magnetic moment due to the orbiting electrons. Paramagnetic elements such as Lithium have unpaired electron in the orbit. The spinning characteristics of the unpaired electron like a small magnet to align the outside magnetism to have lower energy cause paramagnetism.

In addition, we can explain the melting point and boiling point of elements. The melting point and boiling point is decided by the total charges of the molecule, the in-between distance, and the polarity. From the formula of two-four force, we can see why charges and distance can affect molecule-molecule force to affect melting point and boiling point. My chemical bond model can also explain the polarity. Thus, molecules with more total charges, shorter in-between distance, and higher polarity have higher melting point and boiling point.

We can also use the universal lightity to explain the solubility of solid and gas. The solubility of solid chemicals is higher in higher temperature. It is because the high temperature causes larger lightity to let the solid chemicals to easily dissolve in solution. However, the solubility of gas is lower in higher temperature. It is because high temperature causes larger lightity to let the gas chemical to leave solution to maintain gas form. Thus, the problem of solubility can be solved.

Intermolecular Van der Waals forces can be divided into three group: Keesom force(permanent dipoles), Debye force(permanent dipole & induced dipole), and London force(induced dipoles). These forces can be explained by the polarity caused by electromagnetic force. H-bond is a kind of permanent dipole force. It is the force between H and O/N/F. However, it is usually different from HF H bond and H_2O/NH_3 H bond. Eight electrons are in the outermost orbit of NH_3. The three H atoms give total three electron to the N atom and they attach the N atom. And, another H atom from the other NH_3 molecule can push the 3H and link the original N atom of the NH_3 molecule.(H_3N:…..H-N-)

Thus, NH_3 is a pyramid-like structure, not a planer structure. The lone electron pair of N atom (so it is actually hydrogen bond donor, not recipient) serves as a chemical bond for the other H atom. (like in CH4 case) This is the origin of H bond. We can also infer that H_2O is a bending linear structure due to H_2O:…H-O-. PH_3, H_2S, and HCl have less H-bond because they have 8+8 electrons in their outer orbit. You may doubt that Cl and F, S and O, and P and N have same atom size. These electrons form two standing waves with opposite direction in those three molecules. Thus, it is more stable than the above H_2O:…H-O- or H_3N:…..H-N- structure. Thus, there is no H-bond for these three molecules. There are also no H-bonds for HBr, AsH_2, and H_2Se. It is due to they have more electrons and larger atom size. Thus, the distance of H atom and Br/As/Se is much larger. Due to KQq/r^2, we can see the Coulomb force much decreases due to longer distance r. For HF, the H-bond is different than NH_3 or H_2O. There are eight electrons around F atom donated from the H atom. It is still not a perfect bi-directional standing wave. The other H atom will approach the original F atom via hydrogen bond with same distance

as H-F bond due to polarity. This is called symmetric hydrogen bond. As for the above NH_3 or H_2O cases, these are asymmetrical hydrogen bond.

Then, I will discuss about the heat conductivity, electric conductivity, and ductility & malleability of an elements. Among these above characteristics, metals have the great conductivity and ductility & malleability. The reason for this is that metals have free electrons. For example, Cu is 2,8,18,1, Au is 2,8,18,18,32,1, and Ag is 2,8,18,18,1. We can see they all have one extra unpaired electron in the outermost orbit. Thus, if two Cu atoms approach each other, they can use the two unpaired outermost electrons to form a chemical bond with the paired electrons. However, according to my chemical bond theory, only one single electron can also form a chemical bond to link the adjacent atom. Besides, there can be a 3D structure for linking the metal atoms depending on the 3D position of the one binding electron. Thus, if only one electron is used for the Cu-Cu atom linkage, the final extra electron becomes a free electron. That is the origin of free electron in metals. The one remained free electrons

can move freely in the metal, so it can rapidly conduct electricity and heat via movement once they receive heat or electricity from outside environment. In addition, the relatively free movement ability of the one electron also gives metals to have good ductility and malleability. Even the relative of the two copper atoms changed, the one binding electron can adjust its position easily. Besides, the other binding electron can freely change its position. There is a temperature called ductile-brittle transition temperature. If we cool down a metal, it will become fragile with losing ductility and malleability. It is because the cooling reduces the relatively freely moving ability of the binding electrons. Thus, the metal becomes fragile.

Here, I will also comment on the band theory of conductivity. In the band theory of conductivity, the conductivity of an element is due to its band gap. For a metal conductor, there is no band gap between its conduction band and valance band. For an insulator, there is a huge band gap between its conduction band and valance band. And, for the semiconductor, there is a small changeable band gap between its conduction

band and valance band. However, there is no confirmed observation for these "band structure" and "band gap" for these elements. Actually, there is no such band in the determinative atom model. Here, I propose that the electric conductivity is merely due to the numbers of free electron inside an element. In metal, there is a free electron, so the electric conductivity is very good. In an insulator chemical such as CH_4, we can see there is no free electron inside its structure and its conductivity is poor. In a p-type and n-type semiconductor or conductive polymers such as polyacetylene, the relative numbers of free electron inside these elements decide its electric conductivity. The conductivity of semiconductors can be controlled. There is no band gap, the electric conductivity only depends on free electron numbers.

The single outermost free electron can also explain the specific color of the element. Since there is only one electron in the outermost orbit of the metal, so once a light is aiming at the metal, it will let this single free electron group to receive energy to move to more outer orbit. Then, the free single electron group can

emit the radiation and fall back to its original position. That is the reason for the metal colors. The minimal energy for this free electron to move to more outer orbit decides the specific wavelength of the reflect light. It is because it is most easily to achieve. Because of the synchronization of these free electron movement, it gives the specific metal color for a metal. In addition, because of the high density of the metal, light is easily reflected while it is touching the outer surface of the metal. That is why the metal is usually shining.

In addition, we can look at the boiling points and melting points of certain chemical elements or molecules. The boiling points and melting points are depended on several factors of a chemical element or molecule including total charge, intermolecular distance, intermolecular contact surface, polarity, H-bond, packing symmetry. According to my atom model as well as my chemical bond model, I can successfully explain all the above characteristics of these above factors. Besides, the attractive force from intermolecular 2-4 force is Coulomb's force. Thus, the

total charge and polarity can affect the melting point and boiling point.

We can also look at the intermolecular viscosity. According to Staudinger's law, the intermolecular viscosity is in inverse proportion to its molecular mass. In gross magnitude, all substance should be electrically natural and there is no net charge. Thus, the 2-4 force cannot be applied. The Staudinger's law is viscosity $\mu=K*m*c$. c is concentration (n/V). Thus, the viscosity is in proportion to mass density (m/V).

Finally, we can discuss the characteristics of rotation of light polarization of a molecule. This results in the enantiomers of a given molecule. Even a molecule is made by same elements such as lactic acid. There are two mirror structures of this molecule. When light is aiming at this molecule, it may move to left or right due to the different enatiomers of the same molecule. Based on the charge relativity, we can successfully explain this phenomenon. Because the left-right composition of the enantiomers is different, the left-right atoms of the two enantiomers are opposite. Right

side atom and left side atom are differently charged. Since light is torsed due to charge, it will move to left side or right side depending on the structure of the enantiomers. Thus, we can explain the characteristics of rotation of light polarization of a molecule.

Enzyme theory

Currently, enzymes are used for important catalysts for facilitate chemical reaction. However, the actual mechanism of enzyme's catalytic function is still unknown. Why can an enzyme affect the chemical reaction rate without affecting their equilibriums? Since I propose a new atom model and a new chemical bond theory, I would like to propose a new theory for enzyme mechanism here.

Current enzyme theory points out that enzyme can reduce the activation energy for a chemical reaction. Researchers thought that the activation energy for enzyme catalyzed reaction is much lower than that for non-enzyme catalyzed reaction. It is like to climb a mountain. Without enzyme, substrates need to climb higher mountain before entering the chemical reaction. However, no one really sees the activation energy change in catalyzed reaction compared to un-catalyzed reaction. This activation energy catalysis model is only a theory. In addition, it cannot explain the specificity of enzyme to catalyze a certain chemical reaction.

In 1894, Professor Emil Fischer proposed a "lock and key" hypothesis for enzyme catalyzed reaction. He thought that the enzyme and its substrate can fit for each other like lock and key. This model can help to explain the specificity of enzymes. However, his theory faced a puzzle. An enzyme completely complementary to its substrate would a very poor enzyme. Thus, enzyme and its substrate are never perfect lock and key.

I propose a new atom model in this book. And, I propose that an inelastic collision is required for two electrons from two molecules to form the chemical bond between them during chemical reaction. Thus, I will propose here my new enzyme theory: close match. Typically, an enzyme can include two substrates for chemical reaction. And, the enzyme should fit for these two substrates. If there is no enzyme, the two substrates are moving around the spacetime and are difficult to meet with each other. It is even difficult to let the reaction base of these two molecules to meet each other. Thus, if the enzyme has a high affinity to

bind the two substrates, these two substrates can have better chance to meet with each other. In addition, the fit is not a perfect lock and key. The fitting is a close match that means the reaction bases of these two substrate molecule should be exposed to be adjacent with each other without the perfect match of lock and key. All other non-reaction bases or atoms are bound and protected by the enzyme via multiple weak interactions to avoid unwanted reaction. If the two possible reaction bases are close enough, they can have much higher chance to react with each other. After the two reaction bases link to each other, they can lose the temporary binding with the enzyme. The confirmation change will let the end product and the enzyme separate.

In addition, the equilibrium is depending on the free energy change in this chemical reaction. Thus, enzyme catalysis only affects the chemical reaction rate but not the equilibrium. We can list an example for the common one enzyme and two substrates paradigm. The enzyme dihydrofolate reductase can bind to its substrates: $NADP^+$ and tetrahydrofolate with the close

match. After the binding, the reaction bases of NADP$^+$ and tetrahydrofolate can be adjacent with each other. Then, chemical reaction between NADP$^+$ and tetrahydrofolate happens, and the newly synthetic product can separate from the enzyme due to confirmation change.

I can use my model to explain the intramolecular catalysis of RNA molecule. In this type of reaction, nucleophiles of the C2' position can attack the atom forming ester bond binding to the C3' position. This reaction can be seen in HDV intramolecular RNA catalysis (O atom of O-H attacks P atom of O-P=O). We can here inside the RNA molecule, the reactive O atom and P atom are very close to each other for their possible collision. Thus, RNA molecule can help to catalyze and facilitate this reaction after RNA's binding to the two substrates.

The incredible catalytic efficiency of enzyme is long recognized. The efficiency is billions, trillions, and even faster in catalytic reaction compared to control reaction. Originally, researchers thought the effective

concentration of enzyme can decide the chemical reaction rate. However, more concentration of the enzyme doesn't change much of the chemical reaction rate. Thus, enzyme concentration is not a dominant role. Other researchers thought enzyme can induce an entropy trap for the substrates. They froze the substrate into a particular configuration relative to transition and rotation. Freezing in the rotational degrees of freedom of the substrates greatly enhanced catalysis. However, talented organic chemists tried to make small molecules that can limit the entropy to dock the substrates to replace enzymes. However, they cannot find small molecules which are much better than macromolecular enzymes such as proteins. Thus, entropy trap hypothesis is also not correct. In addition, many researchers found out the intermediate conformation change during enzyme catalysis is an important step for the catalytic reaction. Thus, Professor Koshland proposed a "induced fit" hypothesis for this phenomenon. He thought the confirmation change of enzyme can create a confirmation which binds better to the substrate compared to the free enzyme. However, the induced fit

hypothesis doesn't explain why confirmation change can facilitate catalysis. If the substrate binds to the enzyme better, it is harder for them to dissociate and to leave the intermediate stage. Some enzymes operate with kinetic which is faster than normal diffusion rate. Some enzymes can react faster than the predicted rate from classical activation energy. These seem impossible. Some researchers even use quantum tunneling effect to explain this activation energy puzzle. In my opinion, the activation energy theory is not necessary. Proximity is the key for the two substrates to react with each other not the entropy trap. In addition, the confirmation change will help the newly synthesized product to leave the enzyme. Thus, it can explain why confirmation change can facilitate catalysis. The induced fit hypothesis is not necessary. It can also explain why small molecules are not useful because they cannot undergo major conformational change. I think my "close match" theory is correct!

Theory of Everything in Geoscience

Origin of geomagnetism

Magnetism is a basic characteristic of physics. According to Schrodinger's atom model, magnetism can be explained by quantum mechanics when system is achieving thermal equilibrium. However, quantum mechanics or other current theory cannot explain many important phenomenon of magnetism. First, it is unknown why magnetism is closely related to planet's or star's rotation (spin). The magnetic field direction is aligned to star or planet rotational axis including Sun, Earth, Mercury, Saturn, and Jupiter. Current dynamo theory for explaining geomagnetism also has severe problem. For example, why is Venus similar to Earth lacking magnetism? Venus is found that it rotates (spins) very slowly. Why is magnetism found in Mercury? It is postulated that Mercury is completely solid and there is no liquid dynamo for generating magnetism. Second, it is unknown why there is phenomenon of reversal of magnetism. Sun's magnetic field changes its direction to the opposite direction in

every 11 years. In our Earth, it is also suggested that Earth changes its magnetic field direction to the opposite direction in around every million years. There is no satisfactory theory currently to explain these phenomenons.

Recently, we proposed a new atom model incorporating frame-dragging force and magnetic force in the original Bohr's model. It can solve many paradoxes found in Schrodinger's quantum mechanics such as EPR paradox or Schrodinger's cat. In the new atom model, protons ellipsoid and neutrons ellipsoid pack separately but rotate collectively in the same direction. All electrons rotate in the middle plane of protons' and neutrons' rotational planes. All electrons' orbital rotating direction (inner or outer orbits) can be affected by neutron or proton's opposite magnetic field. The major factor for inducing atom's magnetism is electron's spinning and orbiting direction. Fe, Co, and Ni have magnetism because they have maximal unpaired electrons in their orbit. For example, Fe's atom number is 26. It means that electrons fill in the n=1 and n=2 orbit first (2,8,8; n=main quantum

number). In the n=2 orbit, each 4-paired electrons orbit in the opposite direction to form two standing waves. In the n=3 orbit, 8 un-paired electrons fill in the iron atom. The maximal number for n=3 orbit is 18. It means that there could be 9 paired electrons. Thus, iron atom can have many un-paired electrons for developing magnetism. When a magnet is put near the iron, the un-paired electrons in the iron atom will re-locate to align to the external magnetic field. Thus, the un-paired electrons become to have the same spinning direction from the original random direction. Thus, the iron can develop magnetism. According to our new atom model, we can successfully explain the magnetism of Fe, Co, Ni without using quantum mechanics.

It is noted that geomagnetism is closely related to the planet's or star's rotational axis such as Sun, Earth, Saturn, Mercury, and Jupiter. This phenomenon can be explained by Einstein-De Haas effect or Monstein-Barnett effect. This effect saying that a mechanical rotating metal can generate magnetism which axis is related to the rotating axis. This effect can be

understood by the law of angular momentum conservation. When the metal is mechanical rotating in one direction, the subparticles inside the metal will rotate in the opposite rotating direction. Thus, electrons' orbiting direction will tend to be oppositely rotate compared to the metal's mechanical rotation. In addition, proton ellipsoid and neutron ellipsoid inside the atom will spin in the opposite direction compared to the metal's rotation direction. We can view planets as a large metal. So, electrons' orbiting direction will be opposite compared to the planet's spinning direction when the planet starts to rotate due to external torque such as spinity. Proton ellipsoid and neutron ellipsoid will also rotate in the opposite direction as the planet or star's rotation. Because electrons 'orbiting is like a small Ampere current, so electrons' orbiting can generate magnetic field. The magnetic moment generated by the electron's orbiting is u=qJ/2m, q=electron' charge, m=electron's mass, J=electron's angular momentum. Thus, the planet or star can develop magnetism. In addition, the magnetic field direction is closely related to the planet or star rotating direction. It can explain the geomagnetism seen in Sun,

Earth, Mercury, Saturn, and Jupiter. There are iron cores in Mercury and Earth. In Sun, hydrogen and helium atoms are important in developing magnetism. Venus rotates very slowly, and the electron's orbiting and proton/neutron ellipsoids of constituting atoms are hard to align to the planet's rotational axis. Uranus and Neptune have different magnetic axis other than rotational axis. It can be because that the two planets are icy planets and the core of them could be molecular compound other than simple atom. And, the size of star or planet is important. If there are more atoms aligning to the rotational axis, the magnetism will be more apparent.

The other important mechanism of geomagnetism is the reversal of magnetic field. Sun or Earth can reverse their magnetic dipole in a certain period. Sun reverses its magnetic field in every 11 years; Earth reverses its magnetic field in every million years. In current physical theory, there is no satisfactory explanation for this phenomenon. However, it can be explained by the new atom model we postulated recently. In nucleus, protons and neutrons are packed separately and

rotating collectively in the same direction. And, all electrons are rotating in the middle plane of protons and neutrons rotational plane. Proton group and neutron group generate opposite magnetic field due to their different signs of magnetic moment. According to proton or neutron's magnetic field, all electrons can orbital rotate in two possible directions: the direction like the proton magnetic field direction or the direction like neutron magnetic field direction. Here, we postulate that all electrons can change their orbital rotation direction in a cyclic period. In one period, all electrons are rotating around nucleus in the direction as proton magnetic field direction. In the other period, all electrons are rotating around nucleus in the direction as neutron magnetic field direction. The change is due to proton ellipsoid's or neutron ellipsoid's magnetic force. When all electrons in atoms constituting the star or planet change their orbital rotation direction, it means that magnetic field of atom changes direction. Thus, the direction of magnetism of star or planet can also be changed. It is the reason of reversal of magnetism. For example, helium atoms constituting our sun have two paired electrons, two

protons, and two neutrons in each atom. Thus, the electrons' orbiting is changed to proton's rotating direction to neutron's rotating direction in an 11year.

Earthquake theory

Professor Alfred Wegener proposed continental drift theory in 1912. He suggested that all the continents were joined together in old times and they separated by some unknown forces. In the beginning, his idea was thought to be absurd and was difficult to be accepted by people. However, further researches on ocean crust revealed that the ocean crust is actually expanding. This phenomenon happens in the mid-Atlantic ridge. Ocean crust is generated from the mid-Atlantic ridge and spread to both east and west side. We can find the symmetrical alternative geomagnetism reversal pattern in the two sides from mid-Atlantic ridge. The continental coasts of west Africa and east South America can match perfectly. In addition, fossils of the same species can be found in both South America and Africa. Thus, it suggested that South America and Africa was joined together in old era. Thus, continental drift theory was accepted, and then plate tectonics theory was developed to explain the happening of earthquakes and volcano eruptions. Plate tectonics theory says that earth crust can be divided

into several "plates", and these "plates" crush each other to induce earthquakes. The plate crush movement is caused by ocean crust expansion and continental drift. Currently, it is a well-accepted theory for earthquake happening.

However, plate tectonics theory has several fetal defects. First of all, the sudden happening of earthquake in certain point should not be due to the slow process of continental drift. The continental drift is at a speed around 1cm per year. Thus, it only accumulates 30cm per 30 years. It is a very slow process and it cannot account for the huge energy release during a major earthquake. How can a 30cm plate movement per 30 year cause an energy release which is greater than 100x atom bomb energy? The slow continental drift cannot explain the sudden movement of rocks of plates during a major earthquake. In addition, plate tectonics movement or continental drift is a large scale movement and it cannot be accounted for earthquake happening in a single point. Why won't earthquake happen in the whole line of plate boundary concurrently? According

to Young's modulus formula, the pressure is P=F/A=E*(deltaL/L). Since the palate tectonic is wide ranged (huge L), the pressure caused by plate should be very small. Thus, plate tectonics theory cannot well explain the great force of earthquake.

Second, the continental drift is only proved between South America and Africa. The continental coast of South America and Africa matches only mean that there is ocean expansion in the Atlantic Ocean. In addition, the fossils which are similar in South America and Africa mean that only South America and Africa were joined together. For other major continents, the evidences for all continents were joined together are weak. Thus, we cannot say all the continents are moving. We cannot say all the continents are moving which causes earthquake. Where the evidence is, where the conclusion is.

Third, plate tectonics theory cannot explain intrapalate earthquakes. There are some "hotspots" which have frequent earthquake. For example, Hawaii suffers from a lot of earthquakes per year. However, Hawaii is not

located in the boundary of plates. In addition, there are several detrimental intraplate earthquakes. For example, the Sichuan earthquake currently is a huge intraplate earthquake. Plate tectonics theory cannot explain this. How can an earthquake happen when the location is not in the boundary of plates? Based on the plate tectonics theory, the intraplate earthquakes should be small or trivial. How can it cause such a huge and detrimental earthquake such as Sichuan, Tan-Shan, East America, or Thailand earthquakes?

Fourth, mantle convection is thought to be the driving force for plate movement. However, it is still wrong. If we use the sheer stress formula such as $P=v^2\rho$ or $P=\mu*v$ to calculate the sheer stress on crusts induced by mantle convection, we can find the maximal sheer stress is only 10^{-3} or 10^{-4} Pascal. It can be as small as 10^{-13} Pascal. (v: sheer velocity=1/10 flow velocity, ρ:fluid density, μ:fluid viscosity). Thus, the sheer stress induced by the "possible" mantle convection is trivial. How can it induce the heavy plate movement? It is like the water inside the pipe lets pipe movement. It is not logical. Besides, current 3D seismic tomography did not

find out large scale heat convection in mantle which was predicted by plate tectonic theory. Thus, this theory is very doubtful.

