The New Concepts to Big Bang and to Black Holes: Both Had No Singularity at All

====Part 2: Our Universe Didn't Come From Singularity====

《Our Universe Was Originated From Planck Era, Not From Singularity Or The Big Bang Of Singularity . Just The Birth And Combinations Of Very Large Amount Of Minimum BHs $M_{bm} = m_p = 1.09\times10^{-5}$g Created Our Universe And Its Continuous Expansion Until The Present.》

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【Abstract】。 In this article, based on some general laws of astronomy, physics and many classical theories, the calculated results can prove that our present expansive Universe was impossibly born from Singularity or from the Big Bang of Singularity but from the Big Crunch of pre-universe in Plank Era. According to the principle of time symmetry, suppose before the birth of our universe, there could be a final Big Crunch of pre-universe. Once the final Big Crunch of pre-universe reached to Planck Era, i.e. time $t \leq [k_1 (2G\kappa)/C^5]^{2/3}$ (3c), $t = -0.5563\times 10^{-43}$s and temperature $T = 0.734\times10^{32}$k, every Planck particle (m_p) simultaneously reached 3 states: 1. Reached Planck Era; 2. The gravitational linkage between the closest particles broke off and the collapse stopped at the state of no gravity; 3. Every particle (m_p) at that moment would exactly become a minimum gravitational black hole ($M_{bm} = m_p = 1.09\times10^{-5}$g)。 Just those 3 states could effectively stop pre-universe continuously collapse to singularity, and let all M_{bm} explode in Planck Era. The strongest explosions of every M_{bm} in whole pre-universe synchronously formed a so-called the Big Bang. After that, the new and bigger $M_{bmn} = 2M_{bm}$ of longer lifetime could certainly occurrence due to decrease in density and temperature caused by the Big Bang. Newborn $2M_{bm}$ became the embryos of our present universe. It was the process of genesis of our present Universe. The collisions and combinations of all newborn $M_{bmn} = 2M_{bm}$ would create an "Original Inflation", and form the present expansion of our universe. The whole process changed from the disappearance of old pre-universe to the genesis of new universe in Plank's Era was not reversible. Other important conclusions got in this article are those: Our universe has been a real universal black hole (UBH), which accords with all laws of general black holes (BH); Hubble law is just the expansive law of our universe to plunder energy-matters outside; the new and simple explanations and demonstrations to " Original Inflation", etc.

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【1】。The Laws and formulas of Our Universal Evolution.

The laws of our universal evolution can be simply and precisely described by two different methods, which are based on the achievements of modern physics and astro-cosmology. [3][4][2]

First, Figure 1 specifies the numerical values of time (t) corresponding to Temperature (T) at different time in our universe's evolution.[3][4][2]

Second, Formulas (1a) below precisely describes our universe's evolution relevant from the Big Bang to Radiation Era in Figure (1), (from $t = 10^{-43}$ s to $t = 1/3\times10^6$ years). [3][4][2]

$$Tt^{1/2} = k_1,\ ^{[4][3]},\ R = k_2t^{1/2},\ RT = k_3,\ R = k_4\lambda \qquad (1a)$$

t—Characteristic Expansion Time, T—Temperature of Radiations, R— Characteristic Size or Dimension of the Universe, λ--Wavelength of Radiation, k_1, k_2, k_3, k_4—Constants,

Formula (1b) below precisely describes our universe's evolution relevant within the Matter-Dominated Era in Figure 1, (from $t = 1/3 \times 10^6$ years to the present).[3][4][2]

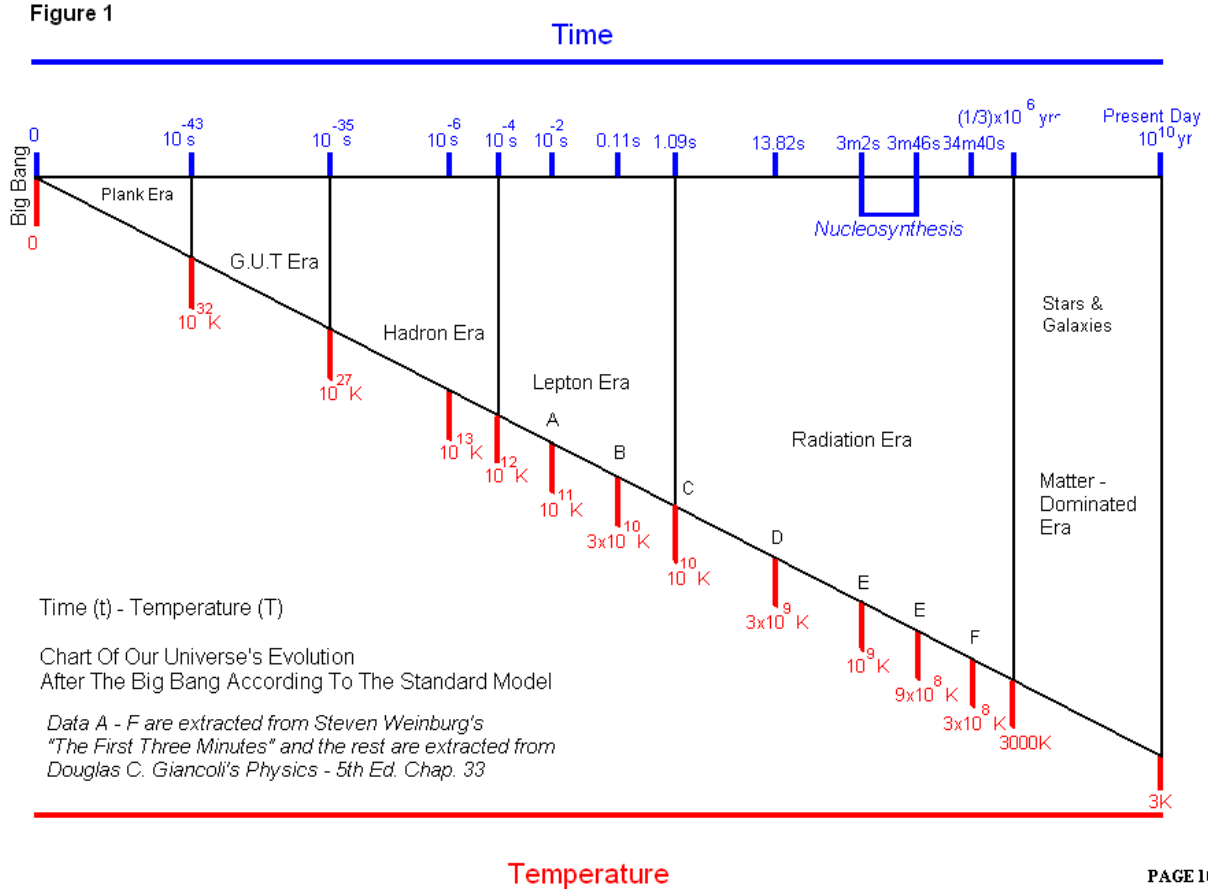
$$Tt^{2/3} = k_6,^{[4]\,[3]} \quad R = k_7 t^{2/3},\ RT = k_8,\ R = k_9 \lambda \qquad (1b)$$

k_6, k_7, k_8, k_9 – Constants

$R = k_2 t^{1/2}$ in Formulas (1a) and $R = k_7 t^{2/3}$ in (1b) conform to cosmological principle, Newton's Mechanics and modern observations.

