Birth and end of universe & Grand Unified Theories

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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) 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 was happening in the beginning of universe.

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 smallest possible 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 and generated a smallest primodial black hole. Then , the black hole evaporated and was called 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.

First of all, there were two opposite light wave with Planck frequency to produce a couple of Planck mass-charge matter-antimatter pair via pair production inside a smallest possible space with Planck volume scale. This initial process was called “creation” or “Tai-Chi”. Before the creation or Tai-Chi was Wu-Ji.

$$2hf_p = 2M_pc^2$$

The formula of Planck mass is:

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

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

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

Thus,

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

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

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

We can say the Planck particle "Adam" has positive Qp and antiparticle "Eve" has negative Qp. It is worth noting that Schwarzschild metric was used because the negative and positive Planck charges cancelled each other and the spin up and spin down Planck mass-charge also cancelled each other with no roles of charges and angular momentum.

In addition, the minimal possible new Planck length (Path length of space unit SHM) is the diameter of the Planck mass:

$$L_h = \frac{\mathrm{h'}}{\mathrm{mc}} = \sqrt{\frac{2\mathrm{h's}}{\mathrm{c}}} = 3.232 * 10^{-35}\mathrm{meter}$$

Because Planck mass is the smallest mass to produce black hole in the Planck volume, the smallest primodial black hole was formed. This black hole was called "snake" or "chaos". Then, black hole evaporated and the energy was transformed to heat and temperature. During this epoch, many annihilation and pair production happened to produce multiple bosons and fermions as well.

$$2\mathrm{Mp} * \mathrm{c}^2 = \mathrm{K} * \mathrm{Tp}$$

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

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

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

$$\mathrm{t_h} = \frac{L_h}{\mathrm{c}} = \sqrt{\frac{2\mathrm{h's}}{\mathrm{c}^3}} = 1.8 * 10^{-43}\mathrm{sec}$$

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. 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 $x=2\pi r$.

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.

In addition, the second term of Einstein-Stern formula is considered to be vacuum energy or zero point energy. The vacuum energy was estimated to be 10^{-9} joules. It is interesting that the Higgs field may contribute to the vacuum energy. The mass of

Higgs boson is around 125 Gev/c^2. If it is transformed into energy, it will also be about 10^{-9} joules. Thus, zero point energy could be the Higgs fields in vacuum.

Fate 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).

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

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

Combing the above two formula:

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

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:

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

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:

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

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

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

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.

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

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. We re-arrange the above formula and get:

$$KT = \sqrt{160\pi h'c\varepsilon} * V$$

In addition, the planck charge is:

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

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

$$KT \propto Q_p * V$$

There is a direct relation between absolute temperature and electric potential(voltage). It means that electric potential and temperature can be mutually transformed. 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 five fields(gravity field, spinity field, electric field, magnetic field, and heat 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=1/2ωs). So, we can also put magnetic field and spinity field into the above equation. Thus, we can link the temperature field(heat field) in the right side to the gravity field, spinity field(angular 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 & s) with the Stefan's law σT^4.

$$\text{BxExAxS} = \frac{3\sigma T^4}{\varepsilon\left(r^3/R^3\right)t} = \pi H c^2 = \frac{1}{2}Lc^2$$

Gravity field：

$$A = \frac{-GM}{r^2}\hat{r}$$

Spinity field：

$$S = \frac{SJ}{r^2} \times \hat{r}$$

Electric field：

$$E = \frac{KQ}{r^2}\hat{r}$$

Magnetic field：

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

Heat field：

$$H = \frac{kT}{\frac{4}{3}\pi r^3 * t}\hat{r}$$

Light field：

$$L = \frac{hf}{\frac{4}{3}\pi r^3 * t}\hat{r}$$

Light and heat are transformed by Unruh effect. Vaccum impediance z is equal to 120π. 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 spinity field which can make a photon. This equation can also explain the mutual transformation between light and heat. Fire, originally thought as fierce oxgenization, could be the form of vigorous heat-light transformation based on the above equation.

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.

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:

$$\mathrm{Ruv=K}(\rho \mathrm{UuUv} - \mathrm{pg_{uv}})$$

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!

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'=γdt (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.