Fifth, there is logical fallacy in plate tectonic earthquake theory. The new ocean crust can be generated from mid-ocean ridge, then the new crusts spread to the two sides. The oldest ocean crust will sunk to the troughs. It is like a conveyor, a crust recycling. If it is a smooth conveyor that old ocean crust goes into the troughs, how can the ocean crust press continental crust to induce earthquake? In addition, how can earthquake happen in the top of mid-ocean ridges? It is not logical.

Sixth, there are observations about seismic waves. In earthquake, there is longitudinal P wave and transverse S wave. During earthquake, we can experience a first upward-downward movement (P wave) then a rightward-leftward movement (S wave). If plate tectonic theory is correct, there should a first horizontal force by plate crushing. Then, the possible P wave will let us to experience a rightward-leftward

shaking first. That is not the case. Only when earthquake is transferred from underground to ground, we can experience upward-downward shaking first.

Seventh, there are foreshocks and aftershocks accompanying the main shocks. If the earthquake is the adjustment of stress of plates like plate tectonic theory suggests, why won't rocks with inertia adjust the stress at once? Why are there so many shocks? 44% major shocks have foreshocks. If small shocks can help to adjust the stress and to relieve the stress, why can't these foreshocks prevent the subsequent main shock? Plate tectonic theory is very confusing.

Here, we propose a new mechanism for earthquake. Earthquake is actually a radiation (light) release from the inside earth. Radiation energy acting on faults causes earthquake. Radiation energy is important in our earth. The earth core and mantle has an estimated temperature around 4000 to 5000 absolute temperature. Radiation needs to be released from inside earth to outside space because it needs to diffuse out to outer space to gain maximal entropy. We

can view these heat particles are photons with momentum, and they will collide each other to expel each other to diffuse out. The formula for Stefan-Boltzmann's law is:

Power=σAT^4 (A=$4\pi R^2$)

The unit of radiation power is joule per second. Earth is covered by crusts to prevent radiation release. It means that radiation will reflex if it touches the inside crust. Thus, it means that in every second, radiation energy is accumulating when radiation is not released to outside space. After 30 years, we can see huge amount of radiation energy achieves. Because the earth core and mantle have very high temperature, we can see that the accumulated radiation energy can cause very detrimental effect. Normally, the radiation energy of inside earth is under the suppression of outer earth crust. After accumulation for decades, the accumulated radiation becomes greater and greater and it finally needs to be released.

We hypothesize that the radiation is released from

earth inner core with its 5700 absolute degree and its 1200 Km in diameter. It can travel through the viscous-liquid mantle:

Thus, power=$1.1*10^{21}$ watt
Even in one second, the total energy is huge.
Energy=$1.1*10^{21}$ joule

We know the energy of a typical atomic bomb is 10^{14} joule.

It is also possible that the radiation is released from mantle with average temperature 1000K. We assume the radiation is from a 1meter*1meter area in mantle. When it is emitted and touched the inner side of crust, it will go back and accumulate. However, when it reflected back, it may change its direction a little bit. After 30 years, the group of reflected radiation beam can have a lot of energy. If it finds a direction (with a refraction angle) which can emit out from the crust fissure and hole. Then, the radiation can be released out and cause earthquake. Light energy can do mechanical work via the concept of mechanical

equivalent of heat.

Power=7.16*10^5 Watt(1000K and 1meter*1meter mantle area)
After 30 years, the total energy:
Energy=7*10^{14} joule which is equal to 7 atomic bombs
If the crust is up-moved by 1000 meter, there will be:
W=F*S
Force=7*10^{11} Newton, still very large

Here, I will explain the scenario of earthquake genesis. First, earth has its strong gravity field a=g=GM/r^2. Then, due to Unruh-Hawking effect(T=ah'/2pi*ck), this gravity field will generate temperature. Subsequently, the temperature will cause radiation due to Stefan's law(P=σAT^4). And, due to my grand unification theory formula, Sefan's law will become Larmor formula to generate electromagnetic radiation. Thus, photons can be generated and released from inside earth. It is know the inside earth is around 1000-6000k, Thus, due to Wien's law(λ_M=b/T), the maximal possible EM radiation generated from inner earth should be visible light(wavelength=10^{-6}meter). It is also possible that UV

light, X-ray, or infrared light can also be generated. The gravity field of light is $g=a=L_p*\omega^2$. Once the UV light is generated, it will generated a gravity field of light which is around $0.001m/s^2$. This degree of earthquake is weak earthquake. Once X-ray is generated, it will generated a gravity field of light which is around $10m/s^2$. This degree of earthquake is strong earthquake. And, because F=ma, it will generate a huge force with a massive earth crust and with the light gravity acceleration field (space curvature rate).

It is important to know that heat will first transform into light to release out from earth. And, the light has gravity field(acceleration) for the space. If the light is near X-ray area, the gravity field produced from the light is around 1g-10g that is similar to observed strong earthquakes. Frequently, the radiation is released from crust fissures and holes. Earth crust fissures include mid-Atlantic ridge and peri-Pacific troughs. Crust holes are the hot spots such as Hawaii. Molten lava from mantle also can be released from these fissures and holes. That is why "Pacific ring of fire" (peri-Pacific troughs) is both for volcano eruptions and

earthquakes. That is why the Hawaii "Hotspot" is both for volcano eruptions and earthquakes. Radiation theory can explain why volcano happens in the same places as earthquake happens. When the radiation is released from inside earth and is passing through the earth crust, radiation energy can cause physical movement of faults of crust. When radiation pushes the crust to move upward, then the crust can move downward to return due to gravity. However, another radiation flush pushes the crust to move upward again. The back and forth phenomenon causes the shock wave. Then, earthquake happens and seismic wave occurs. If there is a fault A\\B, the radiation releasing between A layer and B layer can push B layer upward or push A layer upward or downward. That explains why some P wave is upward and the other is downward. Touching A layer or B layer is depending on the angle of radiation beam.

The new theory can explain intraplate earthquakes. If there is fault in the earth crust, there is possibility that radiation pressure can be released via these faults. They are naturally gaps which allow radiation pressure

to pass through. Thus, it can explain why some intraplate earthquakes are also very huge and detrimental. For examples, Sichuan or Tangshan earthquakes are both huge and detrimental intraplate earthquakes. Plate tectonic theory cannot well explain this.

We can see similar effect on our sun. When solar wind or solar flare is released from the sun surface, it also causes huge amount of seismic wave release.[1] It is called "sunshock" or "sunquake". We think the basic mechanism of sunquake and earthquake is the same: both are due to the release of radiation from inside to outside. Because the sun has much greater absolute temperature, the sunquake caused by sun flare is even much greater than major earthquakes. And, the solar flare is thought to be the abrupt energy release from our inner sun. X ray burst has been observed during sunquake. It is similar to earthquake. There is even higher energy release called gamma ray burst during starquake. In massive star with much greater heat energy, it can release light(gamma ray) and cause star-shock. Thus, the release of gamma ray is the cause of

starquake. Besides, quakes can also be recorded in Venus, Mars, and Moon. Although there is still hot debate on whether there is tectonic plate in Mars, there is no tectonic plate on Moon or Venus. There are only volcanos which can be the crust holes for radiation release. If there is no plate on Venus or Moon, how can we use plate tectonic theory to explain their quakes?

Besides, we must look at the coincidence of the shortest moon-earth distance and the happening of earthquakes. In 2004 South Asian Tsunami-earthquake and 2011/3/11 East Japan Tsunami-earthquake, there is shortest moon-earth distance. In 2011, it is called 319 super moon phenomenon. Many researchers suggested the tidal force may play a role in triggering earthquake. However, the mechanism is unknown. If earthquake is the abrupt release of radiation from crust fissures or holes, we can perfectly explain the effect of tidal force on earthquake. Photon itself has an gravity field $g=Lp*w^2$ which can be attracted by outside strong mass. It is like photon can be attracted by black hole or galactic center. Thus, if the moon is near our

earth, the photon (electromagnetc gravitational wave) inside our earth can be more easily attracted out to induce earthquake. That explains the 319 mystery! It can also explain the mechanism why typhoon can trigger earthquakes as well published in Nature magazine. Typhoon is a low pressure center, so it can also attract the photons to release out from inner earth. It is similar to the mechanism of tidal force. Plate tectonic theory cannot explain this phenomenon.

During 1950-1965, there was a strong earthquake period with seven times larger than scale 8.5 earthquakes happening in the world. Then, there was a relative peaceful period for 40 years. In 2004 South Asia earthquake, another strong earthquake period began. There are five larger than scale 8.5 earthquakes happened after 2004. In addition, an active volcano eruption period also started after 2000. The concurrent active earthquake and volcano period suggested that the radiation energy inside earth has been accumulated exceeding its limit and needs to be released out. Plate tectonic theory cannot explain this phenomenon.

In this new theory, we can also explain many earthquake phenomenon which cannot be explained by traditional plate tectonics theory. Earthquake light before or during earthquake is an important phenomenon related to earthquake happening.[2-5] For example, many people observed white to blue light shining in the sky for all night during the Peru earthquake. Plate tectonics theory says that it is caused by suddenly transformation of rocks into a semi-conductor (p-hole) like substance. Thus, rocks can emit light. This mechanism explained by plate tectonics theory is very strange and cannot be accepted. Rocks are electrically neutral and are simply mass not charge. Even the rock mass is accelerated, it cannot emit electromagnetic radiation based on fundamental Maxwell's classical electromagnetism. Why can an earthquake transform rocks into semi-conductors? Another explanation is there is piezoelectricity effect of quartz crystals during earthquake. Compression of quartz can induce electric dipole moment. However, the arrangement of quartz is in random in rocks. Thus, the net electric dipole moment should be canceling each other out if there is earthquake induced

compression. Besides, piezoelectricity effect is supposed to happen inside the crust. How can it cause the sky to shine with earthquake light? The second explanation is also wrong. In addition, radio disturbance and ionosphere anomaly are usually observed during or before earthquake happening[6-11]. Electromagnetism field anomaly or infrared light anomaly is also observed by satellite or other instruments during a major earthquake[12-21]. Some researchers also noted some changes of animal behaviors. If the earthquake is the release of radiation pressure, we can easily explain visible earthquake light, radio disturbance, EMW/ionosphere anomaly, and infrared light anomaly. Animal behavior change may be due to that some animals can detect the change of radiation wave.[22]

In majority of earthquake observations, infrared light and radio frequency disturbance are frequently seen before earthquake. However, UV abnormal signals are seldom seen. We will deduct the reason here. When a radiation beam is emitted from earth mantle or inner core to outside space, it must suffer from a phenomenon called refraction. It is like light is emitted

from water to air. Because the radiation energy is accumulated, it is not going straight from the mantle just below the crust fissure or hole. There is a refraction angle. The refraction index is:

Snell's law: N=C/v

(C: light speed in air or vacuum; v: light speed in medium such as mantle)

During the refraction, there is a physical phenomenon called dispersion. That is different wave lengths have different refraction indices. Red light which has longer wavelength has less refraction indices; blue light which has shorter wavelength has larger refraction indices. According to the above formula, red light has smaller N and faster v. (lightspeed C is constant). Thus, it means that radiation with longer wavelength transmit faster in the medium such as earth mantle. We assume that the radiations from earth compose a wide spectrum of radiation wavelengths since the radiation substances inside earth is complicated and varied. Thus, radiations with longer wavelength will be released out from inner earth faster. That is why infrared or radio signal which have longer wavelengths are seen before the main phase of earthquakes. This situation is important for

earthquake prediction. Because radiations with shorter wavelengths are associated with higher energy, the short wavelength radiations are more possible to cause earthquake detrimental effects. (E=hf). However, it radiations with longer wavelengths and smaller energy are emitted out faster, we can use them as warning signals. Besides, we might expect to see a radiation spectrum change during earthquake. It should be infrared signal first, then visible light such as earthquake light, and finally UV spectrum light. This serial change of radiation spectrum can also help us for earthquake prediction. A recent review study pointed out there is really EM frequency increase pattern before earthquakes.[23]

Based on the cause-effect relationship, we can examine the following criteria for the link of earthquake and EM radiation.[24][25][26][27] First of all, we check the strength association. Stronger earthquakes are accompanied by strong EM radiation signals and more intense ionospheric anomalies. Second, we look at the consistency. All measured earthquakes can be detected the release of EM radiation. Third, we can see the temporality. Infrared light anomalies and

earthquake light are detected before or during the onset of earthquakes. Fourth, we examine the plausibility. That earthquake caused by the release of electromagnetic radiation energy is more plausible than the current plate tectonic theory. There is no driving force for such an abrupt and vigorous movement in a single point for the current plate tectonic theory. Some say that tectonic plate movement is driven by mantle convection. However, how can this slowly and continuously creeping heat motion cause an abrupt and vigorous signal point disaster? Based on the Unruh-Hawking equation, heat radiation can be mutually transformed into acceleration. You may argue the heat radiation could be from the crust acceleration. However, the truth is the opposite. The heat radiation from the inside earth was transformed into crust acceleration during earthquakes. There is no plausible reason and driving force for the abrupt happened crust acceleration based on plate tectonic theory. If we look at the formula of F=ma, the net acceleration caused by earthquake will be very small with the large mass of the whole tectonic plate due to the plate tectonic theory. Thus, the heat

radiation transformed by the tiny acceleration should be neglected due to the plate tectonic theory. Tectonic plates always move continuously and slowly, and we can find out the temporal association between the plate movement and the occurrence of earthquakes. In addition, there is a lack of strength association. We never observe, detect, or confirm that a more vigorous plate movement has a direct link to a more detrimental earthquake. Plate tectonics theory also has a defect in the consistency. In the detrimental and huge Sichuan earthquake, this earthquake didn't even happen in the boundary of plate-and-plate. How can plate tectonic movement cause such a huge earthquake? A->B is contradict with –B^A. We say A is plate movement and B is earthquake. If plate movement causes earthquake, then it is impossible to have no earthquake with plate movement happening concurrently. However, plate movement is a continuous process and earthquake is not happened every day. Thus, plate-earthquake theory is wrong.

In summary, we think this new earthquake theory is the actual mechanism of earthquake happening. Plate tectonics theory fails to help to do earthquake

prediction. This new theory can shed a light for earthquake prediction. If we can monitor or detect radiation anomaly (earthquake light, radio disturbance, EMW anomaly, infrared light anomaly) before earthquake, we might be able to know when and where the earthquake will happen. Earthquake can be very huge and detrimental. Around 100 thousand people might be killed in current Sichuan earthquake. Current continental drift/plate tectonics theory is wrong, and this wrong theory prevents us from doing earthquake prediction. We sincerely hope this new theory can be helpful in earthquake prediction to avoid huge amount of human life loss.

References

1. Martinez-Oliveros J.C. et al. Helioseismic analysis of the solar flare-induced sunquake of 2005 January 15 II. A magnetoseismic study. Monthly Notices of the Royal Astronomical Society 389,1905-1910 (2008)
2. Hedervari P. Earthquake light phenomenon Nature 301,368 (1983)
3. Lloyd J.J. Earthquake light Science 193,1070 (1976)
4. Richter C.F. Earthquake light in focus Science

194,259 (1976)

5. Kamogawa M. et al. Earthquake light: 1995 Kobe earthquake in Japan Atmospheric Research 76,438-444 (2005)

6. Biagi P.F. et al. LF radio anomalies revealed in Italy by the wavelet analysis: possible preseismic effect during 1997-1998. Physics and Chemistry of the Earth, Parts A/B/C, 31, 403-408 (2006)

7. Biagi P.F. et al. Possible earthquake precursors revealed by LF radio signals Nature Hazards and Earth System Sciences 1,99-104 (2001)

8. Liu J.Y. et al. Seismoionospheric GPS total electron content anomalies observed before the May 2008 Mw7.9 Wenchuan earthquake Journal of Geophysical Research 114,1-10 (2009)

9. Ruzhin Y.Y. et al. Earthquake precursors in magnetically conjugated ionosphere regions Advance in Space Research 21,525-528 (1998)

10. Liu J. Y. et al. Seismo-ionospheric signatures prior to M>6.0 Taiwan earthquakes Geophysical Research Letters 27,3113-3116 (2000)

11. Fujiwara H. et al. Atmospheric anomalies observed during earthquake occurrences Geophysical

Research Letters 31,L17110 (2004)

12. Ni S.D. et al. Energy radiation from the Sumatra earthquake Nature 434,582 (2005)

13. Uyeda S. et al. Electric and magnetic phenomena observed before the volcano-seismic activity in 2000 in the Izu island religion, Japan PNAS 99,7352-7355(2002)

14. Uyeda S. et al. Geoelectric potential changes: possible precursors to earthquakes in Japan PNAS 97,4561-4566 (2000)

15. Varotsos P.A. et al. Electric fields that arrive before the time derivative of the magnetic field prior to major earthquakes Physical Review Letters 91, 148501(2003)

16. Ouzounov D. and Freund F. Mid-infrared emission prior to strong earthquakes analyzed by remote sensing data Advances in Space Research 33,268-273 (2004)

17. Tronin A. A. et al. Thermal IR satellite data application for earthquake research in Japan and China Journal of Geodynamics 33,519-534 (2002)

18. Fujinawa Y. et al. Emission of electromagnetic radiation preceding the Ito seismic swarm of 1989

Nature 347,376-378 (1990)

19. Fujinawa Y. et al. Experiments to locate sources of earthquake-related VLF electromagnetic signals Proc. Jpn. Acad 73,33-38 (1997)

20. Oike K. et al. Electromagnetic radiations from rocks J. Geophys. Res. 90,6245-6249 (1985)

21. Varatos P. et al. Physical properties of the variations of the electric field of the earth preceding earthquake Tectonophysics 110,73-98 (1984)

22. Ikeya M. et al. Electric shocks resulting in seismic animal anomalous behaviors J. Phys. Soc. Jpn. 65,710-712 (1996)

23. Chen ZY. Et al. The observation and research on pre-earthquake electromagnetic radiation information Acta Seismologica Sinica 6,485-494 (1993)

24. Lin JW Principal component analysis method in the detection of total electron content anomalies in the 24hrs prior to large earthquakes Arab J Geosci online 2010 October

25. Biagi RF Possible earthquake precursors revealed by LF radio signals Natural Hazards & Earth System Science 1,99-104 (2001)

26. Fujinawa Y et al. Electromagnetic radiations associated with major earthquakes Physics of the Earth & Planetary Interiors 105, 249-259 (1998)
27. Kamogawa M Preseismic lithosphere-atmosphere ionosphere coupling Eos 87,417-424 (2006)

Tornado and typhoon theory

Tornado is a detrimental nature disaster. It usually causes huge life and financial loss. However, the exact mechanism of tornado is still unknown. Here, I am proposing a new theory to explain the tornado-genesis. I sincerely hope this new theory can help in tornado prediction to prevent from the harmful effects by tornado.

The most puzzling part of tornado-genesis is the origin of spinning of wind. Although many tornados are following the rule of Coriolis force, there are also exceptions. Coriolis force can be successfully applied for larger scale storm such as hurricane or typhoon to explain their rotation direction. However, Coriolis force cannot successfully predict the rotation direction of tornado. In my previous paragraph, I proposed charge relativity to describe that charge can cause space-time vortex. In fact, I think charge also plays a very important role in tornado-genesis. The spinning of tornado wind is actually closely related to space-time vortex induced by charges.

Most tornados start with a huge thunderstorm. The

thunderstorm is a huge cloud with a great amount of electric charges. Why does cloud carry electric charges? We can first look at the mechanism of lightning generation. In the space around our earth, there are two bands called Van Allen belts carrying a great amount of charges. The outer Van Allen belt is composed of electrons, so it is negatively charged. The inner Van Allen belt is composed of protons, so it is positively charged. The two Van Allen belts are surrounding earth because of earth's gravity and magnetism. Electrons are lighter than protons, so they form outer Van Allen belt. These two Van Allen belts are also affected by earth's spinity, so the equator sky has more electron and proton charges. Because the inner Van Allen belt is positively charged, the ground surface of our earth can be reactively to have negative charges. As for thunderstorm formation, the bottom of humid huge cloud can react to the earth's surface negative charges to have positive charges. And, the middle layer of the cloud can have negative charge. The upper layer of the cloud can have positive charge. Lightning occurs when the cloud accumulates a great amount of charge and the atmosphere humidity

increases to enhance conductivity. Humidity can also help the H_2O in cloud to dissolve easier to become H^+ and OH^- ions. Thus, raining is usually associated with lightning.

Tornado is also due to the accumulated charge in the thunderstorm cloud. More than 90% tornadoes develop from a class of thunderstorms known as supercells. Stronger supercells are associated with stronger tornados. Supercells all happen before the onset of tornados. Supercells contain mesocyclones, an area of organized rotation a few miles up in the atmosphere, usually 1-6 miles across. After a huge amount of charge accumulated in thunderstorm cloud, the bottom tip of cloud can attract near-ground air with opposite charge. Thus, besides the supercells, another important factor must present. That is a veering wind which is a progressive shifting of the wind. Since electrostatic charge can cause space-time vortex (whirlpool-like), the near-ground air can be spirally attracted to the charged thunderstorm. Thus, a twister is formed. That is why tornado is usually associated with thunder and lightning. Since the

Coulomb electrostatic force is very strong compared to Newton gravity, the velocity of the vortex wind can be very fast. Thus, tornado can be very detrimental. The spinning direction of tornado is decided by the positive or negative charge of the thunderstorm. Thus, tornado can be both clockwise and counterclockwise. However, since our earth surface is majorly negatively charged, we can see majority of tornado have certain spin direction. In recent studies, positive cloud-to-ground polarity is found in majority of tornadoes.