Right now, it has not been known all problems in Planck Era on the top of Figure 1 below by modern sciences, such as the micro structure, physical states and characters, the genesis of our universe in that Era. This article will describe and prove the mechanism of our universe born out from Planck Era.

Figure 1



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For example, in Matter-Dominated Era, the numerical values below calculated out from Formula (1b) accord with the values on Figure 1 above。

$$R_1/R_2 = (t_1/t_2)^{2/3},\ ^{[3][4][6]}\ R_1T_1 = R_2T_2,\ R_1/R_2 = \lambda_1/\lambda_2,$$

When $t_1 = (13 \times 10^9$yrs) to $t_2 = (4.0 \times 10^5$ yrs), $t_1/t_2 \approx 32{,}500$, $(t_1/t_2)^{2/3} \approx 1{,}000$

$R_1/R_2 = (12 \times 10^{27}$cm) / $(12 \times 10^{24}$cm) $\approx 1{,}000$

$T_1/T_2 = 3K / 3{,}000K \approx 1/1{,}000$, $\lambda_1/\lambda_2 = 0.1$cm / 10^{-2}cm $\approx 1{,}000$,

From the beginnings of the Matter-Dominated Era to the present, the numerical values show that, as time (t) in the universal evolution enlarged 32,500 times, its size (R) enlarged 1,000 times, its radiant temperature (T) decreased 1,000 times, and wavelength (λ) of radiation increased in 1,000 times. The results above are consistent with the modern observations and MBR (Microwave Background Radiation).

【2】. About some essential natures and laws of black holes (BH), They must be obeyed by our universal black holes (UBH). [1] (see Part 1—<black holes> of this article in detail about the essential attributes of BHs)

1*. The minimum BH-- M_{bm}: According to Hawking radiation law of BHs and Schwarzschild special solution to GTRE and other classical formulas, the relationship of many physical parameters on the event horizon (EH) of BHs can be got as below: M_b –- mass of a BH, T_b –- temperature on EH of BH, m_{ss} –-mass of Hawking quantum radiation (HQR) on BH, R_b –- EH of a BH, h—Planck constant = $6.63\times10^{-27}g_*cm^2/s$, C –-light speed =$3\times10^{10}$cm/s,, G –-gravitational constant = $6.67\times10^{-8}cm^3/s^2{}_*g$, Bolzmann constant $\kappa = 1.38\times10^{-16}g_*cm^2/s^2{}_*k$, m_p –- Planck participle, L_p ---Planck length, T_p ---Planck temperature,

Hawking temperature formula on the event horizon (EH) of BH,

$$T_b = (C^3/4GM_b)\times(h/2\pi\kappa) \approx 10^{27}/M_b, \text{ [2]} \qquad (2a)$$

Formula of energy transformation (i.e. gravitational energy can transfer into radiation energy through valve temperature) on EH of BH,

$$m_{ss} = \kappa T_b/C^2 \text{ [3]} \qquad (2b)$$

According to Schwarzschild special solution to GTRE,

$$GM_b/R_b = C^2/2 \text{ [1][2]} \qquad (2c)$$

From (2a) and (2b),

$$m_{ss}M_b = hC/8\pi G = 1.187\times10^{-10}g^2 \qquad (2d)$$

Formula (2d) is a general law effective on any EH of BHs. Furthermore, according to axiom of any part ≦the whole, m_{ss} is impossible > M_b, at the limited condition, the maximum m_{ss} = the minimum M_b, so, M_{bm} –minimum BH,

$$m_{ss} = M_{bm} = (hC/8\pi G)^{1/2} = 1.09\times10^{-5}g \text{ [1]} \qquad (2e)$$

Owing to $(hC/8\pi G)^{1/2} \equiv m_p$, [1][6] so,

$$m_{ss} = M_{bm} = (hC/8\pi G)^{1/2} \equiv m_p \equiv 1.09\times10^{-5}g. \qquad (2f)$$

$$R_{bm} \equiv L_p \text{ [6]} \equiv (Gh/2\pi C^3)^{1/2} \equiv 1.61\times10^{-33}cm \qquad (2g)$$

$$T_{bm} \equiv T_p \text{ [6]} \equiv 0.71\times10^{32}k \qquad (2h)$$

$$R_{bm}m_{ss} = h/(4\pi C) = 1.0557\times10^{-37}cmg \qquad (2i)$$

The best important conclusion: When a BH could get into the gravitational collapse because of emitting Hawking quantum radiations (HQR) after engulfing all energy-matters outside, it would continuously shrink its size R_b, lose mass M_b , increase in T_b, and m_{ss} finally become a perfect minimum BH-- M_{bm} equal to Planck particle--m_p, so, $M_{bm} = m_{ss} = (hC/8\pi G)^{1/2} \equiv m_p$, and explode and disappear in Planck Era,

2*. From formula (2l) below, an essential nature of BHs is that, once a BH was formed, no matter whether it absorbs in or radiates out energy-matters, or collides with other BHs, it will only be a BH forever until it finally contracts to a minimum BH— $M_{bm} \equiv m_p$. In other words, every BH to its owning , losing out and taking in energy-matters knows very clearly, and the event horizon (EH) as a precise recorder can revise its size at any moment as to suit the change of energy-matters in BH.

$$2GM_b = C^2R_b \qquad (2c)$$

$$2GdM_b = C^2dR_b \qquad (2j)$$

If there is another BH—M_{ba} to collide or combine with M_b, so,

$$2GM_{ba} = C^2R_{ba} \qquad (2k)$$

Formulas (2j) + (2k) + (2c), then,

$$2G(M_b + dM_b + M_{ba}) = C^2(R_b + dR_b + R_{ba}) \qquad (2l)$$

3*. The reasons of $M_{bm} \equiv m_p$ must explode, disintegrate and disappear in Planck Era.

Owing to once $M_{bm} < (hC/8\pi G)^{1/2} \equiv m_p \equiv 1.09\times10^{-5}g$, its $m_{ss} < 1.09\times10^{-5}g$, so, $m_{ss}M_b < hC/8\pi G < 1.187\times10^{-10}g^2$, it violates formula (2d), which is the general law of BHs.

Furthermore, according to Uncertainty Principle,

$\Delta E \times \Delta t \approx h/2\pi$ (2m)

To M_{bm}, $\Delta E = M_{bm} C^2 = \kappa T_b = 10^{16}$erg,

Δt = Compton time = $R_{bm}/C = 1.61\times10^{-33}/3\times10^{10} = 0.537\times10^{-43}$.

$\Delta E \times \Delta t = 10^{16} \times 0.537\times10^{-43} = 0.537\times10^{-27}$, but $h/2\pi = 6.63\times10^{-27}/2\pi = 1.06\times10^{-27}$,

Obviously, $\Delta E \times \Delta t < h/2\pi$, it violates Uncertainty Principle. Thus, M_{bm} could impossibly exist, but only disintegrate and vanish in Planck Era, so, it has no way to contract to singularity.

【3】。The Transitive Condition Occurred from Big Crunch of Pre-universe to Big Expansion of Present Universe. Based on the principle of time symmetry, suppose the final collapse of pre-universe obeyed the same expansive law of our newborn universe.

From formulas (1a), (2b), $R = k_2 t^{1/2}$, when pre-universe contracted its size (R) to the Big Crunch, correspondingly its Temperature (T) would increase, and its time (t) would too much shorten. At an extreme circumstance, when (R) contracted to such an infinitesimal dimension, the real distance between two neighboring particles would finally become greater than the product of (C) (light speed) multiplied by time 2(t). It shows that there would not be time enough to transmit the gravity between neighboring particles. At that moment, all adjacent particles had to instantaneously break off the linkage of gravitational forces and lead the pre-universe to stop contraction and disintegration. No gravity between particles could certainly stop the contraction of particles. Thus, the pre-universe would change its state from the Big Crunch to the Big Expansion caused by the explosions of all $M_{bm} = m_p$ in "universal package". The strongest explosions of all $M_{bm} = m_p$ may be called "the Big Bang" in this article. After that, owing to decrease in density and temperature because of the explosions of old M_{bm}, the new $M_{bmn}=2M_{bm}$ could certainly be formed and become the embryos of our present universe. The combinations of newborn M_{bmn} created the "Original Inflation" at the genesis of our universe and the present universal expansion. That is the simple process of the birth of our present universe. Such a process is different with the Big Bang at an infinitesimal explosive point of Singularity known by most people. Of course, the detailed process of changing states should be extremely complicated in Planck Era.

The transitive condition occurred from the Big Crunch of pre-universe to the Big Expansion of the present universe is demonstrated by Formula (3) below.

$d_m \geqslant C\times[2t]$, i. e. $d_m/2C \geqslant t$, $-t \leq -d_m/2C$, $t = r/C$ (3)

t – Characteristic Expansion Time, d_m – Distance between two closest particles, C – Light Speed = 3×10^{10} cm/s,

Let ρ = energy-matter density g/cm^3, $M = 4\pi\rho R^3/3$, (3aa)

H = Hubble's Constant, $H = V/R = 1/t$,

From $4\pi\rho r^3/3 = m$, and $m = \kappa T/C^2$, [3] (2b)

$\therefore\ t^3 \leq 3\kappa T/4\pi\rho C^5$ (3a)

From $\rho = 3H^2/8\pi G = 3/(8\pi G t^2)$, [3] (3ba)

$\therefore\ t \leq T(2G\kappa)/(C^5)$, (3b)

From (1a), $Tt^{1/2} = k_1$ (3ca)

$\therefore\ t^{3/2} \leq k_1 (2G\kappa)/C^5$, or $t \leq [k_1 (2G\kappa)/C^5]^{2/3}$ (3c)

Formulas (3a), (3b), (3c) are all derived from Formula (3), and have the same value of (t).

Now the numerical value of (t) can be calculated as below. First, select two corresponding values (t) and (T) from Figure 1 into formula (1a) to get value of k_1, such as take $t = 10^{-43}$ s, and corresponding to $T = 10^{32}$K, from Figure 1, so,

$k_1 = Tt^{1/2} = 10^{32}\times10^{-43}s = 3^{1/2}\times10^{10} \approx 1.732\times10^{10}$, and from formula (3c),

$t^{3/2} \leq [(2G\kappa)/(C^5)]\times k_1 = 1.732\times10^{10}[(2G\kappa)/(C^5$, (3cb)

$G = 6.67\times10^{-8}cm^3/gs^2$, $C = 3\times10^{10}$cm/s, $\kappa = 1.38\times10^{-16}$gcm/s^{2}K„

$t^{3/2} \leq [(2\times6.67\times10^{-8} \times1.38\times10^{-16}) / (3\times10^{10})^5] \times 1.732\times 10^{10})] = 0.075758\times10^{-74}\times 1.732\times10^{10} \approx$

0.1312×10^{-64},

$t^3 = 0.017217\times10^{-128} = 0.17217\times10^{-129}$, now let $t = t_m$ below for convenient calculations,,

$t_m = 0.5563\times10^{-43}$s, (3d)

$\therefore\ t_m \le 0.5563\times10^{-43}$s, and $t_m \ge 0.5563\times(-10^{-43})$ s, (3d)

Let $t = t_m$ be the disintegrated time of all particles m_m and pre-universe. Correspondingly,

$T_m=k_1/t^{1/2} =1.732\times10^{10}/(0.5563\times10^{-43})^{1/2}= 0.734\times10^{32}$K, (3e)

mass of a particle m_m corresponding to above temperature 0.734×10^{32}K:

$m_m=\kappa T/C^2=1.38\times10^{-16}\times0.734\times10^{32}/(9\times10^{20})=1.125\times10^{-5}$g, (3f)

$\rho = 3/(8\pi Gt^2) = 0.5786\times10^{93}$g/cm^3, (3g)

From formula (3aa), the radius r_m of m_m,

$r_m = (3m/4\pi\rho)^{1/3} =1.67\times10^{-33}$cm, (3h)

$d_m = C\times[2t] = 3.34\times10^{-33}$cm, $d_m \ge 2r_m$ ($=3.34\times10^{-33}$cm) (3i)

$\therefore\ (d_m \ge 2r_m)$ (3j)

(3j) shows that, the gravitational links between two adjacent particles were surely broken,

The density ρ_u of the "universal package" formed by infinite particles m_m,

$\rho_u = m_m/d_m^3 =0.302\times10^{93}$g/cm^3 (3k)

($\rho_u < \rho$) shows that, the density of pre-universe had a little decrease due to particles m_m disintegrated in whole "universal package".