Tornados usually develop in near equator area. There are two reasons for this phenomenon. First, there is lightning-temperature relationship. Lightning usually happens in high temperature area. It can be because heat energy can be transformed into electric energy. Atmosphere electricity is highest at noon and afternoon compared to that in morning or night. This reason can also explain why tornados usually happen in late spring and summer between 3 pm and 7 pm, which is the hottest periods of the day and the year. Second, the Van Allen belt is thickest above the equator area. Thus, there is highest possibility to have

reactive charge phenomenon in equator area. Thus, lightning and tornado can easily happen in equator area. It is worth noting that lightning is not only associated with temperature but also associated with humidity. Thus, wet bulb temperature is more correctly related to lightning and tornado.

There is a temperature-charge relationship which is important in electrolyte solution. Thunderstorm cloud is mimicking the electrolyte solution. The relation is called thermal voltage:

$V_t=KT/q$ (V_t: thermal voltage, K=Boltzmann constant, T: absolute temperature, q=charge)

This formula can explain the lightning-temperature relationship. Thermal energy can be transformed into electric energy.

There are many evidences pointing out tornados are actually driven by charge relativity. First, tornadoes can emit on the electromagnetic spectrum. Abnormal E-field effects are usually detected during tornadoes. In

addition, seismic signatures can also be detected during tornadoes. As we know, earthquake is actually the release of electromagnetic radiation. And, accelerated charges during tornado wind spinning should emit electromagnetic radiation. Thus, it is not surprising that electromagnetic signals can be detected during tornadoes. Second, there is a relationship between lightning and tornado. Overall cloud-to-ground lightning activity decreased as a tornado reaches the earth surface and returns to the original level when the tornado lifts. It can be explained that the cloud electricity decreased if there is direct contact with the opposite charges on ground via tornado winds. When the direct contact is removed during tornado lifts, the cloud electricity can be regained and increase lightning activity. In many cases, intense tornadoes exhibit an increased and anomalous dominance of positive polarity cloud-to-ground discharges. These evidences strongly suggest that charge relativity plays an important role in tornado synthesis.

We can also use this model to explain waterspout and

landspout. Classical tornadoes are charged cloud to attract near-ground air with opposite charges. In waterspout, the charged cloud can attract water from sea or lake which carries the opposite charges. In landspout, the charged cloud can attract dirt from ground which carries the opposite charges. However, since water and dirt have masses, the usual strengths of waterspouts and landspouts are weaker and they have shorter life spans than classical tornadoes.

The United States of America has the most tornadoes of any country, almost four times more than estimated in all of Europe. This is mostly due to the special geography of the continent. North America is a large continent that extends from the tropics north into arctic areas, and has no major east-west mountain range to block air flow between the two areas. That is why tornadoes usually happen in America, especially in Middle-West area. I think this new tornado theory is very interesting. If we know the actual mechanism of tornado genesis, we can develop better methods for tornado prediction. For example: we can detect electromagnetic signals to predict if a tornado is going

to happen. We can also develop methods to destruct tornadoes. We may emit charge bombs to the tornado to help to eliminate the excessive charges in tornadoes.

The principle can also be applied to other cyclone formation such as typhoon and hurricanes. The storm eye formation is still a puzzle. If we use charge relativity, the puzzle can be solved. Eye area is an area with same charged air. The massive charge is due to electric-heat transformation. When the opposite charged moisture gas is attracted to the eye. It will be neutralized and got the same charge from the eye air. Because of the heat of the eye, the moisture gas will be elevated. Because it gets the same charge from the eye, it will be expelled out. When it expel to the peripheral of the typhoon, it will has less heat and started to fall. And then, it will contact and have the opposite charge from the eye again. It will be attracted to the storm eye again. It is a positive feedback mechanism. The charge relativity will let the moisture gas to form a vortex. This can be applied to all cyclone formation. But, for tornado, the gas is a vertical

movement. And, for hurricane and typhoon, the gas is a horizontal movement. But, the basic principle is both charge relativity. I am looking forward to the applications of this new theory!

References

1.Williams ER The Schumann resonance: a global tropical thermometer Science 256, 1184-1187 (1992)

2.Tatom F et al. Tornado detection based on seismic signal Journal of Applied Meterology 34,572-582 (1995)

3.Leeman JR et al. Electric signals generated by tornados Atmospheric Research 92, 277-9 (2009)

4.Perez AH et al. Characteristics of cloud-to-ground lightning associated with violent tornadoes Weather and Forecasting 12,428-437 (1997)

Theory of everything in biology

Protein world hypothesis & homochiralty

Chiralty is a fundamental characteristic of chemical molecules due to optical polarization. Thus, biomolecules such as sugar and amino acid have two forms of chiralty: Dextrorotatory (D-form) and Levorotatory (L-form). Although L-sugars and D-amino acids can be found in chemistry synthesis and in inorganic compound, most biological relevant molecules in biological systems are D-sugars and L-amino acids. Thus, all proteins are made of L-amino acids and all DNA as well as RNA are made of D-sugars. And, an organism can only use or metabolize D-sugars including D-glucose, D-fructose, and D-ribose. In biological system, there is homochirality which means that the same chiralty applies to all amino acids and

sugars. It is a puzzle why biological system chooses only L-amino acids and D-sugars. What is the reason and consequence of the homochirality in biology? Here, I will propose a mechanism to explain the homochirality in biology. I call this symmetry breaking for L-amino acids and D-sugars during evolution.

Since Lee and Yang discovered parity violation principle in weak interaction, researchers proposed that parity violation effect can be the reason of homochirality in biological systems. However, if the homochirality is due to parity violation, the enrichment of L-amino acids or D-sugars would merely 10^{-11}. Based on precise electroweak calculations, there is only 10^{-30} order of energy difference between L-amino acid and D-amino acid. It cannot explain why almost all the biological amino acids and sugars are L-amino acids and D-sugars. The parity violation principle cannot either explain the equal products of L-enantiomers and D-enantiomers in pure chemistry synthesis. Parity violation principle is majorly occurred in each atomic nucleus(W particle), so it is also difficult to apply it to larger scale of biomolecule chemical structures. Thus, homochirality

cannot be originated from parity violation effect.

The most widely accepted abiogenesis theory is RNA world hypothesis. The reason is RNA is not an intermediate cell messenger. It can also serve as a catalyst to caltalyze its own synthesis. It is also like DNA which can store and inherit information. In addition, many co-factors such as ATP etc are made of RNA. Thus, RNA is thought the original bio-substance for earth. However, this hypothesis has several defects. First, RNA must be made of ribose which cannot be formed easily even in hot primordial condition. Ribose formation needs enzyme catalysis help. Second, RNA chain is not stable. If there is no enzyme help for RNA prolongation, it is easily to be hydrolyzed. Third, Why the ribose of RNA is all D-ribose? If RNA is the early beginning bio-substance, where are the pure D-ribose from? Fourth, Drs. Joyce and Orgel argued that activation of phosphate group such as ATP is required for current RNA synthesis. If there is no enzyme help, the RNA linkage will be 5'-5'-pyrophosphate linkage not the correct 3'-5'-phosphodiester linkage. In addition, the wrong di-molecules won't allow further

incorporation of additional nucleotides. Fifth, the self-replication ability of RNA is limited. For the long 189-base pair ribozyme, it can make a longest 14bp RNA which is too short for replication and inherit genetic messages. Sixth, RNA is relative unstable molecule compared to DNA or proteins, especially in primordial high temperature environment. Thus, it is doubtable if RNA is served as the key original bio-material. It can easily be degraded. Seventh, there is still no existing thermodynamically uphill dry-phase synthesis for combining pyrimidine bases and riboses. Eighth, the joining of sugar to base could be alpha or beta anomer of either furanose or pyranose form. For nucleic acids, it needs to be correct beta-furanose form. Without enzyme help, it is not easy to get the correct form. Ninth, the ultra-violet light is primordial environment can rapidly destruct RNA molecules. It is even harder to maintain the early-beginning RNA bio-material.

Here, I will propose a new model called protein world hypothesis. The current central dogma is DNA->RNA->protein. I think the evolution process is just the reverse: protein->RNA->DNA. Protein is actually the

early-beginning biomaterial for earth. In the Oparin-Haldane hypothesis for the early earth environment, there should be chemically reducing substances in nature including methane, ammonia, water, hydrogen sulfide, carbon dioxide, carbon monoxide, phosphate, oxygen, and ozone. In the famous Miller-Urey experiment, container with water, methane, ammonia, and hydrogen stimulated with electrode mimicking lightening in early earth can generate 30-40 kinds of amino acids (original experiment 11 amino acids, modified experiment can generate all the essential 20 amino acids) which is the building stocks of proteins. No any nucleic acids were found in these experiments. Peptides can also be found in these experiments. Amino acids can spontaneously form peptides, polypeptides, proteinoids, and proteins. And, it is more stable than RNA molecule. Sutherland group has used glycolaldehyde, glyceraladehyde, glyceraldehydes-3-phosphate, cyanamide, and cyanoacetylene to generate cytidine ribonucleotides(RNA) only by passing the synthesis of ribose. However, these chemical substances are relatively more complicated. It is not easily made in early beginning earth environment,

especially without enzyme's help. Based on Urey experiment, amino acids should be the early beginning bio-material on earth.

Then, amino acids can form polypeptides or protein via peptide bonds spontaneously. In a research, partial sublimation of 10% racemic amino acids such as leucines can results in 80% more enrichment in enantioenriched sample of leucine in the sublime. Thus, the possible large variations of temperature in the early earth environment can cause the partial sublimation and the accumulation of L-form amino acids. In another experiment, a crystal suspension of a racemic amino acids derivatives continuously stirred, results in 100% crystal phase of one of the enantiomers. Thus, L-amino acids can be accumulated from the original L&D mixed racemic amino acids.

In a recent research, there is a striking finding that L-amino acid can then catalyze the formation of D-sugar[22]. Under the prebiotic condition, the synthesis of glyceraldehydes by reaction of formaldehyde with glycolaldehyde can be catalyzed by L-amino acids.

Then, the 1:1 D-sugar/L-sugar ratio can be amplified to 92:8 using simple selective solubilities. In the previous section, we have introduced that D-ribose can be synthesized by D-glyceraldehydes. Thus, more and more D-riboses can be synthesized. In addition, a study showed that L-Val-L-Val can catalyze the formation of D- tetroses such as D-erythrose to have >80% excess than L-enantiomers[23]. In another study, LL-peptides can be a catalyst for D-ribose formation. In turns, more and more L-amino acids can be synthesized due to the coupling of D-sugar and L-amino acids. In addition, the more efficient catalytic enzyme made by L-amino acid must favor the synthesis of D-sugars and L-amino acids to further amplify these two components as a positive feedback. For example, hexokinase for synthesis of sugar-phosphate is the first and rate limiting step for carbohydrate metabolism. Hexokinase is limited to D-sugar. Finally, the full amplification of D-sugar and L-amino acid happened.[24-27] Peptide formed by L-amino acids can be thought as protein enzymes. The enatiomer ratio of chemical reaction product is usually dependent on the enzymes. In addition, the D-ribose formation must need the existence of protein enzymes

formed by L-amino acids. Thus, protein must precede RNA existence. If the enatiomer of sugar is decided by the L-amino acids, it can explain why all the sugars such as D-ribose, D-ribulose, D-glucose, D-fructose, D-galactose, and D-mannose are all D-forms. Besides, both sugars and proteins are formed by the same enatiomers, and this is another positive feedback. RNA with D-ribose will then prefer the synthesis of L-protein. The above reasons are the world of homochirality origin: symmetry breaking for D-sugar and L-amino acid.

Schrodinger first proposed that life is due to absorbing negative entropy from the environment. Thus, it can cancel out the positive entropy produced by the bio-organism itself. Later, Dr. Prigogine proposed a dissipative structure theory. He thought that life is made of dissipative structure which is opposite to the second law of thermodynamics. A dissipative system must have following characteristics. First, the system must be an open system. It needs to continuously exchange energy and substance from outside environment. It is not like a solitary system which

obeys the second law of thermodynamics. Only with an open system, there could be negative entropy accumulation inside the bio-organism to produce order for the bio-organism. Second, the system should be far away from equilibrium. If the system is in or near the thermodynamic equilibrium position, the system cannot easily maintain and it will fall back to the original system obeying the second law of thermodynamics to accumulate positive entropy. And, there must be a mechanism to let the system away from equilibrium. Third, non-linear relationship. The system must be non-linear. Current physical laws are usually linear. There must be non-linear relationship such as positive or negative feedback for the development of bio-organism. Fourth, mutation/fluctuations. There must be fluctuation for the system. If the system has the fluctuation or mutation, it has the chance to amplification this fluctuation or mutation to be away from equilibrium status via positive feedback mechanism. In addition, the mutation will let the bio-organisms to diversify. This is the origin of the evolution of bio-organisms.

The arising of bio-organism is like a spontaneous symmetry breaking from physical nature. If we want to assume the protein as the early beginning bio-material, we will need to examine if it fits the dissipative structure requirement. In the primordial earth environment, the universe temperature is much higher with more light and radiation. Thus, the protein bio-organism can more easily to get energy from outside environment to maintain negative entropy. It fulfills the open system. The protein can have autocatalytic ability. Thus, it can generate more and more itself via replication-like behavior. This is the non-linear positive feedback mechanism. The again and again positive feedback mechanism will let the protein bio-organism to be away from the thermodynamic equilibrium to avoid the second law of thermodynamics. Finally, mutation. Protein can also mutate conformationally reacting to the outside environment. It is observed by prion experiment. A prion passed to different animals. It will generate different conformational mutants to fit different animals. Thus, protein can be thought as an earliest bio-organism based on dissipative structure.

We can use dissipative structure theory to examine other hypothesis such as metabolism-fist or replication-first theory or lipid world hypothesis. If protein is the early beginning molecule, it can match both the metabolism-first and replication-first theory. However, positive feedback autocatalysis is the key. As for lipid world theory, lipid is not easily self-replication via positive feedback non-linearly. In addition, the fluctuation/mutability for lipids is much less. Thus, lipid is not suitable for a dissipative structure. However, bio-organism still needs lipid in the later stage. Lipid can set a layer of boundary. By meaning of lipoprotein inserting the lipid layers, bio-organism can still selectively absorb energy and substance from outside environment(negative entropy). It can also release out waste to outside environment(positive entropy). Thus, lipid layer can help the bio-organism to have selective advantage. That is the rising of cell. The liproprotein on lipid layer is just like Maxwell's demon.

Even the proteins have functions to combat the environmental nature selection. Its mutation is only conformational change. Thus, it cannot generate more

diversified bio-organism for the changing outside environment. Thus, the evolutional force will let protein to become RNA and DNA to allow more mutation and diversification. Compared to DNA, RNA is easier to synthesize and develop. Thus, we can reasonably assume a primordial happening of a RNA polymerase. This primordial RNA polymerase can generate RNA without RNA template. After the generation of RNA polymerase, ribose with rRNA and ribonucleoprotein can be developed. Thus, protein can make RNA, and RNA can make protein to allow a circular loop to maintain the system. The RNA world is also in the beginning of bio-organism. Thus, RNA is thought as the early beginning bio-material. Many enzyme cofactors are made of RNA. However, these co-factors are for enzymes. If there are no protein enzymes, these RNA enzyme co-factors will be meaningless. In addition, the discovery of Urzyme also suggests the role of pre-existing protein for tRNA evolution and genetic coden development. Since the RNA polymerase raised in the early stage of abiogenesis, the RNA polymerase should be conserved. We can observe that RNA polymerases mostly from

widely variable viral origins are strongly conserved. This means that RNA polymerase can play an important role in the beginning of life. In contrast to ribose, riboses have more diversity compared to RNA polymerase. Ribose is usually used as phylogenic studies to distinguish different species. Based on the evolution principle, ribose should raise later compared to RNA polymerase.

In addition, there is a structural similarity between RNA dependent RNA polymerase and telomerase. Telomerase is the RNA primed short DNA synthesase. Thus, telomerase can be derived from the evolution of RNA polymerase. Thus, DNA raised. Another reason for the last develop of DNA is DNA replication needs RNA primers. Thus, RNA should be developed earlier than DNA in the evolution tree. The advantage of DNA is it can form a double helix. The sex-like combination of DNA makes more diversity of bio-organisms which will facilitate the velocity of evolution. DNA can store information. It can maintain stability to be away from thermodynamic equilibrium. And, it can allow more mutation/fluctuation to allow the driving force of

evolution. Finally, DNA becomes the dominant bio-material to govern the bio-organism. RNA becomes the intermediate molecules for positive feedback as well as non-linear negative feedback machinery (RNAi). And, protein is specialized for the structure and function. Thus, Protein->RNA->DNA becomes DNA->RNA->Protein.

Reference
1. Powner MW, Gerland B, Sutherland JD: Synthesis of activated pyrimidine ribonucleotides in prebiotically plausible conditions. Nature 2009, 459(7244):239-242.
2. Reuben J: Chemically-selective nucleotide-amino acid interactions in aqueous solution. A PMR study. FEBS Lett 1978, 94(1):20-24.
3. Breslow R, Cheng ZL: L-amino acids catalyze the formation of an excess of D-glyceraldehyde, and thus of other D sugars, under credible prebiotic conditions. Proc Natl Acad Sci U S A 2010, 107(13):5723-5725.
4. Pizzarello S, Weber AL: Stereoselective syntheses of pentose sugars under realistic prebiotic conditions. Orig Life Evol Biosph 2010, 40(1):3-10.
5. DeRose VJ: Two decades of RNA catalysis Chem &

Bio 2002,9:961-969

6. Lacey JC:Ribonucleic acids may be catalyst for the preferential synthesis of L-aa peptide JME 1990 31:244

Evolution and extinction

Darwin's evolution explains Dead or Alive Race WINs. However, he didn't well explain extinction phenomenon. Extinction is a major nature selection process. It is a major driven force for evolution. However, the underlying reason for extinctions are not well understood. There are five massive extinctions in earth history. In addition, there are total twenty-three minor extinction events in earth history. The most famous massive extinction event is the KT extinction event. In this last massive extinction, all the dinosaurs died during this tragedy. A well known theory to explain the KT extinction event is comet or asteroid theory. Researchers believed that an asteroid or comet hit our earth during K-T period. The KT impact created dramatic global climate change and let animals and plants disappeared. However, this theory can only explain one extinction event and it is wrong. It cannot explain the other four massive extinction or other

minor extinction events. There are no evidences showing that other asteroids or comets hit our earth to cause the other extinction events. We need a common mechanism to explain why there are repeated extinction events on earth. In addition, there are several defects in the KT impact theory. We will discuss this in the later paragraphs.

Here, I propose a new mechanism for all the extinction events. The reasons for these major and minor extinction events are due to Milankovitch cycle. Milankovitch cycle was proposed to explain the glaciation periods of earth. Our earth is undergoing global climate changes due to following reasons. 1. The eccentricity of orbit that our earth is rotating around the sun. 2. The axis tilt of earth (obliquity) when it is affected by the sun. 3. The apsidal and axial procession of our earth when it is around the sun. 4. The orbital inclination. Combining the above reasons, our earth is undergoing extremely hot or cold periods. During the cold periods, the glaciations happen. Thus, I propose here that extremely cold or hot periods on our earth are the major reasons for massive or minor extinction

events.

Why is there Milankovitch cycle? It can be explained by gravity and spinnism. The elliptical shape (eccentricity), planet orbital precession, and orbital inclination can be explained by the planetary movement formula:

$$\frac{GMm}{r^2} + \frac{SJmW}{r^2} = mrW^2$$

Since the mass is not changing, the planetary movement can be influenced by sun's spin angular momentum, earth orbiting angular velocity, and sun-earth distance. We can also use general relativity to explain Milankovitch cycle. Since gravitospinnism is space-time curvature, so space-time curvature changing cycle can explain the eccentricity, orbital precession, and orbital inclination of Milankovitch cycle. Mercury precession cycle can be a good example to explain this phenomenon.

Distance and angle of planet orbit can affect its acceptance of sun light flux, so the planet climate will be changed. Besides, the internal heat radiation

change of earth can affect its climate. The 100000 years cycle of ice age matches the 100000 cycle of eccentricity and orbital inclination change of earth.

How about axis tilt (from 22.1 to 24.5 degree)and axis precession of earth? It can also be explained by gravity and spinity. The precession angular velocity is external torque divided by spin angular momentum. As for a planet, the external torque can be provided by sun's gravity. Thus, we can see the precession angular velocity is depending on sun's gravity. Thus, we can explain the axis precession of earth. We can see the Sun's gravity induced torque also can affect the axis tilt of the planet. Sun's gravity tends to let our earth to lay down for precession. However, there is the other balance force for the axis change of planet. That is spinnism. Sun's spinnism tends to let the planet's axis go back the original upright position. Due to the two balancing forces, there will be a periodic change for axis tilt and axis precession of the planet. The axis tilt and precession can affect planet weather, and that is the cause of seasonal change from summer to winter on earth. Using gravity and spinity can also explain the

Milankovitch cycle about planet axis change. These above combined effects cause the periodic climate change of earth. Thus, there will be hot "fire age" and cold "ice age" on earth.

There are five massive extinctions (The Big Five) in earth history: 1. Ordovician-Silurian extinction event 2. Late Devonian extinction event 3. Permian-Triassic extinction event 4.Triassic-Jurassic extinction event 5. Cretaceous-Tertiary extinction event. The first massive extinction event is Ordovician-Silurian extinction happened in 440-450 Ma. During this extinction event, two main event phases killed 27% of all families and 57% of all genera. Many scientists rank this event as the second largest extinction event in earth history. The second massive extinction event is Late Devonian extinction happened in 360-375 Ma. This event lasted perhaps 20 MY, and it killed 19% of all families and 50% of all genera. The third massive extinction event is Permian-Triassic extinction happened in 251 Ma. This extinction event is called "Great Dying" which is the largest extinction on earth. It killed 57% of all families and 83% of all genera (53% of marine families, 84% of

marine genera, about 96% of all marine species and an estimated 70% of land species). The fourth massive extinction event is Triassic-Jurassic extinction happened in 205 Ma. This event killed 23% of all families and 48% of all genera(20% of marine families and 55% of marine genera). Most non-dinosaurian archosaurs, mot therapsids, and most of the large amphibians were eliminated, leaving dinosaurs with little terrestrial competition. The most recent massive extinction event is Cretaceous-Tertiary extinction happened in 70-65 Ma. It killed about 17% of all families, 50% of all genera, and 75% of all species. It ended the reign of dinosaurs and opened the way for mammals and birds to become dominant land vertebrates.