$m_m C^2 =1.125\times10^{-5}\times9\times10^{20} = 1.013\times10^{16}$, and $\kappa T = 1.38\times10^{-16}\times0.734\times10^{32} = 1.013\times10^{16}$

$n_m = m_m C^2/\kappa T = 1$ (3l)

Formula (3l) indicates that, in the "universal package", the Crunched every particle m_m was a whole particle of no contracting forces inside. In addition, they were the broken gravitational links between adjacent particles m_m outside. Thus, the only way for all particles m_m of pre-universe could be only disintegrated into powders with pre-universe together at the highest temperature of 0.734×10^{32}K in "universal package",

Conclusions: The calculated values of ($t \le 0.5563\times10^{-43}$s, $T = 0.734\times10^{32}$K) are almost equal to the beginning values of Planck Era in figure 1. It is said, once the Big Crunch of pre-universe collapsed into particles of above calculated values of ($m_m=1.125\times10^{-5}$g, $r_m=1.67\times10^{-33}$cm, $T_m = 0.734\times10^{32}$K), pre-universe reached Planck Era and all particles $m_m = m_p = M_{bm} = 1.09\times10^{-5}$g. No gravity is equal to no power for contractions of particles, so, all m_m could only be disintegrated into rays of the highest energy. and then $T_m \approx 10^{32}$ k become the highest temperature in Universe. With no gravity, the only way for the pre-universe and for all particles m_m had to stop their contraction and then started the expansion. Thus, pre-universe could only disappear in Planck Era, but have no way continuously to collapse to singularity.

Between $t = -10^{-43}$ s and $t = +10^{-43}$ s, there might be appearance of time (t = 0). However, time (t = 0) does not signify the presence of Singularity of infinite density at all, since at the virtual point of (t = 0), the temperature $T \approx 10^{32}$ k, T was not infinity. The density $\rho \approx 10^{92}$g/cm$^3 \ne 0$, and the actual radius of universe $R \ne 0$. So, the virtual point of (t = 0) was just a bridge from contracted state ($t = -10^{-43}$ s, +R) into expanded state ($t = +10^{-43}$ s, +R). Above viewpoints let the universal evolution accord with the law of causality and the second law of thermodynamics as well as all classical theories and laws.

Owing to that, the "universal package" was formed by all particles m_m, their simultaneous disintegrations and explosions in Planck Era could certainly lead the disappearance of pre-universe as well as the space expansion and decrease in density inside. Probably, if people used to consider that, there must be a Big Bang as the genesis of our universe, then, the explosions of all above m_m and the disappearance of pre-universe might be called the "Big Bang" creating our present universe in this article. As the result, in the sealed "universal package", the tiny powders of the highest energy caused by exploded m_m had infinite opportunity to re-collide and re-combine into new particles and new minimum black holes (M_{bmn}). The presences of a large amount of new M_{bmn}

could become the embryos of our new universe, their combinations created "Original Inflation" and our present expansive universe.

【4】..Minimum Gravitational (Schwarzschild) Black Hole (M_{bm}), Planck particles m_p and particles m_m above were all the perfect same thing, they came from final collapse of pre-universe. Formulas (4a) , (4b), (4c) and (4d) come from formulas (1f), (1g), (1h) and (1i). [1]

$$m_{ss} = M_{bm} = (hC/8\pi G)^{1/2} \equiv m_p \equiv 1.09\times 10^{-5}g. \quad (4a)$$

$$R_{bm} \equiv L_p^{[3]} \equiv (Gh/2\pi C^3)^{1/2} \equiv 1.61\times 10^{-33}cm \quad (4b)$$

$$T_{bm} \equiv T_p^{[3]} \equiv 0.71\times 10^{32}k \quad (4c)$$

$$R_{bm}m_{ss} = h/(4\pi C) \quad (4d)$$

Let's compare the numerical values between M_{bm}, m_p and m_m. m_m was particle of the final collapse of pre-universe in the state of no gravitational linkages between any two adjacent particles. M_{bm} was the minimum gravitational BHs come from the final collapse of BHs, they would finally become Planck particles m_p, and explode in Planck Era. [1]

Table 1: comparisons of numerical values between M_{bm}, m_p and m_m

m_m of no gravity	M_{bm}–minimum BH	m_p–Planck particles[3]
$m_m = 1.125\times10^{-5}g$	$M_{bm} = 1.09\times10^{-5}g$	$m_p = 1.09\times10^{-5}g$,
$t_m = \pm 0.5563\times10^{-43}s$	$t_{bm} = 0.539\times10^{-43}s$	$t_p = 0.539\times10^{-43}s$,
$T_m = 0.734\times10^{32}k$	$T_{bm} = 0.71\times10^{32}k$	$T_p = 0.71\times10^{32}k$,
$r_m = d_m/2 = 1.67\times10^{-33}cm$	$R_{bm} = 1.61\times10^{-33}cm$	$L_p = 1.61\times10^{-33}cm$,

It can be seen from table 1, the numerical values of m_m have a little tolerance with values of M_{bm} and m_p. The reasons are that, m_m comes from formula (3f), but in the derived process, the numerical values of time t and temperature T got from Figure 1 are not very precise. Thus, in reality, m_m should be completely equal to M_{bm} and m_p. So,

$$m_m \equiv M_{bm} \equiv (hC/8\pi G)^{1/2} \equiv m_p \quad (4e)$$

It can be seen from (4e) that, particles m_m of the final collapse of pre-universe should be the same with minimum BHs--$M_{bm} \equiv m_p$. After m_m became Planck particles m_p, they could explode and disappear in Planck Era at once with the same results of $M_{bm} \equiv m_p$. [1]

【5】. After pre-universe disappeared in Planck Era, how could our universe be born out from Planck Era?

From (4e), once the final collapse of pre-universe came to Planck Era, all particles m_m in "universal package" would become minimum BHs-- $M_{bm} \equiv m_p$, and explode and disappear in Planck Era at once. That explosions could be so-called "the Big Bang" to the genesis of our universe。Energy-matters from pre-universe were the origination forming our universe. It may be said, no death of pre-universe, no energy-matters as the substantial foundation of our new universe.

How could our new universe be born from the ruins of pre-universe in Planck Era? The key problem is that, the waste energy-matters from disintegrated pre-universe could re-gather and re-form to new and stable minimum gravitational (Schwarzschild) BHs-- M_{bmn}.

Once pre-universe finally collapsed into Planck Era, which would have extreme high temperature of 10^{32}k and density of $10^{93}g/cm^3$ in the sealed "universal package" . When all particles $m_m \equiv M_{bm} \equiv m_p$ exploded and formed the Big Bang, it could certainly created the space expansion and lowered the temperature and density of "universal package ".

Acceding to Hawking law (5a) of the lifetime τ_b of BHs due to emitting Hawking quantum radiations (HQR), M_b–mass of a BH, R_b–the event horizon of a BH, t_{bc}–Compton time, which

indicates the necessary time to form a stable BH. The necessary condition to form a new stable minimum BH—M_{bmn} was as below.

$\tau_b = 10^{-27} M_b^3$ (s) (5a)

$t_{bc} = R_b/C$ (5b)

$\tau_b > t_{bc}$, i e. $10^{-27} M_b^3 > R_b/C$, from (2c),

$M_b = M_{bmn} = 2.2\times10^{-5}g$ ($\approx 2 M_{bm}$) (5c)

$T_b = (C^3/4GM_b)\times(h/2\pi\kappa) \approx 10^{27}/M_b = 0.45\times10^{32}k$,

From (5c) above, a $M_{bmn} \geq 2.2\times10^{-5}g \approx 2 M_{bm}$ can be got. It is said, once the new and original $M_{bmn} \geq (2.2\times10^{-5}g \approx 2 M_{bm})$ were formed and occurred, they could impossibly disappear again and only grow up with absorbing energy-matters of very high density outside or combine to other smaller BHs. How could M_{bmn} certainly occur? Owing to decrease in density and temperature in "universal package" occurred from the explosions of all particles $m_m \equiv M_{bm} \equiv m_p$ could lead: 1*. M_{bmn} could easily appear from combinations of two or more $M_{bm} = 1.09\times10^{-5}g$ in Planck Era, because decrease in temperature let M_{bm} have the longer lifetime. 2*. From (2a) above, lower temperature could more easily form the bigger BHs, so, $M_{bmn} \approx 2 M_{bm}$ would inevitably and easily be formed and become the stable embryos of our new universe. 3* 。 Particles smaller than M_{bmn} could grow up bigger and then collapse to M_{bmn} due to absorb energy-matters outside, just as a neutron star absorbs energy-matters enough outside to collapse a BH. 4*. Particles of mass more than M_{bmn} but density lower than M_{bmn} could contract its size to become a real M_{bmn}. 5*. In Planck Era of the highest temperature and density, energy and particles could only nonstop instantly transfer each others,

Once a M_{bmn} was formed, it could nonstop plunder energy-matters of the highest density outside or combine or collide with other M_{bmn}, and create the "Original Inflation". It just was the birth of our new universe. Thus, through expansions of 137×10^8years, the combined M_{bmn} grew up to a gigantic universal black hole (UBH) of 10^{56}g.

Conclusions: The genesis of our universe came from two key and necessary steps. First, the final explosions and disappearance of pre-universe with its all old $M_{bm} = 1.09\times10^{-5}$g in Planck Era provided the needed energy-matters for our universe and decreased in temperature and density in "universal package". Second, the new minimum stable BHs-- $M_{bmn} = 2.2\times10^{-5}$g could be formed to become the embryos of our newborn universe. It must be known, only new minimum stable BHs-- M_{bmn} as the embryos of our newborn universe can nonstop plunder energy-matters outside and lead our universe to grow up bigger and bigger. In a word, no BHs as embryos, no our present gigantic universal BH appears, because only BHs can nonstop plunder energy-matters outside and keep them inside forever. According to the essential nature of BHs stated on above 【2】, once a BH was formed, it would be a BH forever until it finally contracted to become $M_{bm} \equiv m_p$ and vanished in Planck Era.

【6】。Our present universe is a real gigantic universal black hole (UBH) of $M_u = 10^{56}$g. The complete demonstrations are derived as below. The expansion of our universe is the results of collisions and combinations caused by a very large amount of M_{bm} or M_{bmn}.

1*. The real observational numerical values had demonstrated that, our universe is a ball to have various precise and reliable values. A, The real and precise age A_u of our universe is: $A_u = 13.7\times10^9$yrs.[8], then, the event horizon $R_u = C\times A_u = 1.3\times10^{28}$ cm, density $\rho_u = 3/(8\pi GA_u^2) = 0.958 \times 10^{-29}$ g/cm^3. so, the total mass of our universe is $M_u = 8.8\times10^{55}$g. B. Hubble constant is another reliable observational value, $H_o = (0.73\pm0.05) \times 100$kms^{-1}Mpc^{-1} [9], as a result, the density of our universe ρ_r : $\rho_r = 3H_o^2/(8\pi G) \approx 10^{-29}$g/cm^3. The age of our universe is: $A_r^2 = 3/(8\pi G\ \rho_r)$, $A_r = 0.423 \times 10^{18}$s $= (13.4\pm0.67) \times10^8$yrs. The total mass $M_r = 8.6\times10^{55}$g。

Thus, Mass of our universe has a very precisely observational value. For convenient calculations, let $M_u = 8.8\times 10^{55}$g, $A_u = 13.7\times10^9$yrs, $R_u = 1.3\times10^{28}$ cm, $\rho_u = 0.958 \times 10^{-29}$ g/cm^3 below.

2*. If our present universe is a real gigantic universal black hole (UBH), it certainly came from the collisions and combinations of a very large amount of original $\underline{M_{bmn}}$ or $M_{bm} \equiv m_p = 1.09\times10^{-5}$g, its $R_{bm} = 1.61\times 10^{-33}$cm, its $T_{bm} = 0.71\times 10^{32}$k, its HQR $m_{ss} = 1.09\times10^{-5}$g. Let N_{bu} is numbers of our present universe M_u owning M_{bm}, then,

$$N_{bu} = M_u/ M_{bm} = 8.8\times10^{55}/1.09\times10^{-5}=\underline{8.0734\times10^{60}} \quad (6d)$$

If our universe is a real UBH formed from $N_{bu} \times M_{bm}$, then, $N_{bu} = 8\times10^{60}$ should be suitable with the same precise proportion of their event horizon as below (if let M_{bm1} replace M_{bm}, the same result can be got):

$$N_{bu} = R_u/R_{bm} = 1.3\times10^{28}/1.61\times 10^{-33} = \underline{8.075\times10^{60}} \quad (6e)$$

<u>Owing to (6d) = (6e), it demonstrates clearly that, M_u are actually formed from $N_{bu}\times M_{bm}$, and M_u is a real UBH.</u>

3*. The Hubble's law of universal expansion is just the expansive law of our UBH due to plunder energy-matters outside.