There are totally twenty-three extinction events on earth. Thus, these extinctions repeatedly happen. Despite of the well known asteroid/comet impact theory, we still cannot explain why there are so many extinction events. We don't have any evidences show that a lot of asteroids/comets hit earth several times to cause these extinctions. We need a common cause to

explain all the extinction events. Thus, I will list all the possible explanations first, and then I will deduct why Milankovitch cycle is the actual cause of these extinction events.

The first explanation for extinction events is volcano eruption.[1-2] This theory suggested that massive volcano eruption during ancient times cause severe environment disturbance and cause major or minor extinctions. There are short term and long term environmental impact after volcano eruption. The short term effect is global cooling. The sulfur aerosol from volcano eruption will form SO_2 gas in atmosphere. Sulfur aerosol will then absorb sunlight and cause earth surface temperature dropping. However, this effect is only transient. Because SO_2 will be easily washed out by rain to produce acidic rain, the global cooling can only maintain for several months to ten years. In addition, current observation of global cooling effect induced by sulfur aerosol is only 0.5-0.8 ° C dropping. Thus, this transient mild effect due to sulfur aerosol is unlikely to cause severe extinction events. The long term effect of volcano eruption is

global warming. Theorists suggested that volcano eruption can release a lot of CO_2 which can cause green house effect. CO_2 cannot be easily washed out by rain and it can stay in the atmosphere for fifty to two hundred years. Among all big five extinction event, the Triassic-Jurassic boundary is the only event which is associated with global warming. This event happened in 205 Ma. Many researchers proposed the largest volcano on earth-Central Atlantic Magmatic Province (CAMP) eruption caused this massive extinction.[3] However, a recent study showed that CO_2 concentration is quite stable as 250 ppm during the Triassic-Jurassic boundary.[4] If volcano eruption caused Triassic-Jurassic extinction, the atmosphere CO_2 concentration should reach 3000-4000 ppm. $(\ln[CO_2]'/[CO_2]=k \triangle T, k=0.37)$Massive extinction event can only occur if the global temperature increases 6-7 。C due to 3000-4000 ppm atmosphere CO_2. In a study, it is estimated that CAMP eruption could release 10^{17} mole CO_2 from $3*10^6$ dusts due to the size of CAMP.[5] However, 10^{17} mole CO_2 can also increase atmosphere CO_2 to 200~300 ppm. Thus, CAMP eruption is unlikely the cause of TJ extinction. The

duration of Triassic-Jurassic extinction is relatively short (~10000 years) compared to other major extinctions. However, 10000 years are still longer than the half life of atmosphere CO_2 for 50-200 years. Now, we only observe the global cooling effect caused by volcano released sulfur aerosol. We never observe the global warming effect caused by volcano CO_2 emission. In a recent study, carbon isotopes of lipids (n-alkanes) derived from leaf wax and lignin, and total organic carbon from two sections of lake sediments interbedded with the CAMP in the eastern North America have shown carbon isotope excursions similar to those found in the mostly marine St. Audrie's Bay section in England.[6] The negative carbon excursion could be due to massive organism extinction with increased burial and decreased productivity. It is not a strong evidence for CAMP eruption. In addition, the Os^{187}/Os^{188} ratio and the Sr^{87}/Sr^{86} are decreased during TJ boundary. The non-radiogenic Os^{188} and Sr^{86} should be increased due to volcano eruption such as CAMP eruption.[7] We can say CAMP did erupt during Triassic-Jurassic period. However, CAMP eruption was postdated in 199-201 Ma after Triassic-Jurassic

extinction in 205 Ma. Volcano was not the reason. Another two massive extinction events (End-Permian and End-Guadalupian) are also suggested to be related to the volcano eruptions. However, global cooling was observed during these two events. In addition, suspected volcano killers (Siberian traps and Emeishan volcano) also erupted after the main phase of extinction events. For example: the eruption of Siberian traps happened in 250 Ma, but the Permian-Triassic extinction happened in 251 Ma. Thus, volcano eruption is not likely the cause of massive extinction events.

Second, we will discuss about the famous KT impact theory. Several paleontologists (Professors Alvarez) proposed that an asteroid "Chicxulub" hit our earth about 65 Ma and killed all the dinosaurs[8]. They suggested that Chicxulub hit Mexico gulf and they found evidences of Ir deposition in rocks during KT boundary. They suggested that large asteroid/comet hitting could produce dust and aerosols covering the sky and inhibit plant photosynthesis. Sulfur aerosol from sulfur-rich asteroid/comet could also cause global

cooling. After calculation, all the dusts produced by asteroid or comet will drop down from atmosphere within several months. Based on Professor Brian Toon's estimation, dust >4mg will drop down within 2 weeks and dust>2mg will drop down within 2 months. In addition, photosynthetic phytoplankton can form spore to become dormant during cold weather. Continental ferns can also produce spore during cold weather, and other conifers are highly resistant to cold weather. Some trees like Maples can drop their leaves and become dormant too. Thus, it is unlikely that plants are so vulnerable that they all died after several months. In addition, the sulfur aerosol can only cause mild and transient global cooling effect that is described in above paragraph. SO_2 or NOx molecules will be washed out by rain within several months. Thus, it is also unlikely that asteroid/comet hitting could cause massive and long-term global cooling. In addition, recent evidences show that there was an interval of about 300 ka from the Chicxulub impact to the massive KT extinction event. Due to the lack of temporal association, the KT impact theory is unlikely the cause of KT extinction. In 2007, a new hypothesis

suggested that the impactor of KT boundary was from Baptistina asteroid family not Chicxulub. However, it was recently discovered that 298 Baptistina doesn't share the same chemical signature as the source of the KT impact[9]. There is evident that dinosaurs died within 500 hundred years, but no strong evidences show that dinosaurs died within a short period of time. In addition, asteroid/comet theory cannot explain why only warm-blood mammals and birds survived after KT extinction. Thus, asteroid/comet impact theory is unlikely the cause of massive extinction events.[10-12]

The third explanation is sea level change.[13-16] Sea level change has been associated with all Big Five massive extinction events, and this phenomenon is highly agreed by most scientists.[17] Sea level falls are found in the four massive extinction events. The lowest sea level was noted in the largest extinction event-End Permian extinction. Thus, sea level change is highly linked to massive extinction events. Researchers think that sea level fall can let animals and plants habiting in shallow sea to die. However, this theory cannot explain why continental plants and animals also died during

these massive extinctions. There must be other reasons to explain the sea level change. In my opinion, sea level change is only a secondary event caused by global climate change. However, Dr. Hallam suggested a rapid sea level fall followed by sea level rise in the Triassic-Jurassic boundary.[18] If the rapid sea level fall was due to volcano cooling effect, the transient and mild 5-10 years global cooling induced by sulfur aerosol should not be observed geologically. Many researchers found that there was actually sea level rise without sea level fall in TJ boundary.[19-21] Global cooling can let sea level fall and global warming can let sea level rise. Thus, global climate change is the primary cause of massive extinctions.

Other explanations are less likely to be the primary causes of extinction events. Supernova gamma ray burst was suggested to be a cause of End-Ordovician extinction. Scientists estimated that supernova gamma ray burst happened for one time in the last 540 million years. They think the gamma ray burst(less than 6000 light year away) could sufficiently irradiate earth surface to kill organisms and destroy ozone layers.

However, there is no evidence baking up there was such burst in the right time and right place. In addition, the geomagnetic field of earth could help to avoid the electromagnetic radiation and particles from outside universe like shielding solar wind. And, what is the relation between sea level change and gamma ray burst? Is gamma ray burst severe enough to cause massive extinction events? I severely doubt this. Another theory is plate tectonics or continental drift. Theorists think continental drift created a super-continent and reduced the area of continental shelf (the most species-rich part of the ocean). However, continental drift or plate tectonics is a very slow process. We can review the continental drift process. The Rodinia continent lasted from 1.1 billion years ago to 750 million years ago, and it was not associated with extinction. Pannotia continent formed between 600 million years ago to 540 million years ago, and it was not associated with extinction. Pangea existed from 500 Ma to 175 Ma. The first phase of Pangea splitting happened in 175 Ma and Laurasia and Gondwana were formed. The second phase of Pangea splitting happened in 140-150 Ma, and the Gondwana split into

multiple continents including Africa, South America, India, Antarctica, and Australia. The third phase of Pangea splitting happened in 60-55 Ma, and Laurasia split into North America and Eurasia (current Europe and Asia Land). We can see none of the time sequences match the massive extinction events. How can it explain both the terrestrial and ocean organism extinctions? In addition, there is clathrate gun hypothesis. Methane clathrates form on continental shelves. These clathrates are likely to break up rapidly and release the methane if the temperature rises quickly or the pressure on them drops quickly (such as sea level fall situation). Methane is much powerful greenhouse gas than CO_2. This clathrate gun hypothesis was proposed to explain the End-Permian extinction. It is because there was a decrease in the ratio of carbon-13 to carbon-12 (-0.009) during End-Permian period. However, many other events can reduce the percentage of carbon-13. Global cooling can let plants to release more CO_2 which is composed of carbon-12. Plants can affect one-seventh CO_2 concentration on earth each year. In addition, negative carbon excursion can be due to increased organism

burial and decreased organism productivity during massive extinction. And, End-Permian period is related to global cooling not global warming. Thus, the clathrate gun hypothesis is unlikely.

Other interesting hypothesis may be the secondary events of climate change. First is the anoxic event hypothesis. Anoxic events are situations in which the middle and the upper layers of the ocean become lacking in oxygen. It is thought to be related to Ordovician-Silurian, late Devonian, Permian-Triassic, and Triassic-Jurassic extinctions, as well as a number of lesser extinctions. However, this anoxic event hypothesis can only explain the ocean organism extinctions not the terrestrial organism extinctions. And, if the photosynthetic phytoplankton were dead, they will reduce O_2 production and release. Thus, the O_2 level in ocean could decrease. Thus, anoxic event can be a secondary event after global cooling or global warming killing photosynthetic plants. The other interesting hypothesis is oceanic overturn. Oceanic overturn is a disruption of thermo-saline circulation which let surface water sink straight down, bringing

anoxic deep water to the middle depths. Thus, it can kill most of the oxygen-breathing organisms which inhabit the surface and middle depths. Thus, it may help to explain the oceanic organism extinction. However, the oceanic overturn usually happens in the beginning or the end of glaciations. Thus, it is a secondary event of global cooling. The above two hypothesis can be secondary events after global climate changes.

Finally, we will discuss about my hypothesis. Milankovitch hypothesis was proposed to explain the glaciations periods of earth. Due to the Milankovitch cycle, our earth will have climate periods from extremely warmness to extremely coldness.[21-36] Since moderate climate are most suitable for bio-organisms, extremely warm or extremely cold periods will cause extinction events. Biological enzyme system works the best at core temperature 37 °C, and higher or lower temperature can damage the activity of enzymes. The more temperature changes, the more enzyme activity loss will occur. Now the average environment temperature is around 25 °C. Higher or lower

temperature can hurt the survival of bio-organisms, especially during cold periods. Evidences show that the big five massive extinction events are all related to global climate changes. Global cooling is related to Ordovician-Silurian extinction (440-450 Ma), Late Devonian extinction (360-375 Ma), Permian-Triassic extinction (251 Ma), and Cretaceous-Tertiary extinction (70-65 Ma). Global warming is related to Triassic-Jurassic extinction (205 Ma), and it is associated with moderate Cenomanian-Turonian extinction (91.5 Ma). Sea level changes are all related to the Big Fives. Sea level rise was noted in Triassic-Jurassic extinction. And, sea level fall was associated with Ordovician-Silurian extinction, Late Devonian extinction, Permian-Triassic extinction, and Cretaceous-Tertiary extinction. We need to explain what mechanism induced sea level change. Global climate change is the best reason. Sustained global cooling can form more ice ridges or mountains, and then the content of ocean will be less. Sustained global warming can result in the melting of ice ridges or mountains, and the content of ocean will be increased. Thus, sea level change is just a secondary event of global climate change. The End Permian is the

most severe extinction event, and the sea fell in the lowest level in End Permian period. We can deduct that the global climate change to cooling is most severe in End Permian period. Due to a research paper in Nature, earth temperature will rise 3 $^{\circ}$C before 2050, and 15%-37% organisms will be extinct. Due to the Copenhagen Diagnosis document, 40% organisms will die if temperature raises 5 $^{\circ}$C and 95% organisms will die if temperature raises 6 $^{\circ}$C. Thus, there is link between climate change and bio-organism survival.

We can look at the earth glaciations periods and their relations with extinctions. The Andean-Saharan ice age was from 450-420 Ma, and there is temporal association with the Ordovician-Silurian extinction (440-450 Ma). The Karoo ice age was from 360-260 Ma, and there is temporal association with the Late Devonian extinction (360-375 Ma). We can see extinction events occurred at the beginning phases of glaciations periods. There are no well documented ice age later, but we can look at the estimated climate graph by delta-O18 below. There was a sharp temperature drop in 260-250 Ma, and it could be

associated with the End-Permian extinction (251 Ma). There was also a sharp temperature drop in 70 Ma which could be associated with Cretaceous-Tertiary extinction (70-65 Ma). This period is sometimes called Paleogene glaciations. How about the Triassic-Jurassic extinction 205-201 Ma? There is noted Milankovitch cycle related global warming during this period. Thus, Milankovitch cycle should be the reasons for all these extinction events.

Phanerozoic Climate Change
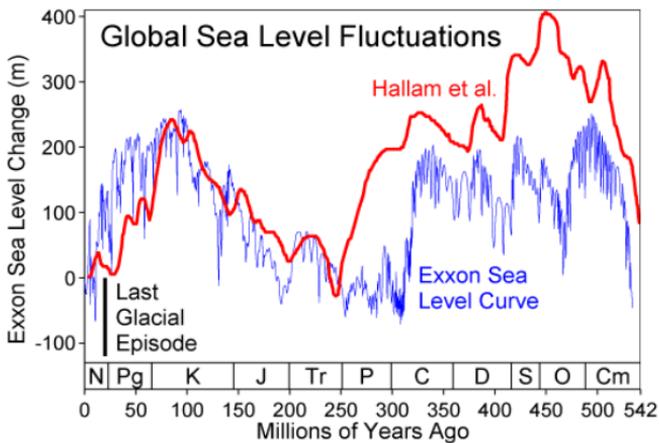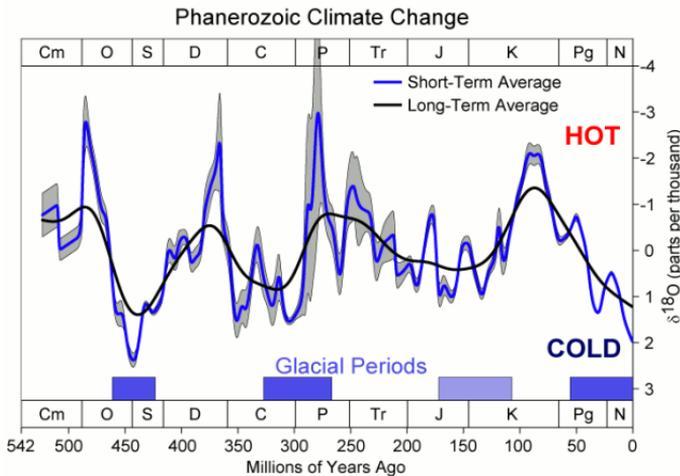
We can examine the climate change patterns with these major extinction events in detail. There are well-documented evidences about the End Ordovician and Late Devonian glaciations. Global cooling was also reported in End Permian and End Cretaceous periods. In the Triassic-Jurassic boundary, global warming with increased fire activity was reported. In a paper, fossil plants are also found to have leave pattern (fossil leave width and stomatal density/size) implicating increased atmosphere CO_2 suggested by the author.[37] However, increased heat in atmosphere itself can also lead leave width and stomatal density/size change.[38] Increased aromatic hydrocarbon concentration was also reported

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in T-J junction.[39] That could reflect the increased aromatic hydrocarbon substance after increased forest fire due to global warming. It is important to know the role of atmosphere CO_2 in the extinction events. If volcano eruption is the reason of extinction events such as T-J green house period, then volcano released CO_2 needs to play a dominant role. However, strong evidences showed that there is decoupling of atmospheric CO_2 concentration and global climate change[40-41]. In addition, stabilized CO_2 concentration was noted in TJ junction, so volcano eruption with CO_2 release is unlikely the cause of extinctions.

We can also examine the extinction organism patterns to check our hypothesis. In End-Permian extinction event, the most vulnerable organisms are with low metabolic rate or weak respiratory system. If animals have high metabolic rate or strong respiratory system, they can be protected from cold climate due to more heat production. Thus, it is reasonable why animals with high metabolic rate survived after End-Permian extinction. It is reasonable that there was global cooling in End-Permian period. In addition, marine

organisms with calcareous hard parts are vulnerable to extinct. This can be due to high ocean CO_2 during this period. It is worth noting that plants prefer carbon-12 for photosynthesis and subsequent respiration. ($CO_2+H_2O+sun-energy->O_2+sugar$; $O_2+sugar->CO_2+H_2O+bio-energy$). When oceanic and continental plants died, they would decay and give off more CO_2 with carbon-12. Thus, it can explain the decreased ratio of C-13/C-12 because of increased organism released CO_2 with C-12. Decreased C-13/C-12 ratio can be also due to decreased plant productivity due to reduced C-12 intake by plants during massive extinction. That is why negative carbon excursion is frequently seen in extinction. If there is increased CO_2 concentration in ocean, there is higher chance to have H_2CO_3 formation. When H_2CO_3 accumulates in ocean, the H+ will dissolve the $CaCO_3$ shell of marine organisms. Thus, these marine organisms are highly vulnerable to this extinction event. The duration of End Permian extinction is 4-6 million years which can be explained by sustained global cooling. The long duration also suggests that a sudden event such as comet/asteroid impact or volcano eruption is not likely.

A study said the Permian-Triassic junction is non-event which lets the impact or volcano theory unlikely. The duration of Late Devonian extinction is estimated to be 500000 to 15 million years. The long duration implies a sustained global event such as cooling. The most important groups to be affected by this extinction event were the reef-builders including the stromatoporoids, and the rugose and tabulate corals. These $CaCO_3$ excreting organisms did not recover until the Mesozoic era. This phenomenon can be also explained by increased CO_2 in ocean due to great animals/plants death. ($CaCO_3+CO_2+H_2O->Ca^{2+}$) In Ordovician-Silurian extinction event lasted for 10 million years, brachiopods, bivalves, echinoderms, bryozoans, and corals were most affected organism. There organisms all have calcareous exoskeleton and it can be also explained by above reason in Ordovician extinction. In K-T extinction, cold blood dinosaurs died and warm blood birds and mammals survived. Although some researchers suggested that dinosaurs could be warm blooded, recent findings show that most dinosaurs don't have respiratory turbinates which are signature of warm blood animals. It suggested that

K-T period is a global cooling period. On the other hand, majority of therapsids (ancestor of mammals) died in the Triassic-Jurassic boundary. Many therapids are found to have respiratory turbinates and are thought to be warm blood animals. Although warm blood animals have higher metabolic rate to generate more heat, they also have higher resting metabolic rate which costs a lot of energy. Thus, in warm period, warm blood animals don't have survival advantages compared to cold blood animals such as dinosaurs. Thus, it is reasonable that Triassic-Jurassic boundary is a global warming period. In a moderate extinction period-Cenomanian-Turonian boundary event, many ancestors of whales and dolphins: ichthyosaurs were dead during this extinction event. Thus, it is reasonable that Cenomanian-Turonian junction is a global warming period.

In summary, we can see that global climate change is the actual cause of massive extinctions. Majority of extinction events are due to global cooling or global warming induced by Milankovitch cycle. The procession and axis tilt of earth can be affected by

sun's universal spinity. However, sun's spinity is decreasing and decreasing due to transfer of angular momentum. Thus, the Milankovitch cycle should be prolonged. We can check these major extinction events due to global cooling. There was 80 Ma between End Ordovician extinction and Late Devonian extinction. There was 110 Ma between Late Devonian extinction and End Permian extinction. There was 180 Ma between End Permian extinction and End Cretaceous extinction. Thus, the duration of next possible major extinction is likely to be prolonged. There were at least 23 extinction events in earth history. If we want to use one single common reason to explain all the extinctions, Milankovitch cycle is the best choice. There are no strong evidences that multiple major comet impacts or many major volcano eruptions happened in these 23 extinction events. In addition, climate changes are associated with all the extinction events. But, the link of comet impact or volcano eruption to climate change is very weak. In addition, there were lacking temporal sequence between comet impact or volcano eruption and the extinction events. We can also use this theory to explain Cambrian explosion.