Apply Hubble's law to the boundary of our universal ball,

$$M_u = 4\pi\rho_o R_u^3/3 = 4\pi(3H_0^2/8\pi G)C^3 t_u^3/3 = 4\pi(3H_0^2/8\pi G)C^3t_u/3H_0^2 = C^3 t_u/2G = C^2 R_u/2G \quad (6f)$$

From Schwarzschild solution To GTRE, i.e. formula (2c), $2G M_b = C^2 R_b$

$$M_b = R_bC^2/2G = C^3 t_{bu}/2G = R_{bu}C^2/2G \quad (6g)$$

<u>Right now, owing to $M_u = M_b$, $t_u = t_{bu}$, so, $R_{bu} = R_u$,. So, our universe is a real UBH,</u> and the Hubble's law is just the expansive law of our UBH due to plunder energy-matters outside. <u>When might $t_u \neq t_{bu}$? Once our UBH plunder all energy-matters outside in future, it can no more expand, Hubble law will be no longer effective, then, the universal age $t_u >$ Compton time t_{bu} of our UBH.</u>

4*. <u>So-called "Flatness" ($\Omega = \rho_r / \rho_o \approx 1$) of our universe is really just the essential nature of any BHs included our UBH</u>. Our universe as a real UBH is certainly a sealed giant ball. To any BH, the exact amount of ρ_b must correspond to an exact amount of M_u, so, $\Omega = \rho_r / \rho_o = 1$ is a certain result. Therefore, <u>the argument about ($\Omega = \rho_r / \rho_o \approx 1$) in scientists over 50 yrs is really a false proposition.</u>

Owing to the wrong proposition of ($\Omega = \rho_r / \rho_o \neq 1$), it led a lot of scientists to propose some wrong concepts, such as "Seeking lost energy-matters", "zero energy" and "dark energy", etc. It can be seen from formulas (6d) and (6e), <u>Our UBH has not lost any energy-matters at all, , but only has matters not found out.</u>

From now on, if no energy-matters outside to be plundered, our UBH will no more expand, and start to emit HQRs, contract its size very and very slowly. According to Hawking law of lifetime of BHs (5a), the lifetime τ_b of our present universe will be about $\tau_b = 10^{-27} M_b$ (s) $=10^{-27}(8.8\times10^{55})^3 \approx 10^{132}$yrs, due to emitting HQRs to finally become M_{bm} to disappear in Planck Era. If there are energy-matters outside, our UBH will plunder all energy-matters, and then emit HQRs to contract its size. Thus, the lifetime of our UBH will be much longer than 10^{132}yrs until it contracts to M_{bm} and disappears in Planck Era.

【7】。In this paragraph, <u>author propose a newest and simplest principle</u> to calculate the mechanism, process and terminal of <u>"Original Inflation". it caused from "combinations of the newborn minimum BHs--M_{bm}".</u> Once all M_{bm} in our universe M_u were linked together to a "universal package", "Original Inflation" would go to the end, "universal package" had to turn into slower conventional expansion until to the present.

Let t_o be the time needed by all N_{bu} ($=8.8\times10^{60} \approx 10^{61}$) $\times M_{bm}$ linking them together in the "universal package" in the newborn period of our universe, the total mass M_u of our present UBH is $M_u = 8.8\times10^{55}$g, which formed and expanded from original minimum BHs-- $M_{bm} \equiv m_p = 1.09\times10^{-5}$g, i.e. $M_u = N_{bu}\times M_{bm}$. Therefore, after "Original Inflation", our universal expansion was just the completely expansive result of $N_{ub} \times M_{bb2} = 2.2\times10^{40} \times 4\times10^{15}$ (7-4)(7-6) through their combinations of 137×10^8yrs.

For convenient calculations, let $M_{bmn} = M_{bm}$. Now let's know how $N_{bu}\times(M_{bm} \approx 10^{-5}g)$ could combine them together. $R_{bm} = 1.61\times10^{-33}$cm was the event horizon of M_{bm}. Suppose a newborn M_{bm} wanted to combine its adjacent companions in (2 or 3) times t_{bmc}, t_{bmc} is Compton time of M_{bm}, $t_{bmc} = R_{bm}/C = 1.61\times 10^{-33}/3\times10^{10} = 5.37\times10^{-44}$s. In case light (gravity) went through $2\times t_{bmc}$, M_{bm} should link with numbers N_{bm2} of M_{bm}, so,

$$N_{m2} R_{bm}^{\ 3} = (2R_{bm})^3, \quad \therefore \quad N_{m2} = 8 \qquad (7a)$$

Formula (7a) shows, when t_{bmc} prolonged to 2 t_{bmc}, M_{bm} would link with other 8 M_{bm}. How long could M_{bm} link with all $N_{bu} = 8.075\times10^{60}$ of M_u ($=N_{bu} M_{bm}$)?

$$N_{bu} = 8.8\times10^{60} \approx 10^{61} = (8^{67.5}) \qquad (7b)$$

Formula (7b) shows, after original M_{bm} went through $(2^{67.5}) \times t_{bmc}$, all N_{bu} ($=8^{67.5} \approx 10^{61}$)$\times M_{bm}$ would be linked together to become an original "universal package" of M_u. However,

$$(2^{67.5}) \approx (10^{20.3}), \text{ let } n_{o2} = 10^{20.3} \qquad (7c)$$

Now, with the same way to get $N_{m3} = 27$,

$$N_{m3} R_{bm}^{\ 3} = (3R_{bm})^3, \quad \therefore \quad N_{m3} = 27 \qquad (7d)$$

$$N_{bu} = 8.8\times10^{60} \approx 10^{61} = (27^{42.6}), \text{ and } (3^{42.6}) \approx (10^{20.3}), \text{ let } n_{o3} = 10^{20.3},$$

$$\therefore \quad n_o = n_{o2} = n_{o3} \approx (10^{20.3}) \qquad (7e)$$

From formulas (7a) and (7d), regardless how many times t_{bmc} could prolong, the needed time to link all M_{bm} together was the same time-- $n_o \times t_{bmc}$. However, owing to that, the combinations of all M_{bm} certainly created the biggest space expansion, it was just "Original Inflation". According to the essential nature of BHs and formula (2c), in (7a), combinations of 8 same BHs certainly created 8 times space expansion of the event horizon R_{bm}, so, $8 = 2^3$. Under the similar condition, in (7d), $27 = 3^3$. It is said, when time from t_{bmc} prolonged to 2 t_{bmc}, the combined numbers of M_{bm} was not 2^3, but $(2^3)^3 = 2^9$. when time from t_{bmc} prolonged to 3 t_{bmc}, the combined numbers of M_{bm} was 3^9.

Furthermore, with the same way to get a general law of n_o,

$$\text{Let } N_{mn} = n_o^{\ 9}, \text{ and } n_o = 10^{x} \qquad (7f)$$

$$\text{But } N_{bu} \approx 10^{61}, \quad \therefore 10^{61} = 10^{9x} \qquad (7g)$$

$$x_1 = 61/9 = 6.8, \quad \therefore \quad n_{o1} = (10^{6.8}) \qquad (7\text{-}1a)$$

Formula (7-1a) shows , under the condition of "Inflation", t_{bmc} only needed to prolong $n_{o1} = 10^{6.8}$ times to link all M_{bm} tohether. Now, according to same principle of (7-1a) , x_2 and n_{o2} can be got from (7e), it was the condition of "no Inflation", it may be called as "conventional expansion".

$$x_2 = 61/3 = 20.3 \quad \therefore \quad n_{o2} = 10^{20.3} \qquad (7\text{-}1b)$$

$$\therefore n_{o2} = n_{o1}^{\ 3} \quad \text{or} \quad n_{o2} = 10^{13} n_{o1} \qquad (7\text{-}1c)$$

1*。Formulas (7-1a) and (7-1b) indicate that, there could be 2 ways to link all M_{bm} together in M_u, the needed time of 2 ways are all decided by value of M_u.

A. "Original Inflation": t_{o1} was time of the end of "Original Inflation",

$$t_{o1} = t_{bmc}\times n_{o1} = 5.37\times10^{-44}\times10^{6.8} = 0,2\times10^{-36}\text{s} = 2\times10^{-37}\text{s}。 \qquad (7\text{-}2a)$$

B. " conventional expansion": t_{o2} was time of the end of " conventional expansion",

$$t_{o2} = t_{bmc}\times n_{o2} = 5.37\times10^{-44}\times10^{20.3} = 2\times10^{-24}\text{s} \qquad (7\text{-}2b)$$

$$\therefore \ t_{o2}/t_{o1} = n_{o2}/n_{o1} = 2\times10^{-24}/2\times10^{-37} = 10^{13} \qquad (7\text{-}2c)$$

The event horizon R_{bb2} or R_{bb1} of little BHs-- M_{bb2} or M_{bb1} created after time of t_{o2} or t_{o1},

$$R_{bb1} = C\, t_{o1} = 6\times10^{-27}\text{cm} \qquad (7\text{-}3a)$$

$$R_{bb2} = C\, t_{o2} = 6\times10^{-14}\text{cm} \qquad (7\text{-}3b)$$

$$R_{bb2}/R_{bb1} = 10^{13} = t_{o2}/t_{o1} = n_{o2}/n_{o1} = n_{o1}^{\ 2} \qquad (7\text{-}3c)$$

2*. From (7-2a) and (7-2b), the newborn M_{bm} might have 2 ways to link all M_{bm} in M_u together and created 2 kinds of great expansions to become to little BH--M_{bb2} or M_{bb1}, A 。 "Original Inflation": from (7-2a), "Original Inflation" can be considered, the event horizons R_{bb1} of newborn little BHs-- M_{bb1} made the total "Inflation" of n_{o2}/n_{o1} included its conventional expansion, after "Inflation of $t_{o1} = 2\times10^{-37}$s, $R_{bb1}\times n_{o2}/n_{o1}$ turned equal to $R_{bb2} = 6\times10^{-14}$cm, so, 2×10^{-37}s was

the end of "Original Inflation". B。" conventional expansion": Through." conventional expansion" created by the combinations of all M_{bm} to form little BHs-- M_{bb2}, after $t_{o2} = 2\times10^{-24}$s, R_{bb2} of M_{bb2} reached to 6×10^{-14}cm.

Conclusion: Above A and B reached the same results to form $M_{bb2} = M_{bb}$, and $R_{bb2} = R_{bb1}$. The sole difference between both is , "Original Inflation" was prior to "conventional expansion" to form M_{bb1}. M_{bb1} was formed at the end of 2×10^{-37}s, but M_{bb} at the end of 2×10^{-24}s.

3*。The other parameters of M_{bb1} and M_{bb2}; known number; $R_{bb2} = C\,t_{o2} = 6\times10^{-14}$cm,

$M_{bb1} = M_{bb2} = 0.675\times10^{28}$ $R_{bb2} = 4\times10^{15}$ g (7-4)

$\rho_{bb1} = \rho_{bb2} = 3M_{bb2}/(4\pi R_{bb2}^3) = 4.4\times10^{54}$ g/cm^3. (7-5)

At the time of $t_{o1} = 0{,}2\times10^{-36}$s or $t_{o2} = 2\times10^{-24}$s, density ρ_{bb} of M_u was equal to ρ_{bb2} of M_{bb2}, the event horizon R_{ub} of M_u was:

$R_{ub} = (3M_u/4\pi\rho_{bb2})^{1/3} = 2.4$ cm (7-6)

$N_{ub} = M_u/M_{bb2} = 8.8\times10^{55}/4\times10^{15} = 2.2\times10^{40}$

$N_{bbm} = M_{bb2}/M_{bm} = 4\times10^{15}/1.09\times10^{-5} = 4\times10^{20}$ (7-7)

4*。Now, let's study the real conditions of "Original Inflation". According to the information and calculations in paragraph 12.7 of《New Instruction to Astronomy》,[3] from formula (1a) $R = k_1 t^{1/2}$, R is Characteristic Size the Universe, t is Characteristic time, at the time of $t = 10^{-36}$s, the universal size $R_{-36} = 3.8$ cm after "Original Inflation", At that time, the universal density $\rho_{bbb} = 3.8\times10^{53}$g/cm^3, the size R_{-44} of our universe at $t = 5.37\times10^{-44}$.