During Cambrian period (530 Ma), all the major Phyla appeared with all diversity over a period of several million years. The evolution rate increased in an order of a magnitude. Darwin thought it is a puzzle. The Cryogenian ice age was from 800-630 million years ago. After the ice age, the earth temperature will become warmer gradually. During the Cambrian, the global climate of earth became most suitable for livings. Thus, Cambrian explosion occurred.[42]

We can also use a simple logical principle to check if the popular comet hypothesis and volcano hypothesis is true for extinctions. The meaning of if p then q is equal to if –q then –p. Thus, if comet caused extinction events, then non-extinction event must be associated with no comet impact. We can examine if this is true. In last early century, there was a famous comet impact on Russia called Tunguska event. A 5-10 km size comet hit the Siberia. There was no report of extinction event after the Tunguska impact. In Alvarez's estimation, the Chicxulub hit Mexico gulf and caused KT extinction. Based on the geological finding, the size of Chicxulub was 10-14 km. Thus, the comet hit Tunguska should also cause a major extinction event or a minor

extinction event. Professor Alvarez thought the dust arose by the hit comet will block the sky and prevent plants' photosynthesis. Chicxulub hit in the ocean and it caused such event. Why didn't Tunguska comet hit the land and cause stronger event to block the sky and stop photosynthesis. In addition, an asteroid sized 22km in diameter hit Gosses Bluff, Australia with 40km/sec at 142 Ma. Its size is larger than the Chicxulub, but there was no extinction event in 142 Ma. Based on the –q then –p principle, the comet impaction hypothesis is weak. Then, we can also check the volcano hypothesis. We can check the largest igneous provinces in history. There were no extinction events in 121 Ma, 112 Ma, and 55.5 Ma. However, there were major volcano eruptions in the above timeline including Ontong-Java-Manihiki-Hikarangi Plateau eruption with 59-77 million km^3 in 121 Ma, Kerguelen Plateau-Broken Ridge eruption with 17 million km^3 in 112 Ma, and NAIP eruption with 6.6 million km^3 in 55.5 Ma. The most possible link for volcano hypothesis for extinction is CAMP which included 2 million km^3 volume. Compared to the above three volcano eruptions, the volume of CAMP was very

small. The volumes of 1-4 million km^3 Siberian traps and 1 million km^3 Emeishan traps were also small. CAMP, Siberian traps, and Emeishan traps were proposed to cause major extinction events. And, neither of these above most severe volcano eruptions caused major or minor extinction events. The Aptian extinction was noted in 117 Ma. However, the estimated date was far from the major three eruptions. Thus, volcano eruption hypothesis is also wrong. Compared to the recent global warming caused by CO_2, the extinction rates of animals and plants do increase in recent years. Thus, global climate change is the most reasonable explanation for the extinction events. Current volcano theory or comet theory must use global climate change to be the reason for the subsequent bio-extinctions. Thus, climate change is the common confounder. This common confounder is more likely to be the real cause of extinction events! In addition, the extinction events recovered after the global cooling or global warming went back to suitable temperature. If we remove the cause, the effect will tend to recover. Besides, a single causing factor like volcano eruption cannot sometimes cause global

cooling and sometimes cause global warming. It disobeys David Hume's criteria of cause-effect relationship "The same cause always produces the same effect, and the same effect never arises but from the same cause". In addition, there is a strength relation between climate change and extinction. End Permian extinction is the most severe extinction event. And, global cooling change and the lowest sea level fall were found in End-Permian era. Climate change is the real reason!

Finally, we can list an example to explain the extinction theory. The last glacial period of earth is from 110000-10000 years ago. And, the lowest temperature happened in 26500-20000 years ago. That period is called last glacial maximum. Neanderthals was first appeared 130000 years ago. And, they were totally extinct 30000-24000 years ago. That matched the period of last glacial maximum. That suggests that Neanderthals could not survive in the cold weather of ice period and were all dead. On the other hand, woolly mammoths maximally survived about 40000-10000 years ago. However, their habitants reduced from 7.7 million Km^2 in 40000 years ago to 0.8 million

Km^2 in 6000 years ago. Woolly mammoths were totally extinct 3750-1700 years ago. They can successfully survive in the cold ice age, but they could not survive in the warm period after the last glacial period finished. Thus, both "ice age" or "fire age" cause extinction events. (references:Wikipedia)

Darwin proposed that uniformitarianism is the usual mechanism for nature selection. However, catastrophism is also important in nature selection due to these major extinction events. In conclusion, we need to know the impact of climate change on earth to avoid the possible man-made extinction event such as industrial produced CO2 greenhouse gas.

Reference

1 Wignall P.B. Large igneous provinces and mass extinctions Earth-Science Reviews 53, 1-33 (2001)
2 Marzoli A et al. Extensive 200 million year old continental flood basalts of the Central Atlantic Magmatic Province Science 284,616-618 (1999)
3 Marzoli A et al. Synchrony of the Central Atlantic magmatic province and the Triassic-Jurassic boundary climatic and biotic crisis Geology 32, 973-976 (2004)
4 Tanner LH et al. Stability of atmospheric CO2 levels across the Triassic/Jurassic boundary Nature 411, 675-

677 (2001)

5 Berner RA Examination of hypotheses for the Permo-Triassic boundary extinction by carbon cycle modeling PNAS 99, 4172-4177 (2002)

6 Whiteside JH et al. Compound specific carbon isotopes from Earth's largest flood basalt eruptions directly linked to the end-Triassic mass extinction PNAS early edition,1-5 (2010)

7 Schoene B. et al. Correlating the end-Triassic mass extinction and flood basalt volcanism at the 100 ka level Geology 38,387-390 (2010)

8 Keller G et al. Chicxulub impact predates the KT boundary mass extinction PNAS 99,4167-4171 (2002)

9 Reddy V et al Composition of 298 Baptistina: implication for the KT impact link meteontics and planetary Science 44, 1-11 (2009)

10 Kaib NA et al. Reassessing the source of long period comets Science 325,1234-1236 (2009)

11 Gastaldo RA et al. The terrestrial Permian-Triassic boundary event bed is a nonevent Geology 37,199-202 (2009)

12 Koeberl C et al. Geochemistry of the end-Permian extinction event in Austria and Italy: no evidence for an extraterrestrial component Geology 32,1053-1056 (2004)

13 Forney GG Permo-Triassic sea level change Journal of Geology 83,773-779 (1975)

14 Hallam A Estimates of the amount and rate of sea level change across the Rhaetian-Hettangian and

Pliensbachian-Toarcian (latest Triassic to early Jurassic) Journal of the Geological Society 154,773-779 (1997)

15 Hallam A. et al. Mass extinctions and sea-level changes Earth Science Reviews 48,217-250 (1999)

16 Hallam A. et al. The case for sea-level change as a dominant causal factor in mass extinction of marine invertebrates Philosophical Transactions of the Royal Society of London, Series B, Biological Sciences 325,437-455 (1989)

17 Peters SE et al. Environmental determinants of extinction selectivity in the fossil record Nature 454, 626-630 (2008)

18 Hallam A. A revised sea-level curve for the early Jurassic Journal of the Geological Society 138,735-743 (1981)

19 Hesselbo SP et al. Sea level change and facies development across potential Triassic-Jurassic boundary horizon, SW Britain Journal of the Geological Society 161, 365-379 (2004)

20 Roe SL et al. Sedimentation, sea-level rise and tectonics at the Triassic-Jurassic boundary (Statfjoid formation) tampen spur, northern north sea Journal of Petroleum Geology 8, 163-186 (1985)

21 Hallam T Discussion on sea-level change and facies development across potential Triassic-Jurassic boundary horizons, SW Britain Journal of the Geological Science 61,1053-1056 (2004)

22 Hays et al. Variations in the earth's orbit: pacemaker of the ice ages Science 194,1121-1132 (1976)

23 Jaramillo C et al. Cenozoic plant diversity in the Neotropics Science 311, 1893-1896 (2006)

24 Zachos J et al. Trends, rhythms, and aberrations in global climate 65 Ma to present Science 325, 1234-1236 (2009)

25 Mayhew PJ et al. A long term association between global temperature and biodiversity, origination and extinction in the fossil record Proc R Soc B 275, 47-53 (2008)

26 Krassilov V et al. Paleofloristic evidence of climate change near and beyond the Permian-Triassic boundary Palaeogeography, Palaeoclimatology, Palaeoecology 284, 326-336 (2009)

27 Van Dam JA et al. Long period astronomical forcing of mammal turnover Nature 443, 687-691 (2006)

28 Thomas CD et al. Extinction risk from climate change Nature 407, 145-148 (2004)

29 Kemp DB A nonmarine record of eccentricity forcing through the Upper Triassic of South West England and its correlation with Newark Basin astronomically calibrated geomagnetic polarity time scale from North America Geology 35, 991-994 (2007)

30 Olsen PE et al. Long period Milankovitch cycles from the Late Triassic and Early Jurassic of Eastern North America and their implications for the calibration of the Early Mesozoic time-scale and the long term behavior of the planets Philosophical Transactions: Mathematical, Physical and Engineering Sciences 357, 1761-1786 (1999)

31 Caputo MV et al. Late Devonian & Early Carboniferous glacial records of South America The Geological Society of America Spe 441-11, 1-13 (2008)

32 Bonis NR et al. Milankovitch-scale palynological turnover across the Triassic-Jurassic transition at St. Audrie's Bay, SW UK Journal of the Geological Society 167, 877-888 (2010)

33 Barrera E. Global environmental changes preceding the Cretaceous-Tertiary boundary : earl-late Maastrichtian transition Geology 22, 877-880 (1994)

34 Allison I et al. The Copenhagen Diagnosis (2009)

35 Veizer J. et al. $^{87}Sr/^{86}Sr$ $\delta^{13}C$ & $\delta^{18}O$ evolution of Phanerozoic seawater Chemical Geology 161, 59-88 (1999)

36 Wilf P et al. Correlated terrestrial and marine evidences for global climate changes before mass extinction at the Cretaceous-Paleogene boundary PNAS 100, 599-604 (2003)

37 Erwin DH The End-Permian mass extinction Ann Rev Ecol Syst 21, 69-91 (1990)

38 Schootbrugge B et al. Floral changes across the Triassic/Jurassic boundary linked to flood basalt volcanism Nature Geoscience 2,589-594 (2009)

39 McElwain JC et al. Fossil plants and global warming at the Triassic-Jurassic boundary Science 285,1386-1390 (1999)

40 Belcher CM et al. Increased fire activity at the Triassic/Jurassic boundary in Greenland due to climate-driven floral change Nature Geoscience 3, 426-429

(2010)

41 Rothman DH Atmospheric carbon dioxide levels for the last 500 million years PNAS 101, 3753-3758 (2004)

42 Veizer J et al. Evidence for decoupling of atmospheric CO_2 and global climate during the Phaerozoic eon Nature 408, 698-701 (2000)

43 Planavsky NJ et al. The evolution of the marine phosphate reservoir Nature 467, 1088(2010)

Neo-Lamarckism "Disuse"

The famous scientist Jean-Baptiste Lamarck proposed his Lamarckism evolution principle before Darwin's natural selection theory. His theory is called "use and disuse". He suggested acquired inheritance or called "soft inheritance". He stated that if you use an organ frequently and this organ will become more advanced developed; if you don't use an organ and this organ will regress. However, if a worker trains his muscle everyday and causes its hypertrophy, this muscle hypertrophy will be inherited to his offspring. And, after Darwin proposed his natural selection theory, Lamarckism was abandoned.

But, the "Use and disuse" theory may not be totally wrong, especially the "disuse" part. Thus, there is a rising biologists suggest a Neo-Lamarckism. This revised Lamarckism is supported by recent evidences from epigenetic DNA methylation machinery. The inheritance can also be acquired by DNA methylation mechanism.

DNA methylation is a mechanism to suppress gene expression. Thus, if a gene is not useful or if its expression is harmful for host survival, DNA methylation machinery can occur to shut down the gene. DNA methylation usually happens in CpG island of genome. During DNA replication, the DNA methylation pattern can be kept to inherit to the newly synthesized DNA. Thus, this epigenetic characteristic can be persistent.

During embryo formation, there is a global demethylation process to let most genome to activate to transcribe for development process. However, there is a de novo methylation machinery to let the late embryo to re-establish their original somatic cell methylation pattern. That may be due to the recognization of CpG island in the embryo genome. There is also a RNA guide DNA methylation machinery. The RNAi existing in oocyte cytosol can lead to DNA methylation that the DNA sequence is complimentary to the RNA sequence. Thus, de novo methylation can happen and restore the parents' methylation pattern. Thus, the acquired soft inheritance can be passed

generation-by-generation. This can also be an important evolution machinery.

If an organ is "disuse", it is highly possible that DNA methylation to shut down related unnecessary genes because of economic principle. It can also avoid possible harmful effect of this gene. Then, the "disuse" organ by DNA methylation can be transmitted generation by generation. Thus, evolution can begin. Evolution will select the individuals who "disuse" the garbage gene or organ. It is worth noting that epigenetic mechanism is necessary participating in the evolutionary origin of cell differentiation.[12]

Here, I will list several examples about this Neo-Lamarckism principle. First, the appendix of human. The appendix is highly useful in other mammals such as rabbit. However, the appendix is not useful in human. Thus, DNA methylation or epigenetic machinery can occur to shut down the unnecessary appendix related genes in somatic cells. Then, the germ line cells can inherit the epigenetic pattern of the somatic cells. Thus, generation-by-generation,

appendix will regress. Second, there is a structure inheritance phenomenon. Ciliates such as Tetrahymena can inherit the pattern of ciliary rows on the cell surface. This inheritance is due to epigenetic regulation. That helps to say that epigenetic mechanism is also important to inheritance. Third: the eyes in deep sea fish. The eyes in deep sea fish can regress generation-by-generation because their eyes are "disuse" in deep sea. If DNA methylation started to shut down the unnecessary eye organ-related genes in these fish, the epigenetic pattern of somatic cells can also inherit to the germ line cells of this fish. Thus, eyes started to regress during the evolution process. Neo-Lamarckism also plays an important role in natural evolution process.

References

1. Christopher B et al. Epigenetic decisions in mammalian germ cells Science 316,398(2007)
2. Kafri T. et al. Developmental pattern of gene-specific DNA methylation in the mouse embryo and germ line Genes Dev 6,705(1992)

Inbreeding-proof & origin of species

There is a very important phenomenon in bio-organism, especially high class bio-organism. That is the mechanism to avoid inbreeding. Inbreeding or incest in human can cause congenital defects or premature embryo death or many recessive harmful mutations. Mammals such as mice usually avoid mating with their relatives such as parents or siblings or offspring. High class plants can reject their own pollens to avoid this inbreeding phenomenon. In human being, many religion beliefs and laws also forbid the happening of incest. It is well-known why harmful recessive mutation can show up in the inbreeding offspring. However, we do not know the mechanism of premature embryo death in inbreeding offspring. Here, I would like to propose a mechanism.

In Drosophila melanogaster, there is a mechanism called "hybrid dysgenesis".[1] This phenomenon is caused by a transposon called "P element". P element is a transponson gene including a transposae and protein repressor. The repressor can suppress

transposae and stop the P element transition. If the P element transition happens, it can jump and replicate within all the fly genome to cause lethal effect of the embryo. The flies can be divided into two types: P type with P elements in their genome and M type without P elements in there genome. Since only eggs from maternal origin have the repressor protein in cytosol and sperm has no cytosol with inherited substance, that causes the problems in fly offspring. If a maternal P type fly mates a parental M type fly, the repressor in egg cytosol will suppress P element to stop P element transposition. If a parental P type fly mates a maternal M type fly, no repressor in egg cytosol presents and P element will start its transition to cause multiple genetic defects in fly genome. Then, hybrid dysgenesis occurs. That means no offspring is generated in the two flies.

There is no such P-type or M-type of higher class animals or plants identified to cause infertility. However, in higher animals or plants, I also think transposon activation is the key to cause the premature embryo death in these high class animals or

plants. There also observations that transposon activation is much higher in inbreeding population than in outbreeding population[2]. In higher animals or plants, the transpon elements location and number differ from individual to individual. In the somatic cells of the high class plants or animals, there is a DNA methylation machinery to turn off the harmful transposon transposition.[3] However, during the fertilization process, the early embryo will start an entire demethylation process to globally remove DNA methylation on the genome.[4] Then, it is a critical period that some transposons such as Alu repeats in human will be activated to start their transposition.[5] However, the transposition frequency of higher class animals or plants also depends on the situation. A situation called homologous recombination between two transposons will largely increase the transposition frequency. Thus, if an inbreeding event happens, there is a high chance that two equal chromosomes from one same parental origin will meet. Since the two chromosome are equal, the transposon element location and number are the same, then it highly enhance the chance of homologous recombination

between any two of the transposons. If this homologous recombination of transposon-transponson occurs, the transposition process can cause DNA duplication, insertion, and deletion, fusion, and translocation. For example, Alu repeat homologous recombination can cause gene translocation and carcinogenesis.[6] That will hurt the entire chromosome structure. That can make early death of the embryo. Even the two chromosomes during the inbreeding event are not entirely equal, the two chromosomes will have a great degree of similarity to let transposon elements to have equal position in the two chromosomes. If there is an outbreeding, the chance of equal numbers or positions of transposons are much less, then the chance of homologous recombination of transposon-transposon and subsequent transposon activation is much less. Thus, a healthy embryo can develop.

Thus, this transposon machinery can prevent high class animals or plants from inbreeding. That has an evolutional advantage. If more chromosome diversity happens, it will have more offspring with different

phenomenon type to cope with different environmental change. That is the inbreeding-proof mechanism.

Thus, transposons play important roles in preventing close family hybrid. However, why is transposon needed to be inherited in bio-organism? Actually, it plays a key role in the generation of new species. Transposon, which may be originated from integrated viral genome, can be duplicated or activated due to environmental stress. Like the temperature change in Milankovitch cycle, transposons inside cells of bio-organisms will be activated and duplicated in responding to outside environment stress. Once transposons are activated, they can more easily mediate gene recombination via transposon exchange. In addition, transposons can link two chromosomes to fuse to make only one new chromosome. The breakage of chromosome of transposon site will also duplicate the original one chromosome into two chromosomes in the gametes. Thus, the new chromosome numbers of one bio-organism will be changed. Thus, a new species of bio-organism will be born. Thus, transposon plays a key driving force in making species with

different chromosomes. In addition, gene mutation and genome size change can also happen in transposon activation. Why chromosome fusion or breakage will facilitate evolution, it is due to breakage-fusion-bridge(BFB) cycle causing chromosome instability. The transposon mediated chromosome fusion or breakage will let bridged sister chromatids to divide unevenly in cell cycle. The process repeat as cycles until the end chromosome gains telomere to regain stability to prevent further fusion. This BFB cycle will cause genetic instability with a great deal of gene amplification with mutations. Thus, DNA with new functions can be generated within newly generated or reduced chromosome. The common gene point mutation, on the other hand, can not easily make or fuse chromosome to generate species. Thus, transposition is a very important mechanism for the origin of species. In McClintock's famous experiment, maize receiving environmental stress will activate these transposable elements. We can view transposons as regressed virus integrated in the genome. If the host cell fitness is well with good environment, the integrated transposons will keep stay

in the host genome without activation. If the outside environment is bad with the bad cell fitness(dying/loss of energy source), the transposons will be re-activate for evolutional strategy. It is like a virus can stay in latent period within host genome. When there is outside stress, virus such as HSV will leave the latent stage and reactivate to enter lytic stage to try to leave the cell. This is the reason why stress can trigger transposable elements. Thus, transposons and host genome have co-evolution relationship. Thus, gene mutation and chromosome change will occur to facilitate evolution process. To creating a new species has an advantage to overcome the abrupt environmental change compared to the common sex-driven gene recombination. The later mechanism cannot create new species and the phenotype still follows one allele of the existing genes. Thus, its ability to combat the environmental stress is limited. After the outside environment becomes more stable, the surviving bio-organism may restore the transposons back in introns to inactivate them. Thus, a new far-away equilibrium will be achieved. This new bio-organism will become a new successful species after

environmental challenge. Transposons play vital roles in the fluctuation/mutation process in the bio-organism dissipative system. That is why transposons are so important to be inherited in the genome of most life forms.

Reference

1. Rio DC Molecular mechanisms regulating Drosophila P element transposition Annu Rev Gent 24,543 (1990)

2. Charlesworth D et al. Transposable elements in inbreeding and outbreeding populations Genetics 140,415 (1995)

3. Lippman Z et al. Role of transposable elements in heterochromatin and epigenetic control Nature 430,421 (2004)

4. Kafri T et al. Developmental pattern of gene-specific DNA methylation in the mouse embryo and germ line Genes Dev 6,705 (1992)

5. Kudo S et al. Structural organization of glycophorin A and B genes: Glycophorin B genes evolved by homologous recombination at Alu repeat sequence PNAS 86,4619 (1989)

6. Batzer M et al. Alu repeats and human genomic diversity Nature Review Genetics 3,370 (2002)

Sugar lipid & protein code

The central dogma of biology by Dr. Crick is:
DNA->RNA->Protein
Here, I would like to slightly modify it to:
DNA->RNA->Protein->Sugar or Lipid
It is because that glycoprotein or lipoproteins add sugar or lipid based on specific amino acids. Thus, sugar and lipid code is decided by the sequence of amino acids of proteins. 80%-90% proteins are glycoproteins and 80-90% proteins are acetylated. Thus, glycoprotein or lipoprotein can be decided by the original DNA sequence.

First, I will talk about the sugar code. Glycosylation can be grouped into three categories: N-glycosylation, O-glycosylation, and C-glycosylation. It is well known that N-glycosylation, adding GlcNAc linked core pentasaccharide (Man3-GlcNAc-GlcNAc-) has a specific amino acid sequence: Asn-X-Ser/Thr-X or Asn-X-Cys-X. Here, X can be any amino acid except proline, aspartic acid or glutamic acid. N-glycosylation is adding Dolichol-P-P-Oligosaccharide by specific enzyme. All N-

glycosylations have the common pentasaccharide structure, and the mediating enzyme only recognize the Asn of above sequences. This is the sugar code for N-glycosylation. Asparagine link is the most common residue for N-glycosylation. There is one exception that arginine is the linking residue in sweet corn.

Then, how about C-glycosylation? C-glycosylation is also called C-mannosylation. One mannose is added to the tryptophan residue of protein. And, the enzyme can only recognize a specific amino acid sequence: W-X-X-W. W is tryptophan and X can be any amino acid. This is the sugar code for C-glycosylation.

As for O-glycosylation, O-glycosylation can be discussed with following possibilities. Proteoglycan has specific amino acid sequence –Ser-Gly-X-Gly-(X is any amino acid residue). And, xylose started sugar is linked to Ser residue of the proteoglycan. This is the sugar code for proteoglycan's O-glycosylation. Another abundant extracellular glycoprotein is collagen. It has a common amino acid sequence: (Gly-X-Y)n. X is proline and Y is hydroxyproline or hydroxylysine. And, Gal can

link to hydrolysine residue of collagen. This is the sugar code for collagen.

O-glycosylation is mainly the linking of GalNAc or GlcNAc to OH of Ser/Thr/Tyr in the cellular protein. The decision of adding GalNAc or GlcNAc is depending on the location of the glycoprotein synthesis. In Golgi, GalNAc is added to protein. In cytosol or nuclear, GlcNAc is added to protein. Thus, the signal peptide which decides protein's location will decide the adding of GalNAc or GlcNAc. In addition, there is also a preferred amino acid sequence for O-glycosylation: Pro-X-Ser/Thr-Pro. X is any amino acid, but non-polar amino acid is preferred such as proline, valine, or alanine. For example: PV[S/T] consensus sequence is seen in HCMV(UL32)BPP, human erythrocyte 65KD, human serum response factor, rhesus monkey alpha-B-crystallin, bovine lens alpha-A-crystallin, rat NF-L, and rat NF-M. This is the sugar code for O-glycosylation. If we compare O-glycosylation to N-glycosylation, we can see a proline residue in X of Asn-X-Ser/Thr-X will prefer O-glycosylation to N-glycosylation. Thus, the two types of glycosylation can be competing. Another examples

for less common specific O-glycosylation is Fuc-alpha-Ser/Thr for EGF modules(Cys-X-X-Gly-Gly-Thr/Ser-Cys) and TSR modules(TrpX$_5$CysX$_{2-3}$Ser/ThrCysX$_2$Gly), and Glc-beta-Ser for EGF modules (Cys-X-Ser-X-Pro-Cys).

Phosphorylation versus O-glycosylation

It is very interesting that phosphorylation also works on the OH of Ser/Thr/Tyr residue of proteins. And, (Pro)-X-Ser/Thr-Pro is the very common consensus sequence for protein kinases such as ERK, CDC, and MAPKs. Since this specific sequence for O-glycosylation and phosphorylation is the same, we can see cell use this Ying-Yang machinery to control the protein signaling. After protein phosphorylation, protein will initiate a signal transduction cascade to phosphorylate other proteins to amplify the outside signal. However, the protein is easily to be degraded. On the other hand, O-glycosylation will make the protein become stable. But, it lacks the ability for signal transduction. If one protein is phosphorylated, then it is not O-glycosylated and vise versa. For example, when outside growth factor signaling is given, the O-GlcNAc is

removed in c-myc and be replaced by O-phosphate to initiate the signaling cascade. O-GlcNAcylation of Ser16 on estrogen receptor beta causes it to become less transcriptional active, but long lived more in the cell. In contrast, O-phosphorylation of Ser-16 residue causes it to become more active but degraded much more rapidly.

Then, I will talk about lipid code. N-myristoylation is the attachment of myristate to the N-terminal glycine of a protein. S-palmitoylation is the attachment of palmitate to cytoplasmic cysteine residue of a given protein. Isoprenylation(farnesylation & geranylgeranylation) is to add the lipid group to the C-terminus cysteine from the consensus sequence CaaX(a is any aliphatic amino acid). Finally, cholesterol is added to the c-terminus glycine of a given protein.

Methylation versus acetylation versus sumoylation versus ubquitination

Then, I will discuss about protein methylation and acetylation. This is another Ying-Yang machinery to

control protein activity. The most famous example is histone. Acetylation of histone causes its activity and methylation of histone makes it inactive. Acetylation is to add the acetyl-CoA carried acetyl group to the lysine residue or N-terminal of a given protein. Methylation is to add the methyl group to lysine or arginine residue of a given protein. The consensus sequence of arginine methylation is RGG, RXR, or GRG. And, both lysine acetylation and methylation tends to work on possible K-S/T residue. This consensus sequence is seen in H3, RelA, CEBPA, IFNAR2, G9a, Snf2, and FOXO1. Thus, the competing lysine acetylation and lysine methylation will determine protein's fate. Protein methylation causes permanent protein inactivation seen there is no or only few demethyltransferase in eukaryotic cells. Protein methylation may be seen in differentiation process when certain protein has finished its task and been turned off. On the other hand, protein acetylation usually gives the protein activity. Besides histone, this Ying-Yang control can be seen in NFkB, Rel, and P53 and so on.

Methylation and acetylation works on amino-terminal

lysine residue of a given protein. However, there are another two important cellular mechanisms working on lysine residue. Those are sumoylation and ubiquitination. When there is no methyl group or acetyl group on the lysine residue of a protein, it can be recognized by an ubiquitin protein. After the polyubiqutin reaction, this protein will be delivered to proteasome for digestion and degradation. Old proteins tend to lose their acetyl groups, so it is the natural turnover mechanism for protein.

Sumoylation is another mechanism. SUMO protein can also recognize lysine residue of a protein. Then, SUMO reaction can transiently inactivate the protein. Most SUMO targeted proteins are transcription factors. After SUMO targeting, proteins will be usually delivered to cell nucleus and repress transcription. SUMO recognizes a specific protein sequence: ΨKXE/D. Ψ is any hydrophobic acid, K is lysine, X is any amino acid, and D/E is acidic amino acid. All these four mechanisms target the epsilon amino-group of lysine residue. Thus, these four pathways inhibit each other. Methylation is the permanent protein inactivation.

Acetylation is to activate the protein. Ubiquitination is to degrade the protein. And, sumoylation is to transiently inactivate the protein. The four post-translational modifications are very important to protein metabolism or function.

In normal physiological cells, proteins after translation will be folded with molecular chaperons. These normal chaperones will activate acetylation enzyme to give the protein intact function. If a protein is not folded with the help of chaperone, it is usually deacetylated and aggregated and will be recognized by ubiquitin for degradation. However, during stress condition, another group of chaperones will be activated. They are heat shock proteins. On the other hand, heat shock proteins activate deacetylation enzymes. Thus, if a cell is infected by a virus, it will tend to produce non-acetylated proteins due to the heat shock reaction. The non-acetylated viral proteins will be labeled by ubiquitins and sent to proteasomes. Thus, degraded viral peptides can then for antigen presentation for immune cells. Besides, the cell degrades viral proteins to prevent its further infectivity. HDAC, a deacetylation

enzyme, is a strong immune initiator for T cells. Hyperacetylated HSP90 usually loses its function. HSF1 usually initiates deacetylation. These all suggest that cell use this mechanism for defense.

References
1. Igura M et al. Glycobiology 21,575(2011)
2. Lundby A et al. Nature Comm 3:876(2011)
3. Zellbiologie Lf et al. EMBO reports 4,628(2003)
4. Gavel Y et al. Protein Engineering 3,433(1990)
5. Hansen JE et al. Biochem J 308,801(1995)
6. Ande SR et al. PLOS ONE 4,e4586 (2009)
7. He A et al. Genes & Development 26,37 (2012)
8. Yang XJ et al.Molecular Cell 31,449(2008)
9. Caron C et al. BioEssays 27,408(2005)
10. Lee DY et al. Endocrine Reviews 26,147(2005)
11. Wu SY et al. EMBO J 28,1246(2009)
12. Ito A et al. EMBO J 21,6236(2002)
13. Yang XD et al. Mol Cel Biol 30,2170(2010)
14. Shi XB et al. Mol Cell 27,636(2007)
15. Kawaguchi Y et al. Cell 115,727(2003)
16. Fillingham J et al. Mol Cell Biol 28,4342(2008)
17. Kee HJ et al. Circulation Research 103,1259(2008)

18. Westerheide SD et al. Science 323,1063(2009)
19. Akimova T et al. Blood 119,2443(2012)
20. Bali P et al. J Biological Chemistry 280,26729(2005)
21. Fritah S et al. Mol Biol of the Cell 20,4976(2009)

Conciousness and subconscious

Conciousness is a very important issue both in psychiatry and neurology. Freud proposed his psychiatry analysis method to subgroup the consciousness levels into id, ego, and superego. Although his concept is very successful in psychology, no clear evidence in neurology firmly supports his theory. Here, I will use knowledge from neurology to explain the origin of consciousness and subconscious.

Based on Freud's dream analysis, he found that human beings have an underlying subconscious level. The subconscious level is related to our basic drive and emotion. It is related to the memory of anxiety and fear. And, this subconscious is opposite to socialization constraint. In addition, he also found that human beings consciousness have another level. This consciousness level can inhibit subconscious level to fulfill socialization, ethics, and morality. Thus, he created three terms: id, superego which is related to subconscious and upper consciousness level, respectively. Human beings' behavior is the combination of id and superego which makes an

integrated consciousness called ego. His concept had helped a lot of psychiatry patients such as anxiety, panic disorder, and post traumatic stress disease. However, since psychiatry is based on neuro-function. No clear neurology foundation is provided for his theory.

Based on my neurology knowledge, I will explain his theory by neuroanatomy. The id subconscious level should be related to our limbic system from archicortex. Limbic system is in the inner part of our brain. It includes amygdale, hippocampus, and hypothalamus. Neurologists have pointed out the function of the three parts of limbic system. Amygdala is responsible for our emotion including panic, anxiety, fear, and anger etc. Hippocampus, located in medial temporal lobe, is responsible for autobiographical memory and autonoetic consciousness.[1] Autobiographical memory is the personal memory which stands for self identity, self continuity, and self awareness in space and time. Autonoetic consciousness is the sense of self to place in the present, past, or future, and to analyze our own

thought. Dysfunction of hippocampus will cause intrusive thought and fragmentation of memory. It is like the RAM for our brain. And, hypothalamus is responsible for our basic drives such as hunger, thirst, and sex. Freud thought subconscious is a repository for socially unacceptable ideas, wishes or desires(drives), traumatic memories, and painful emotions. Thus, the limbic system with self awareness/memory, emotion and drive makes the subconscious id.

Then, which part of our brain stands for the superego. I think it is in the frontal lobe from neocortex. Frontal lobe is located in the front side of cerebral cortex. Its functions include plan, execution, judgement, and decision making. It also has a very important function for socialization and morality. Patients with frontal lobe damage usually have disinhibition behaviors. This is called frontal disinhibition. Patients with frontal lobe damage are also related to crime behaviors. Thus, frontal lobe should be related to the superego. It makes the conscientia syneidesis.

Neuroanatomy evidences showed that nerve fibers

from limbic system will input to frontal cortex. Only after the modification of frontal lobe, the emotion and behavior can be expressed and executed. Thus, the emotion and basic drive can be modified by frontal lobe. After the modification by frontal lobe(superego) for the limbic system(id), our ego after the integration can be shown.

For an example, if you are on the street and you want to urinate. The drive and emotion wants you to urinate immediately on the street. However, after the impulse transmitted to frontal lobe, it will inhibit your abrupt behavior. Finally, the integrated ego will let you to find a restaurant's toilet room to let you urinate there.

In traditional Confuciasm, there is a debate whether our human nature is good or bad. Mencius said that human nature is good. It is because we have four feelings: feeling of commiseration, feeling of shame, feeling of right and wrong, and feeling of deference and compliance. Xunzi, on the other hand, said that human nature is bad. I think they are both right and wrong. We should use the neuroanatomy and

psychiatry evidences to explain the human nature. We have both id and superego to make an ego.

Id is our basic instinct, and we don't need to learn it. However, the superego must be learnt from outside education. I call this frontal lobe learning. Dr. Piaget has a famous morality development theory. Children below 4 years-old is in the anomous stage. In this period, only basic instinct id exists without socialization and morality. From 4y/o to 8 y/o is called heteronomous stage, children start to learn outside rules and principles from their parents and teachers. They accept all authority, and superego highly suppresses id in this period. They are trying to figure out morality and socialization in this period. Children after 8 y/o reach autonomous stage. In this stage, they can successfully integrate id and superego to have a successfully initiation of ego. It is worth noting that we can not say id is just bad. Id is just our natural drive and emotion from bio-organisms' survival instincts.

Thus, the prominence of frontal cortex depends on the evolution status of animals. Primates, such as human

beings, have higher developed frontal lobe and function. Thus, more socialization and morality is for more high class animals. Some lower primates, such as monkey, also developed their "ethic" stratum. All monkey need to obey the order of their monkey king.

Sleep is the duration and the function which our cerebral cortex can take a rest. Thus, the superego frontal lobe is resting during sleep. However, during the NREM and REM sleep, our subconscious such as hippocampus still has activity. During dream from REM sleep, hippocampal activity can have fancy and irrational thoughts with emotions without frontal logically or morally inhibition. Thus, Freud thought dream can reflect our subconscious.

Finally, I will discuss about the clinical phenomenon called dissociation. Under the normal circumference, our id and superego are integrated. However, drugs, such as ketamine, can cause this dissociation status to separate id and superego, or limbic system and frontal lobe. Another activities such as hypnosis which suppresses frontal lobe activity or even takes over

frontal lobe activity can also cause this dissociation status. This is my opinions about consciousness and subconscious.

Reference
1. Bartsch T el a. CA1 neurons in the human hippocampus are critical for autobiographical memory, mental time travel, and autonoetic consciousness PNAS 108,17562(2011)

Sociobiology

Confucius academy believes that human beings have moral ethics and that is the reason to distinguish human and other animals. However, there is recently a science division called sociobiology. This new science division proposes that the moral principle should be raised the socialized animals, especially socialized mammals or birds. It is because mammals and birds have neocortex or neocortex-like structure including frontal lobe and conscious layer to adapt socialization. Thus, ethic principle should be the product of evolution. It is very logical because all socialized animals should follow certain rules to maintain their groups. However, current sociobiology has some defects which may lead to socioDarwinism. Here, I will propose the key moral principles for the socialized bio-organism.

Here, I propose a "BELIEFS" principle for including most important moral principles by using most simplified methods.

"B" is Being. The principle of existence. That is the most fundamental virtue. If there is no existence of life, there is no other moral value. Thus, it is the leading virtue. In this principle, we cannot harm, and we cannot kill. Peace and non-violence is to promote Being principle. Hopefulness and optimism is to promote Being in spiritual part. Caring and "Do no harm" is the practice of Being principle. It is worth noting that "Being" principle is fundamental. Every life is special, unique, and invaluable. You cannot kill one single life to save other more lives. That disobeys the "Being" principle. That is also a problem of utilitarianism. Every life is irreversible. In animal kingdom, animals belonged to certain race won't kill each other. Crows do not pick crow's eyes, dog does not eat dog, and hawks will not pick hawk's eyes out. 同類不相殘 Although animals will ritually fight for mating or getting the leadership or territory, they won't actually kill their opponents because of this principle even though their opponent is much weaker. This principle is the key for the animal race's survival. If they kill each other, this animal race will extinct soon due to the evolution selection. This principle is

generalized in all animal kingdoms. Although infanticide behavior is seen in mammals such as lion or rat, it is still a rare event. Adult animals usually do this because of economic reason. They see young animals as their asset as well as loading. If the environment is bad, they cannot and don't want to raise them and infanticide happens, especially when the young animals are not derived from the adult male animals. It may be like the abortion behavior in human beings.

First, animal society creates principles for each individual in this society to let him/her obey the principles. Then, these principles are internalized into the frontal cortex to let the individual to follow these laws. If each individual follows these rules, the animal society will be more successful. If the animal society becomes more successful, these ethic principles will be re-enforced. Thus, both the two ethic philosophies are interdependent cause and effect. Both are correct but incomplete. We need to consider both to guide the sociobiology ethic behaviors. Besides, the Being principle is key. Because life is irreversible, it is very important to consider the life before applying the above two principles. Thus, white lie is allowed and

Marxism is wrong in the above examples.

In addition, Darwin proposed that animals need to compete in order to survive from nature selection. His theory leads to a wrong division called social Darwinism. This philosophy facilitates racism and imperialism with global wars. Actually, different species compete, but same specie cooperates. Darwin's philosophy didn't point out that same specie needs to cooperate to each other to overcome the environment to let the specie more successful. And, this cooperation leads the origins of ethics principles for animal groups due to sociobiology.

Theory of everything in social sciences

Conservation of money

The current dominant theory of economics is Adam Smith's theory. He thought that supply and demand will reach a balance status due to invisible hand of market. The basic assumption is that all players in economics are rational. Thus, they can make a complete rational decision for demand and supply to reach economical equilibrium. However, this theory has severe problems. For examples: this theory cannot explain why economic bubbles occur in all economical history. Economic bubbles occurred several times in world history. When economic bubbles burst, the whole country suffers from a short or long period of economic depression. The whole economic system suffers from a detrimental impact. They are all due to irrational investors. General equilibrium theory means that equilibrium prices for goods exist and that all prices are at equilibrium. This theory was proposed by French economist Leon Walras. This kind of market equilibrium is called Pareto efficient. These economic

bubbles point out that the great equilibrium of economics theory has a severe defect.

Here, I will propose a new theory for the general demand-supply market. I will apply the theory of energy conservation from physic law. This is called conservation of money. In order to prevent inflation, the total money (currency) in the whole market should be conserved. The central bank of any bank will tend to maintain the stable amount of currency in the domestic market. Thus, the total amount of money is unchanged. When the money is spent to certain market such as stock market, there will be winners and losers. Winners are the first people to enter the stock market by buying stocks with low price. And, the losers are the last people to enter the stock market by buying stocks with high price. Because of the conservation of money, the stock market won't rise even higher without extra money entering the stock market. Thus, this stock market with maximal currency will be turned downhill. Then, these losers need to sell out their stocks by high price and they lose money. However, the winners also sold out the stocks with high price and

they get the extra money. In a simple sentence, some earn the money and some lose the money. Winners get money from the losers because of the conservation of money.

This new simple theory can explain the happening of economic bubbles. The wickeded winners buy in certain "potential stocks". For example: internet.com stock. Then, they advocate that these kinds of stocks are very potential and have a lot of profits in the future. They can use media or advertisement to attract other foolish followers. Then, many poor fools will believe their words and start to buy in these "potential stocks" such as internet.com stocks. When the stock market starts to go higher and higher, it will reach a plateau because of the conservation of money. There no extra money for this stock market for buying in these "potential stocks". Then, the stock market will "bankrupt". The stock market will go downhill. Then, an economic bubble will burst up. This new simple but powerful theory can fix the defect of Adam Smith's demand-supply theory and Leon Walras's general equilibrium theory. It can successfully explain the

economic bubbles. In addition, there is a key point in this theory. There is information asymmetry. These wicked winners have more information about these "potential stocks". They know much better than those poor fools. In addition, they can control the opinions of the mainstream media and advertisement. That is the reason they can control the stock market. They can also use economical psychological effect to attract these poor fools to buy in these "potential stocks". Then, they will get high profits from these poor losers. As for the foreign exchange market, the wicked winner could be the risky investors and the poor foolish losers can be the government. There is money conservation: some win, some lose.

There is another variant of this money conservation theory. There could be a short term of extra money from other countries to enter the domestic market. For example: the Great Depression of America. After the World War I in Europe, many European thought that Europe was not safe and they started to invest the American stock market. Because of the excessive hot money, their behaviors let Americans think American

stock market will go higher forever. Then, these poor fools followed and bought in some "potential stocks". However, the excessive hot money is only short termed. These hot money went back to Europe soon because European could not invest American stock market for too long time. When the excessive hot money was withdrawn from USA market, the USA stock market started to go downhill. This is the "bankrupt" of USA stock market, and Great Depression occurs. Although there are other reasons contributing to USA Great Depression, excessive short term money still plays an important role. This theory pointed out that short term excessive hot money is the cause the burst of economic bubbles. This theory is useful and powerful. The continuity equation for conservation of money can be expressed as:

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

Monetary leverage

From the above paragraph, we can see the detrimental effect of the short term hot money. Here, I would like

to introduce another concept: monetary leverage. This concept is frequently used by some notorious or famous international risky investors. Monetary leverage is the tight and close relation between foreign exchange market, stock market, real estate market, and bond market. This is like the physic law: principle of leverage. When you push down one market of foreign exchange market, stock market, real estate market, or bond market, the other three markets will be affected and changed. The linking leverage of these markets is interest rate. The starting point is usually the foreign exchange market. Speculators used this principle to earn a lot of risky money.

First of all, I would like to introduce the leverage principle of these financial markets. I would like to use Taiwan as an example. When you sell a lot of New Taiwan dollars in the foreign exchange market, the Taiwan central bank will need to buy in these great amount of money in order to maintain the conservation of money. In other words, Taiwan's central bank needs to maintain the currency exchange rate to maintain the stability of foreign exchange

market. If there is a great fluctuation of the currency exchange rate, it can severely affect the trade in and trade out in Taiwan. If the central bank of Taiwan doesn't have enough ability to buy in these New Taiwan dollars, there is another tool for Taiwan central bank. The Taiwan central bank can raise the bank interest rates to encourage money deposit in bank to reduce the huge amount of New Taiwan market in foreign exchange market. However, the raising interests will also reduce the amount of New Taiwan dollars in Stock market and Real estate market. Thus, the stock market will first go down to reflect the shrinkage of New Taiwan dollars in the market. Then, the real estate market can also be affected to go down to reflect the shrinkage of New Taiwan dollars in the market. If you are a risky investors such as the famous speculator, you can bet there will be a going down in Taiwan stock market and predict the lowering Taiwan stock market index in the Future market. Then, you can get a lot of money not only in the foreign exchange market but also in the Future market. As for the Bound market, the interest rate and central bank buy-in/sold-out can also affect the value of the Bound market.