$R_{-36} = 1.83\times10^{25}\text{cm}\times(10^{-36}\text{s})^{1/2}/(7\times10^5\times3.156\times10^7\ \text{s})^{1/2} = 3.8$ cm [3] (7-8)

$\rho_{bbb} = 3M_u/(4\pi R_{-36}^3) = 3.8\times10^{53}$g/cm^3 [3] (7-9)

$R_{-44} = (3M_u/4\pi\rho_u)^{1/3} = 10^{-13}$ cm (7-10)

$R_{-36}/R_{-44} = 3.8/10^{-13} = 3.8\times10^{13}$ (7-11)

Above numerical values about "Original Inflation" have broad typical case. It pointed out, when $t = 10^{-36}$s, the size R_{-36} of universe increased in 10^{13} times, the volume suddenly rose 10^{40} times。

5*。Conclusions: A。The universal size 3.8 cm in (7-8), and the universal size 2.4 cm got by author in (7-6) are all after "Inflation" of $t = 10^{-36}$s, the numerical values of 3.8 cm and 2.4cm are very approximate. It indicates that, the mechanism, process and terminal of "Original Inflation" proposed by author are all right, i.e. the combinations of all BHs surely created "Original Inflation", which terminal was just all BHs in M_u to be linked together and formed new little BHs—M_{bb1}. B。Owing to "Original Inflation" caused before the universal time of $t = 10^{-32}$s, it might impossibly be observed by mankind forever. If "Original Inflation" before 10^{-36}s would be denied in future, the "conventional expansion" before 10^{-24}s should be recognized. Through calculations in detail in this article, that our universe was come from minimum BHs--M_{bm} should be a convincing proposition. In reality, "conventional expansion" was also a "slower Inflation".

6*。From Figure 1 of page 2, $t_o = 0.2\times10^{-36}$s was in GUT Era。

【8】. Simple Reviews to Our Universe in the past, at present and in future

Our present universe is a gigantic universal black hole (UBH).

The age of our universe is: $A_u = 137\times10^8$years,

Schwarz child's radius of universe: $R_u = 1.3\times10^{28}$ cm,

Density $\rho_u = 3/(8\pi GA_u^2) = 0.958\times10^{-29}$ g/cm^3.

The total mass of our universe is $M_u = 8.8\times10^{55}$g.

If no energy-matters outside, the lifetime of our present universe may be: $L_u \approx 10^{132}$yrs. If there still are energy-matters outside our present universe to be plundered, then, $L_u >> 10^{132}$yrs.

Our universe was born from new $M_{bm} = (hC/8\pi G)^{1/2} \equiv m_p \equiv 1.09\times10^{-5}$g, The expansion of our universe was originated from the combinations of a large amount $N_{bu} = 8\times10^{60}$ of new M_{bm}.

The size of our original Universe of M_u in Planck Era looks like the size of a present proton R_{u0} $=1.54\times10^{-13}$ cm,

The numbers of proton mass of the Universe are; $N_{op}=M_u/m_{proton}=10^{56}/1.67\times10^{-24}\approx 10^{80}$.

After the end of "Original Inflation" at the universal expansive time of 0.2×10^{-36}s, due to all M_{bb} in M_u had linked together, the expansion of our universe was a conventional expansion due to decrease in temperature and density of all ($N_{bb} = 0.33\times10^5$) M_{bb}.

Mankind has exactly lived in the gigantic universal black hole (UBH), a great number of small and big black holes have scattered in the boundless universal space.

【9】. The further explanations, analyses and conclusions:

1*. Singularity is defined a point of infinite density. The conditions of point structure, no resistance (exclusive forces) and universal model of zero pressure in General Theory of Relativity Equation (GTRE) would certainly lead the occurrence of singularity in a contracted ball of definite energy-matters. It was demonstrated from GTRE by S•Hawking and R• Penrose 40 years ago that, our universe was born from singularity or the Big Bang of singularity, and singularity would certainly occur in BHs. In this article, applying Hawking laws about BHs which is based on quantum mechanics and thermodynamics, author has successfully demonstrated and derived out the new and important formula (3c)--$t^{3/2} \le k_1(2G\kappa)/(C^5)$, and calculated out accurately the time (t) of final collapse of pre-universe into Planck Era. Once pre-universe finally collapsed to $t \approx -0.5563\times10^{-43}$s, all particles in pre-universe became minimum BHs of $M_{bm} = (hC/8\pi G)^{1/2} \equiv m_p \equiv 1.09\times 10^{-5}$g, which could prevent pre-universe continuously to collapse to singularity and create new minimum BHs-- M_{bmn}. The new M_{bmn} occurred from Planck Era, would become the embryos of our newborn universe, their combinations created our present expansive universe.

2*. In reality, John & Gribbin pointed out in his book—<Companion To The Cosmos>: "Our universe might originate from such particles-- $M_{bm}\approx10^{-5}$g." [7] " （Planck Era ）was really the state at genesis of our universe."[7] In this article, author may just better demonstrated John & Gribbin's above suppositions with correct Hawking laws about BHs through the more precise calculations.

3*. Our present universe is a real universal BH (UBH), it completely accords with the laws of general BHs. Hubble law better reflects the expansive law of our universe come from the combinations of original M_{bm} and to engulf energy-matters outside.

4*. The "Original Inflation" of our newborn universe was created by the combinations of all adjacent minimum BHs--M_{bm} of our universe. The end of "Original Inflation" was at universal time $t_{bb} = 0.2\times10^{-36}$s. That mechanism of "Original Inflation" is firstly proposed and demonstrated in this article.

5*. Whether our present universe expand or not in future will not be decided by the real density ρ_r, but only be decided by energy-matters outside the present event horizon of our universe. If there are still energy-matters outside, our universe will continuously expand, and in turn if no energy-matters outside, our universe will contract. Our universe as a UBH, $\rho_r = \rho_c$ or $\Omega = 1$ is its essential nature. Therefore, $\rho_r \neq \rho_c$ or $\Omega \neq 1$ was a false proposition by the most scientists in the past.

6*. The four difficult and complicated problems (Singularity, flatness, Event Horizon and magnetic monopole) at the genesis of our universe had troubled scientists for several decades. After author has negated the occurrence of Singularity and proved the flatness is the essential nature of our UBH in this article, the other two problems may be easily solved. Moreover, the new concepts in this article have given the better explanations to "Original Inflation".

7*. If the new concepts in this article could exclude the occurrence and existence of Singularity at the genesis of our universe, scientists will not need to beg the marvels or to provide some special original conditions for solving the complicated GTRE in future.

8*. All numerical values calculated from Hawking theory about BHs and classical theories and its formulas in this article are precisely consistent with the observational results and the real evolutionary process of our universe in Figure 1. Probably, the new concepts in this article may not be accepted and convinced by the most scientists and scholars, because of no abstruse theory, no complicated mathematical equations as well as the old conventions not broken down. However, as a reasonable explanations to the genesis of our universe, new concepts in this article are much better than "Big Bang" of Singularity, because people do not need to be puzzled by uncertain Singularity.

====The End====

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