Thus, there are tight links between these four markets.

Let me tell you a real example: the Hong Kong financial crisis. During this crisis, the speculator first announces that there will be a financial crisis in Hong Kong. It is because the speculator has successfully defeated the Thailand government before. He successfully attacks the Thailand dollars to let it devalue to earn a lot of money. Thus, he claimed that the whole Asia cannot be avoided from this "crisis". In order to earn a lot of risky money in Hong Kong, he started to sell the Hong Kong dollars to exchange it to US dollars in the foreign exchange market. In order to defend Hong Kong dollars, Hong Kong government needs to buy in these amount of Hong Kong dollars sold by the speculator. However, Hong Kong government was afraid that they don't have enough money to do this. Thus, they also enhance the banking interest rate in Hong Kong. Then, the Hong Kong stock market started to go down to reflect the shrinkage of money in Hong Kong. The speculator already predicted this, and he betted that the Hong Kong stock market index needs to go down in the Future market. Thus, he also earned a lot of money

from the Future market. The speculator was very proud and he said the whole Hong Kong is his ATM machine. He could get any amount of Hong Kong dollars as he wanted. On the other hand, the Hong Kong government faced a "real financial crisis" with a double going down both in foreign exchange market (the devalued Hong Kong dollars) and in Hong Kong stock market (the downhill stock market). Thus, Hong Kong government faced a dilemma. If they wanted to give up the foreign exchange market to save the Hong Kong stock market, they will see the severe devalue of Hong Kong dollars. If they wanted to give up the Hong Kong stock market to save the value of Hong Kong dollars, they will see the bankrupt of Hong Kong stock market. Both situations can severely defect Hong Kong economics to create a detrimental economic bubble to totally destroy Hong Kong. After considering, the Hong Kong government made a decision. They used the Hong Kong dollars bought by Central bank from the speculator to buy in the stocks of Hong Kong stock markets. Thus, both foreign exchange market and stock market can be maintained stable.

The second principle of leverage is the financial leverage in the Future market. There is a very basic characteristic in the Future market. It is very risky because you can only pay a little amount of "working fee" or "guarantee fee" and use a great amount of money. The speculator used this characteristic very well. It is very easy to use 1/10 even 1/20 amount of "working fee" to play with 10X or 20X amount of "real money". In the above Hong Kong example, the speculator didn't have much Hong Kong dollars. However, he used the Future market and the Option market to play this great amount of Hong Kong dollars. Because of the leverage effect, even the great amount of Hong Kong government's reserved money is very difficult to deal with speculators' "playing money". Thus, Hong Kong government was facing such a great crisis.

Thus, we know the principle of leverage. We can also play this principle to deal with the hot money. We all know that the QE2 with 65 million US dollars (190 billion New Taiwan dollars) from America government in 2010 has a great impact on the world, especially

Asia. If I am the speculator, I can use some strategies to earn a lot of money. First of all, we can use the economical psychology principle. He can advocate the excessive hot money will appear in Taiwan. Then, he and other collaborators can announce that the New Taiwan dollars must raise its value. This will cause a panic in Taiwan. Then, he can buy in a great amount of New Taiwan dollars from the Central bank of Taiwan. He can use the above leverage principle in the Future market and the Option market. He just needs to pay some "working fees" and he will have the right to buy in a great amount of New Taiwan dollars by using the USA dollars from QE2. For example, Taiwan government now has 350 billion Foreign Exchange Reserves. If he wanted to play, he and collaborators can use 17 billion money (1/10 of the QE2) to buy the Futures or Options to counteract Taiwan government by using the 20:1 leverage. If Taiwan central bank needs to maintain the stability of foreign exchange market, it needs to sell out a great amount of New Taiwan dollars to the speculator. And Then, Taiwan's central bank will need to reduce the banking interest rate in Taiwan. Thus, more New Taiwan dollars in the

market compared to US dollars can avoid its raising value. Then, there will be a great amount of excessive New Taiwan dollars to go to Taiwan's stock market and real estate market. If I am speculator, you can bet that Taiwan's stock market will go up and you can predict the raising of Taiwan stock market index in the Future market. If Taiwan government maintains the currency exchange rate in the Taiwan foreign exchange market, you can get a lot of profit by betting Taiwan stock market index in the Future market. In addition, speculator can buy in a lot of Taiwan stocks during or before he attacks the New Taiwan dollars. He can use the economical psychology principle again to announce that the Taiwan stock market will reach 16888 for example. Then, a lot of poor fools in Taiwan will follow these wickeded winners (speculators) to buy in Taiwan stocks. It will be similar in Taiwan's real estate market. Thus, it is not difficult to create a possible economic bubble in Taiwan. If Taiwan stock market or real estate market really goes to extremely high, Taiwan government finally needs to raise the banking interest rate. According to all previous economic bubble experiences, all economic bubbles burst when the

government central bank raise the banking interest rate. It is because more people will deposit their money to bank and more people cannot easily borrow money from bank. If the economic bubble bursts, it will be a great disaster in Taiwan. After 1990 Japan's economic bubble bursting, the whole Japan cannot fully recover until now.

We know there is excessive hot money from QE2 currently. In order to prevent from the possible economic bubble in Taiwan, we can have the following procedures. In Brazil, they start to ask for hot money tax and raise the tax of stock benefit for foreigners In Singapore, they interfere the Singapore foreign exchange market. In South Korea, they ask for the tax of foreign exchange market and the 14% tax of investment by foreigners. In Hong Kong, they limit foreigners to buy Hong Kong's real estate to avoid the real estate bubble. We can look their procedures as reference. Many foreigners send a lot of hot money goes into Taiwan by pretending they are buying our government bound. Thus, we can limit these foreigners' right to buy our government bound. This

can also cut off the relationship between bound market and the other three markets and banking interest rates. We can also ask for hot money tax or management fee for the hot money. We can ask for tax for foreign exchange market. Most important of all, we need to have efforts on the Option and Future markets. We can highly raise the "working fee" or "guarantee fee" for buy-in or sell-out these Futures or Options to avoid the monetary leverage. Or, it should not only need "working fee" or "guarantee fee" for buy-in or sell-out great money in Future or Option markets. We can cancel the "working fee" or "guarantee fee". There is an investment principle of speculators. They never risk all his money to invest a single item, so he must use the leverage principle very well. Due to our Futures market law, any one cannot try to control the Future markets. Thus, we can detect if there is a joint control behavior between these foreign hot money risky investors. We can use an anti-trust law against them. Due to our Future market law, we can also completely cancel or stop the Future or Options markets during an emergent or difficult situation. I don't see any necessity of the existences of

these completely risky Future and Option markets like the existence of subprime lending. Many risky investors will criticize our government that we disobey the freedom of market. However, the second loan crisis of America and many economic bubbles or crises are actually the results of this uncontrolled "free market". Free markets always fail. We need to maintain the "justice" of market not the "freedom" of market.

Sociology (Economics Sociology)

There are three main social structure theories in sociology: functionalism, conflict theory, and symbolic interactionism. Functionalism thinks that each individual or each group has a certain stable position in society. The reason is based on their function. However, this will make a static situation. It is not easy to explain the society movement during period and period. Based on Functionalism, even a social phenomenon is so ridiculous or so evil, its existence has its functional reason for sure. That triggers a lot of argument. Conflict theory is the opposite. It explains that the social stratum change is due to the conflicts between each social group or each individual. It is proposed by Karl Marx. However, conflicts theory is emphasizing too much about the moving of society. It emphasizes too much on the competition and revolution between stratum, and it neglects the cooperation between stratum in the society. It cannot explain the relatively stable structure of society. The third sociology theory: Symbolic interactionism emphasizes on the interaction between each individual and each individual in the society. However, it focuses

on the mind of individual(microsociology). And, it overemphasizes the importance of symbolization. It overemphasizes the symbol's meaning on individual's mind which drives the social movement or interaction. It focused too much on the psychology not the groups or stratum of society.

As the Ecnomicist Gary Backer used economic concept to deal with sociology, I will also use an economics concept to deal with the problem. There is dynamic equilibrium in economics processes. This dynamic equlibrism can be also applied to the structure of society. There is an equilibrium in the stratum of society. However, it is relatively stable but not static. There is room for stratum conflicts. The conflicts may be due to awareness of stratum(such as morality awareness about inequality etc.). It can also due to the economic change or technology/science improvement. It is like an evolution process. Thus, the dynamic equilibrium is the most suitable theory for sociology.

Politic science

Shan Rang system

The most modern and successful politic system is democracy. However, if politic system is a dissipative system, is there another successful system in our modern world? Kingdom is an example which exists for a long period. However, modern kingdom should be adapted to fit current human right requirement. Thus, they will need constitution laws to protect human right. They also need a beaurocracy system to help to manage the nation.

In old China, there is a politic system called Shan Rang 禪讓 system. The king will give his throne to a wise and moral person when he is alive. This system was originated from 堯舜禹. Shan Rang is an ideal political system in old China. However, this system is replaced by Kingdom-Empire system later on.

Nowadays, China government also uses similar way to change the national leader. I call this variant of Shan Rang system. The selection of new leader is from the

communist party itself. The selection is not from all people of China. In addition, long-term incubation and observation are needed. In addition, there is a fixed duty period and age limitation for each new leader. By the way, the officer beaurocracy system is also needed to support the leader.

I will like to describe here to see if politic system is a dissipative system. First, it must be maintained and away from equilibrium. The system must be inherited successful just like democracy system to change their leaders. The duty period and age limitation can help to maintain the transmission. Second, a nonlinear positive or negative feedback is needed. If the system is successful, then a positive feedback will help the system to keep on working. Then, the system will be maintained. China is a government with focused power. Thus, it has high efficiency. This is their system's advantage. This also helps to maintain the regimen. Finally, mutability is needed. Democracy can use election to select new leader with different politic idea to change the direction of nation to face environmental change. Thus, the mutability of

democracy is high. When we look at the "Shan Rang system", new leader is selected based on old leader's choice. Thus, the mutability is not as high as democracy system. However, if the old leader can take media or people's idea into consideration, a new leader with different idea can still be probably selected. This is my academic discussion of politic system.

Theory of everything in mathematics

Higgs-Meson Interaction

Here, I will use mathematic proof to discuss the fundamental interaction of standard model. This part belongs to theories of everything in mathematics. First, I will introduce higgs-meson interaction. Here, I propose that meson, especially pion, is also actually a

gauge boson which mediates the attractive force within atomic nucleus. Thus, proton-proton, neutron-neutron, and proton-neutron can be bound. This nuclear force was mislead as a residual force of gluon. This is actual hardon physics.

Thus, the pion mediated force is also a SU(2) force. So, it is a force between proton-proton, neutron-neutron, and proton-neutron. Due to the formula of Yang-Mill equation:

$$Fuv = \partial uAv - \partial vAu - [Au, Av]$$

In addition, the QHD formula is:

$$U(SU(2)) = \exp[ig \sum_{j=1}^{3} T_j P_j(x)]$$

Thus, the covariant derivative is:

$$\partial^\mu = \partial^\mu + igT * P(x)$$

Where i means imaginary number, g is coupling constant for QHD, T is isospin, and P(x) means gauge pion field. Originally, pion is thought not a gauge boson because it has mass. Here, I will demonstrate that pion gets its mass from higgs-meson interaction. Thus, pion is originally a massless particle. The isospin T for pion

are:

$$T_x = \frac{1}{\sqrt{2}}\begin{bmatrix} 0 & 1 & 0 \\ 1 & 0 & 1 \\ 0 & 1 & 0 \end{bmatrix}$$

$$T_y = \frac{1}{\sqrt{2}}\begin{bmatrix} 0 & -i & 0 \\ i & 0 & -i \\ 0 & i & 0 \end{bmatrix}$$

$$T_z = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

Because pions include three particles: π^+, π^-, π^0, we should use a real scalar higgs field to interact with pion field. This Higgs scalar field also has three component: $(0,0,V/\sqrt{2})$. And the lagrangian for the real scalar field is:

$$L(\varphi) = \frac{1}{2}(\partial_v\varphi)(\partial^v\varphi) - \frac{1}{2}\mu^2(\varphi(x))^2 - \frac{1}{4}\lambda(\varphi(x))^4$$

Then, we introduce the covariant derivative of QHD and the isopin matrix into the lagrangian. It becomes:

$$\frac{1}{2}|[(igTP(x)) * \varphi(x)]^{+} [(igTP(x)) * \varphi(x)]|$$

$$= \frac{1}{2}(0, \frac{1}{\sqrt{2}}v(gP_x - igP_y), -gvP_z)$$

$$* (0, \frac{1}{\sqrt{2}}v(gP_x + igP_y), -gvP_z)$$

$$\text{let } P^{\pm} = \frac{1}{\sqrt{2}}(P_x \pm iP_y)$$

The above equation becomes:

$$\frac{1}{2}(0, gvP^-, -gvP_z) \times (0, gvP^+, -gvP_z) =$$

$$\frac{g^2v^2}{2}P^+P^- + \frac{g^2v^2}{2}P_z^2$$

In addition,

$$P_z^2 = P * \overline{P}$$

If π^+ is P^+, π^- is P^-, and π^0 is Pz, then all the three pion particles can get the mass of $gv/\sqrt{2}$. The antiparticle of π^0 is still π^0. This is why three pion particles get the same mass from higgs mechanism. Thus, π^+ is u$\underline{d}$, π^- is d$\underline{u}$, π^0 is u$\underline{u}$ or d$\underline{d}$. Component of π^0 is u$\underline{u}$-d$\underline{d}/\sqrt{2}$. The mass of π is around 135-139 MeV/c^2. The mass of π^0 is only slightly lighter than π^+ or π^- because it doesn't carry any electric charge. The slight mass difference is

due to the quark content of the charged pions and neutral pion. The mass of up quark is 1.7-3.1 MeV/c^2, and the mass of down quark is 4.1-5.7 MeV/c^2. Thus, the mass of pion is not merely from quark, and pion acquires mass from Higgs mechanism. This is Higgs-Meson interaction.

Strong-Light Unification

In previous research, Professor Weinberg proposed an electroweak interaction to predict the masses of W

and Z particles. His theory is very successful. However, it is actually the interaction of photon and W/Z bosons. So, it is Weak-Light Interaction. It is the interaction between weak force and light. Here, I propose an interaction between strong force and light. Thus, it can solve the problem of gluon mass.

Based on Yang-Mills theory of standard model, we know the Yang-Mills equation is:

$$Fuv = \partial uAv - \partial vAu - [Au, Av]$$

In addition, the QHD formula is:

$$U(SU(2)) = \exp[ig \sum_{j=1}^{8} F_j\, G_j(x)]$$

Thus, the covariant derivative is:

$$\partial^\mu = \partial^\mu + igF * G(x)$$

Besides, F=1/2λ, and λ is Gell-Mann matrix:

$$\lambda_1 = \begin{bmatrix} 0 & 1 & 0 \\ 1 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}$$

$$\lambda_2 = \begin{bmatrix} 0 & -i & 0 \\ i & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}$$

$$\lambda_3 = \begin{bmatrix} 1 & 0 & 0 \\ 0 & -1 & 0 \\ 0 & 0 & 0 \end{bmatrix}$$

$$\lambda_4 = \begin{bmatrix} 0 & 0 & 1 \\ 0 & 0 & 0 \\ 1 & 0 & 0 \end{bmatrix}$$

$$\lambda_5 = \begin{bmatrix} 0 & 0 & -i \\ 0 & 0 & 0 \\ i & 0 & 0 \end{bmatrix}$$

$$\lambda_6 = \begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & 1 \\ 0 & 1 & 0 \end{bmatrix}$$

$$\lambda_7 = \begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & -i \\ 0 & i & 0 \end{bmatrix}$$

$$\lambda_8 = \frac{1}{\sqrt{3}} \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & -2 \end{bmatrix}$$

For photon, there is another matrix:

$$\lambda_9 = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

We let r or |r>=(1,0,0), b or |b>=(0,1,0), and g or

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$|g>=(0,0,1)$. Then, the whole matrix is:

$$\begin{bmatrix} r\bar{r} & b\bar{r} & g\bar{r} \\ r\bar{b} & b\bar{b} & g\bar{b} \\ r\bar{g} & b\bar{g} & g\bar{g} \end{bmatrix}$$

In addition, each matrix has its corresponding gluons and photon:

$$G_1 = \frac{1}{\sqrt{2}}\left(r\bar{b} + b\bar{r}\right)$$

$$G_2 = \frac{i}{\sqrt{2}}\left(r\bar{b} - b\bar{r}\right)$$

$$G_3 = \frac{1}{\sqrt{2}}\left(r\bar{r} - b\bar{b}\right)$$

$$G_4 = \frac{1}{\sqrt{2}}\left(r\bar{g} + g\bar{r}\right)$$

$$G_5 = \frac{i}{\sqrt{2}}\left(r\bar{g} - g\bar{r}\right)$$

$$G_6 = \frac{1}{\sqrt{2}}\left(g\bar{b} + b\bar{g}\right)$$

$$G_7 = \frac{i}{\sqrt{2}}\left(b\bar{g} - g\bar{b}\right)$$

$$G_8 = \frac{1}{\sqrt{6}}\left(r\bar{r} + b\bar{b} - 2g\bar{g}\right)$$

Besides, the photon boson is:

$$B = G_9 = \frac{1}{\sqrt{3}}\left(r\bar{r} + b\bar{b} + g\bar{g}\right)$$

Thus, there are totally 9 bosons(8 gluons plus 1 photon) for the whole 3X3 matrix, and they are acquiring masses due to the interaction with Higgs bosons. In order to maximize the total gluons, we need to use complex scalar field here to include 6 Higgs bosons. We predict that six of the bosons will interact with Higgs field, and three gluons will have no mass. The Higgs field is:

$$\varphi(x) \equiv \frac{1}{\sqrt{2}}\begin{pmatrix} \varphi1 + i\varphi2 \\ \varphi3 + i\varphi4 \\ \varphi5 + i\varphi6 \end{pmatrix}$$

And, we let$\varphi1 = \varphi2 = \varphi3 = \varphi4 = \varphi6 = 0$ and $\varphi5 = $ v. Thus, the Higgs field should be $(0,0,V/\sqrt{2})$

The lagrangian for the complexl scalar field is:

$$L(\varphi) = (\partial_v\varphi)(\partial^v\varphi) - \mu^2(\varphi(x))^2 - \lambda(\varphi(x))^4$$

Then, we introduce the covariant derivative of QCD and Gell-Mann matrixinto the lagrangian. It becomes:

$$\frac{1}{4}|[(ig\lambda G(x)) * \varphi(x)]^+ [(ig\lambda G(x)) * \varphi(x)]| =$$

$$\frac{1}{8}(gv(G_4 - iG_5), gv(G_6 - iG_7), v(g'B - \sqrt{2}gG_8)) \times$$

$(gv(G_4 + iG_5), gv(G_6 + iG_7), v(g'B - \sqrt{2}gG_8))$

We let $G^4 = 1/\sqrt{2}(G_4 + iG_5)$, $G^5 = 1/\sqrt{2}(G_4 - iG_5)$ and so for G^6 and G^7. And we let $1/\sqrt{2}g = g''$. Then, we get the above formula:

$$\frac{1}{8}\left(\sqrt{2}gvG^5, \sqrt{2}gvG^7, v\left(g'B_u - \sqrt{2}gG_{8u}\right)\right)$$

$$\times \left(\sqrt{2}gvG^4, \sqrt{2}gvG^6, v\left(g'B^u - \sqrt{2}gG_8^u\right)\right) =$$

$$\frac{g^2 v^2}{4}G^4 G^5 + \frac{g^2 v^2}{4}G^6 G^7 + \frac{v^2}{8}(G_{8u}, B_u)\begin{pmatrix} g''^2 & -g'g'' \\ -g''g' & g'^2 \end{pmatrix}\begin{pmatrix} G_8^u \\ B^u \end{pmatrix}$$

$$+ 0 * (g''G_8^u + g'B^u)(g''G_{8u} + g'B_u)$$

$$\div (g'^2 + g''^2)$$

$$= \frac{g^2 v^2}{4}G^4 G^5 + \frac{g^2 v^2}{4}G^6 G^7 + \frac{1}{2}M_{G8}^2 G_u^8 G^{8u} + 0$$

$$* A^u A_u$$

We let $G^{8u} = (g'B^u - g''G_8^u)/\sqrt{(g'^2 + g''^2)}$ and $A^u = (g'G_8^u + g''B^u)/\sqrt{(g'^2 + g''^2)}$

Similar to electroweak theory, we get the mass of G^8

$$m\,G^8 = \frac{1}{2}v\sqrt{g'^2 + g''^2}$$

And the mass of photon A^u is still zero. Similar to electroweak theory, we get G^8 field and photon field:

$$G^8 = \frac{g'}{\sqrt{g''^2 + g'^2}} B - \frac{g''}{\sqrt{g''^2 + g'^2}} G_8$$

$$= B \sin\theta - G_8 \cos\theta$$

$$A = \frac{g'}{\sqrt{g''^2 + g'^2}} G_8 + \frac{g''}{\sqrt{g''^2 + g'^2}} B$$

$$= G_8 \sin\theta \quad + B \cos\theta$$

In addition, the mass of the new gluons G^1, G^2, and G^3 is still zero after the Higgs mechanism. Besides, the mass of gluons G^4, G^5, G^6, and G^7 is 1/2vg. The G^8 gluon becomes gg after the Higgs mechanism. Besides, we know

$$\frac{1}{\sqrt{2}} (G_1 - iG_2) = r\bar{b} \text{ , and } \frac{1}{\sqrt{2}} (G_1 + iG_2) = b\bar{r}\_etc$$

G_8 and photon Higgs interaction is in the right and bottom most position of the matrix, and we get a final gg gluon. The form of rr-bb(λ3) is (which is similar to neutral pion):

$$\frac{1}{\sqrt{2}} (r\bar{r} - b\bar{b})$$

I don't know the exact coupling constant ratio between photon and strong force. However, if the alpha ratio (strong) is 1 which is similar to the color force, we can

get:

$$\sin\theta = \frac{1}{\sqrt{3}}$$

$$\cos\theta = \frac{\sqrt{2}}{\sqrt{3}}$$

Thus, we will get the results of G^8-A interaction (mixing).

$$G^8 = g\bar{g}$$

$$A = \frac{1}{\sqrt{2}}(r\bar{r} + b\bar{b})$$

Thus, we can get the new sets of the massive gluons G^{4-8}: bg,gb,gr,rg, and gg. Besides, there are four non-massive gluons: λ1, λ2, λ3,& A. A is the same as B0 boson in Weinberg's electroweak interaction. The four no-massive ones can then undergo a SU(2) electroweak mechanism to interact with a Higgs(0,V/√2) to generate W+, W-, Z, and γ. Thus, we can link strong force, weak force, and light together. W+ is linking to rb, and W- is linking to br. That is the reason why neutron can emit a W- particle and proton can emit a W+ particle in beta decay. Thus, we can link strong force, weak force, and light altogether.

Green-related gluons have masses, and non-green gluons have no mass. This solves Yang-Mills mass gap problem for gluons. That's why neutron/proton has more mass than its quarks. From above, we know alpha decay is related to meson and beta decay is related to W boson. Both are SU(2).

Then, we state why quarks and leptons have three generations. The electroweak interaction is the main source of the three generations of leptons such as electron and neutrino. After Higgs interaction, W and Z bosons acquire mass to generate electron and neutrino. We know the massive fermions do not exhibit chiral symmetry. That is because mass term in the langragian $m\Psi\underline{\Psi}$ breaks the chiral symmetry. And we know the NXN Cabibbo-Kobayashi-Maskawa (CKM) matrix's principle to decide the generations of quarks and leptons. The factor is (N-1)(N-2)/2. If N=1, there is no quark mixing angle and CP violation. If N=2, there is one quark mixing angle and no CP violation. If N=3, there is 3 mixing angle and one CP violation. As our above discussion, weak-light and strong-light both

cause spontaneous symmetry breaking with one CP violation after gauge bosons acquire mass. Neutral terms in the QCD langragian are able to break CP symmetry like electroweak theory. This can help to solve strong CP problem. Thus, there must be a 3x3 CKM matrix for quarks and leptons. Quarks and leptons have three generations.

Finally, I want to discuss the relation of charge, hypercharge, and isospin. By applying the above Higgs mechanism, we can easily explain the phenomenon of this relationship. We use left handed quarks and leptons as examples. In strong interaction, we have Gell-Mann Nishijima Formula:

$Q=T_3+1/2Y$
(Q: charge, T:isospin, Y:hypercharge)

First, we look at the Higgs-gluon interaction. From above, we can see a three component Higgs (V,0,0) interacts with gluons to let gluon acquire mass. If a whole neutron or proton is generated, we can see if the above equation is achieved. We know the isospin Iz and charge of neutron is -1/2 and 0, and the isospin Iz

and charge of proton is +1/2 and +1. From the Gell-Mann equation, we can get both proton and neutron has hypercharge Y=1. Besides, we can get hypercharge Y=-1 for both anti-proton or anti-neutron.

Then, we look at up quark and down quark which make the neutron and proton. The isospin Iz and charge of up quark is +1/2 and +2/3. The isospin Iz and charge of down quark is -1/2 and -1/3. Then, we can get that both up quark and down quark has hypercharge Y=1/3. And, the anti-up or anti-down quark is -1/3. Thus, there must be three quarks which make one proton or one neutron(Y:1/3*3=1). And, this matches three component of original Higgs (v,0,0). This can also apply for strange quark, charm quark, top quark, and bottom quark. Besides, we know strong interaction is SU(3).

We can also apply the above principle to meson such as pion. The hypercharge of pions are zero. Pion+ has +1 charge and +1 isospin, Pion- has -1 charge and -1 isospin, and Pion0 has 0 charge and 0 isospin. Because pion is made of quarks with hypercharge 1/3, pion hypercharge 0=1/3-1/3 is with one quark and one anti-

quark. The two components of hypercharge means it is also SU(2) interaction. 1/3 means it needs quark matrix with higgs field(V,0,0) with three components.

Then, we look at Higgs electroweak interaction. There is a two component Higgs (v,0). Here, we will use a weak hypercharge formula for weak interaction:

$Q=I_3+Y_w$ (I_3:weak isospin, Y_w:weak hypercharge)

We know W boson will decay into two components: electron and anti-neutrino. W^-->e^-+anti-v. We know the isospin I_z and charge of electron is -1/2 and -1, and the isospin I_z and charge of anti-neutrino is -1/2 and 0. Thus, we can get the weak hypercharge of electron is -1/2 and the hypercharge for anti-neutrino is +1/2. The 1/2 means two component Higgs and two products of W boson decay. We can also view this relation in Z boson decay. Z boson will decay into neutrino and anti-neutrino pair. The isospin I_z and charge of neutrino is 1/2 and 0 and the isospin I_z and charge of anti-neutrino is -1/2 and 0. Thus, from the above weak hypercharge formula, we can get the hypercharge of

neutrino is -1/2 and for anti-neutrino is +1/2. Z boson also decays into two components which match the two components of original Higgs sectors. Both the hypercharge of Z or W bosons is zero, and it is the combination of the two parts of electron and neutrino hypercharge.(Yw=1/2-1/2=0) Moreover, we know electroweak is SU(2).

Finally, I would like to discuss the basic phenomenon of natural radiative decays. We know basic radiative decays include alpha decay, beta decay, and gamma decay. Here, I will propose that alpha decay is to release meson(pion) particle. Beta decay is to release W particle(SU(2)). And, gamma decay is to release gluon particle(and/or Higgs boson)(SU(3)). Alpha particle is also a helium nucleus with two protons with opposite spin and two neutrons with opposite spin. Between neutron and proton, there is pion mediated nuclear force. The release of alpha particle must be involved in a dropping out of a neural meson(pion) from the atomic nucleus. Thus, I say alpha decay is related to the release of meson(pion). And, we all

know that beta decay is related to the emission or absorption of W^+ or W^- boson. The releasing of W^- boson with decaying into electron and neutrino is more common. And, nuclear neutron will become proton. Thus, I say beta decay is related to release of W (SU(2)) particle. In gamma decay, gamma ray can be released from an excited nucleus. However, the charge-mass of nucleus is not affected. Gluon can absorb gluon or emit gluon. Two fused gluons can generate higgs boson and then turn into gamma ray. Thus, I propose here that gamma decay is the release of gluon(SU(3)) from the nucleus. Thus, it will help to explain the characteristics of the three fundamental nuclear decays.

Navier-Stokes and Euler equation

Turbulence is still a puzzle of modern physics. Until now, no one can successfully explain the detailed mechanism of turbulence. Fluid mechanics is guided by Navier-Stokes equation and Euler equation. Here, I will propose a mechanism to explain the emergence of turbulence and its relationship between Navier-Stokes equation and Euler equation. I propose that turbulence is generated by Euler equation and it can be prevented by Navier-Stokes equation.

The Navier-Stokes equation is:

$$\rho\left(\frac{\partial v}{\partial t} + v \cdot \nabla v\right) = -\nabla p + \nabla \cdot T + f$$

p is pressure, T is sheer stress, and f is body force, especially gravity. If f means gravity, it can be expressed by a scalar quantity F with f=deltaF. We can ;et deltaP'=delta(P-F). Then, the above equation becomes.

$$\rho\left(\frac{\partial v}{\partial t} + v \cdot \nabla v\right) = -\nabla p' + \nabla \cdot T$$

The divT can be expressed as μ*delta²v. And μ is the viscosity. Here, I propose that viscosity is actually from the mass density according to Staudinger's law. From Einstein's relation about electrical mobility, we can find out the relationship between charge and viscosity:

$$D = \frac{KT}{6\pi\mu r} = \frac{\varphi KT}{q}$$

$$\text{mobility } \varphi = \frac{q}{mf}$$

$$\text{viscosity } \mu = \frac{mf}{6\pi r}$$

f is collision frequency of two molecules. Thus, we can see there is a direct proportion between linear mass density m/r and viscosity μ. Most fluids are grossly electric natural, so no net electromagnetism such as 2-4 force should be applied. Mass density is the actual reason of fluid viscosity.

If we consider the Reynold number(Re) in fluid mechanics, the Navier-Stokes equation becomes:

$$\rho \left(\frac{\partial v}{\partial t} + v \cdot \nabla v \right) = -\nabla p' + \frac{1}{Re} \nabla^2 v$$

In addition, if we totally ignore the sheer stress (viscosity) term, the equation becomes Euler equation:

$$\rho \left(\frac{\partial v}{\partial t} + v \cdot \nabla v \right) = -\nabla p'$$

In the turbulence phenomenon, high Reynold number can induce the happening of turbulence. That is viscosity term can prevent the happening of turbulence. Here, I will show that the transition from Navier-Stokes equation to Euler equation causes the phenomenon of turbulence.

Turbulence has several characteristics. First of all, turbulence is usually a rapid rotational flow with spontaneous vortex formation. How to generate a vortex, we can take a curl of both left side and right side of the Euler equation:

$$\nabla \times \rho \left(\frac{\partial v}{\partial t} + v \cdot \nabla v \right) = -\nabla \times \nabla p'$$

Based on the calculus rule, we have

$$-\nabla \times \nabla p' = 0$$

And,

$$w = \nabla \times v$$

We also have following rules:

$$v \cdot \nabla v = \nabla \left(\frac{1}{2} v \cdot v \right) - v \times w$$

$$\nabla \times \nabla \varphi = 0$$

$$\nabla \times (v \times w) = -w(\nabla \cdot v) + (w \cdot \nabla)v - (v \cdot \nabla)w$$
$$+ v(\nabla \cdot w)$$

$$\nabla \cdot (\nabla \times v) = 0$$

In addition, in incompressive fluid, there is

$$\nabla \cdot v = 0$$

Finally, we will get:

$$\frac{\partial}{\partial t} w + (v \cdot \nabla)w = (w \cdot \nabla)v$$

And, we let:

$$\frac{D}{Dt} w = \frac{\partial}{\partial t} w + (v \cdot \nabla)w$$

Finally, we get:

$$\frac{D}{Dt} w = (w \cdot \nabla)v$$

This is the vorticity equation. Thus, Euler equation can spontaneously induce vorticity equation with vortex generation. However, if we consider the viscosity term of Navier-Stoke equation, the curl of divergence T won't become zero in the right side of the equation.

Thus, the existence of Navier-Stokes equation prevents the happening of vorticity equation.

The second characteristic of turbulence is the diffusivity. That is the increased homogenization (mixing) of the fluid during the turbulence. This can be explained by the singularity formation in the vorticity equation with a vortex.

Based on Biot-Savart law for fluid mechanics:

$$v(x,t) = \frac{1}{4\pi} \int \frac{x-y}{|x-y|^3} \times w(y) d^3 y$$

We put this into the right side of vorticity equation, and the equation becomes:

$$\frac{Dw}{Dt} = \left[\iint \nabla K(x-y) w(y) dy \right] w$$

We can see there is a singular integral operator acting on vorticity. That is saying vortex formation is related to the formation of singular point. When fluid is moving into the center of the vortex due to this singularity, the diffusivity of turbulence can be explained. If we consider Navier-Stokes equation with

viscosity term, it can prevent vorticity equation generation as well as the singularity formation.

The third important characteristic of turbulence is irregularity. This can be explained by shock wave generation from Euler equation. Based on Euler equation, we can get the shock (jump) condition called Rankine-Hugoniot condition:

$$[\rho Vx] = \rho 1 V 1 x - \rho 2 V 2 x = 0$$

$$\left[\frac{1}{2}V_x^2 + E\right] = 0$$

$$[p + \rho V_x^2] = 0$$

Because the discontinuity characteristic of shock wave from Euler equation, we can predict the turbulence from Euler equation is irregular. For example, the tangential discontinuation (instability) can be derived from Euler equation:

We let the pressure:

$$p = f(z)e^{i(kx - \omega t)}$$

We can get:

$$\omega = kv\frac{\rho 1 \mp i\sqrt{\rho 1 \rho 2}}{\rho 1 + \rho 2}$$

The presence of the imaginary unit I means the instability of the fluid. (Fluid Mechanics, Lifshitz & Landau). If we consider the viscosity term, then the instability will be reduced. Thus, we can get the three key characteristics of turbulence from Euler equation. Based on the Rankine-Hugoniot condition, we can explain several instability phenomenons. Rayleigh-Taylor instability is due to two fluids with different density. Richtmyer-Meshkov instability occurs when an interface between fluids of different density is impulsively accelerated by the passage of shock waves. Kelvin-Helmholtz instability occurs when there is a velocity difference across the interface between two fluids. Saffman-Taylor instability is also due to different density of two fluids. Rayleigh-Benard convection is due to the difference of thermal energy between interfaces. Finally, electrothermal instability is due to elevated heat energy(temperature). Thus, mechanism of turbulence phenomenon is clearer now.

Godel Incomplete principle

Godel proved that any math system consisting Peano axiom must be incomplete. Stephen Hawking used his theory to explain that there is no theory of everything. However, I propose here that the incomplete is from the initial of the Peano axiom. Thus, there is still theory of everything.

The Peano axiom gives the definition of natural numbers. It has five axioms: 1. 0 is a natural number 2.for any natural number a, there is a successor a' and a' is also a natural number 3. If natural number b,c 's successor number is a, then b=c 4. 0 is not any successor number of any natural number 5.any proof shows correct for natural number 1, and it is also true for natural number n, then it is also true for n'.

The problem related this is about 1+1. If we treat 1 as an individual, then 1+1 will become nonsense. If we use the definition of 1 as a class according to the rule of symbolic logic, then 1+1 will become 1 but not the result 2 due to Peano axiom. If we also look at Banach-Tarski paradox says a ball can decompose into two balls, we also see 1+1=1. Thus, the initial step already causes the incompleteness. Thus, Godel's incompleteness is originated from the initial of Peano axiom. We can remember that the Adam-Eve matter-antimatter in the beginning of universe. The two stones should be made by two identical rays. Thus, 1+1=2 needs to be defined in the early beginning universe. And, the "define" and the existence of the two stones are the early-most situation of our universe that we cannot derive further.

Summary

In conclusion, this book provides many important theories about physics, chemistry, biology, geosciences, and economics. I think these theories are very interesting and powerful. A lot of these theories are from logical deduction and previous experiment observation. Further confirmations are very welcome to prove these theories. I sincerely hope these theories can contribute a lot to the human beings, especially the earthquake theory. If the new earthquake theory can lead to a successful earthquake prediction, it can potentially save a great amount of human life loss. In the past 10 years, it is estimated that 750 thousands human being were killed by earthquake and the earthquake related sequel such as tsunami. If dear readers think my theories are correct, please help me to advocate these theories. Me myself cannot do this

thing by my own self alone. This is really emergent and important! Thus, the author sincerely wishes these new science and BELIEFS can be really helpful for the new bright future of our earth.

Appendix: Revision History

This book was originally published on January 22, 2012. Originally, it has totally 287 pages with six parts: physics, chemistry, geosciences, biology, economics, and philosophy. Majority of the book content was finished on January 22, 2012. Then, there were several minor modification during 2011 and 2012. On 2011/01/24, a modification about no gravitospinnism wave and gravitospinnism Ampere's law was made. On 2011/08/30, modifications about the discrepancy of quantum mechanics and special relativity and about the nebula protoplanetary disk formation were made. In addition, Higgs particle mediated pair production is also added. On 2011/09/27, proton-neutron nucleus model was added. Besides, earthquake theories including mantle convection problem, sunken ocean crust, foreshock/aftershock, and observation of seismic

wave were added. On 2011/10/01, I had a comment that the torsion tensor formula is equal to electric and magnetic field mathematic formula. On 2011/10/08, I modified the total orbiting energy of electron in atom model. On 2011/10/10, I explain the origin of chemical polarity such as NaCl chemical. On 2011/10/13, I modified and added a paragraph about Two-Four force and explained that lightity is mainly repulsive. On 2011/11/02, I explain the symmetry of E*t, X*P, and L*θ. I also tried to deduct the spin angular momentum of sphere. However, that deduction is wrong and I provide new deduction in later modification. On 2011/12/20, I modified the part in theories of everything in philosophy. On 2011/12/21, I deleted the original deduction for electron's magnetic moment RQV by using 3V concept. I also added Yang-Mills equation in the text. On 2012/02/10, I modified the philosophy part. On 2012/02/12, I added the superconductive BCS theory. On 2012/02/18, I delete the part that mass could cause intrinsic spin. On 2012/03/01, I removed theories of everything in philosophy. I also deduct that photon is spinning in lightspeed and there is no imaginary time. On

2012/03/02, I deducted that there is no Hawking radiation in Schwartzchild blackhole. In addition, I provided the figure of H2 atom binding. On 2012/03/03, I explained why galaxy started to spin. On 2012/03/22, I added the part of neo-Lamarckism diuse and inbreeding proof. On 2012/04/02, I added the comments on woolly mammoth and Neanderthals. On 2012/04/03, I added the origin of Milankovitch cycle due to spinity and gravity. On 2012/04/10, I modified that neutrons and protons are rotating in the same direction in atomic nucleus, and there generate opposite magnetic moment. On 2012/07/18, I modified the deduction of electron's magnetic moment and solid sphere's angular momentum. In addition, I added the part of theories of everything in mathematics(detail insight of higgs mechanism). On 2012/07/30, I provide detailed theory for spiral galaxy formation. On 2012/08/06, I add paragraph of acid-base mechanism and ion solution as well as the characteristics of elements. On 2012/08/16, I explain why mass always has radiation. On 2012/09/18, I explain the relation between light refraction and general relativity. On 2012/09/24, I add the section of

Navier-Stokes and Euler equations. On 2012/10/05, I proposed modified Staudinger's law. On 2012/10/10, I modified light pressure-spacetime equation and opposed hyperconjugation theory. On 2012/12/12, I proposed the detailed relation between charge, hypercharge, and isospin. On 2013/02/07, I proposed the linear frame dragging force: impulsity(impelity). On 2013/02/12, I used bird attack and synchronous satellites to provide evidences for impelity. On 2013/5/14, I added the field/potential formula for momentity. On 2013/5/19, I changed to non-linear gravitomementity equation and provided sugar-lipid codes. On 2013/06/07, I renamed impulsity to impelity and explained Bertrand theorem. On 2013/09/10, I used moon's orbiting earth to explain impelity. On 2013/09/23, I proposed the relation of thermal conduction coefficient and thermal expansion coefficient. On 2013/09/30, I tried to explain Tully-Fisher relationship. On 2013/10/06, I provided the relation between thermal conduction/expansion coefficient and heat capacity. On 2013/10/21, I used twin paradox and light pressure-spacetime formula to deduct that time will be near eternity in the final of

universe. On 2013/11/06, I adjusted flight principle and explained why heat is the common final pathway of all other energy. On 2013/11/13, I used time reversal to explain why anti-matter cannot exist long in universe. On 2013/11/19, I explained conscious/subconscious neurology basis. On 2013/12/12, I provided explanation of dissociation. On 2013/12/25, I explain the link of Maxwell demon and life organism. On 2014/01/25, I changed to use Unruh effect to derive Hubble law and dark energy. On 2014/02/02, I explained comic radiation anisotrophy, proton spin crisis, origin of meson, socio biology(origin of ethics), strong CP problem, neutrino mass, sonoluminescence, supernovae formation problem. On 2014/02/08, I explained the characteristics of nuclear force(pion)(tensor/spin components). On 2014/02/12, I proposed that light is electromagnetic wave as well as gravitational wave. On 2014/02/22, I proposed that there is smallest unit space-planck volume for spacetime discontinuity. I also derive the relation of light's gravity field with its angular frequency. On 2014/3/2, I proposed the definition of time is the inverse of unit space simple harmonic oscillation. I

explained principle of special relativity and light frequency can decide time by affecting unit space oscillation. From 2014/3/2 to 2014/3/5, I proposed grand unified field theory (GUTs) to link electric field, magnetic field, gravity field(acceleration), momentity field(linear momentum/angular momentum), and heat/temperature field as well as light expression in one equation by linking Larmor formula to Stefan's law. I used Yukawa fields to incooperate the above equation with strong and weak interaction as well as Higgs and mesons. Fermion-Boson radiation can also be explained by this formula. On 2014/3/10, I proposed protein world hypothesis to explain the origin of homochiralty. I explained the link of dissipative system and the origin of life. On 2014/03/20, I used wave equation to derive light as gravity wave. Besides, the electromagnetic wave equation is actually equal to the form of gravity wave. On 2014/04/01, I proposed that transposon is the key evolution component for driving new species formation by making new chromosomes. I also provided the detailed mechanism for gg gluon to acquire mass after strong-light interaction. On 2014/04/08, I try to use unit space arrangement to

explain spacetime curvature and torsion, and I also explain to solve the black hole information lost paradox. On 2014/04/11, I provide detailed explanations why light wave is also gravitational wave.