The Complete Demonstrations To Our Universe Impossible To Be Created From Singularity

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 $M_{bm} = m_p = 1.09 \times 10^{-5} g$ 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 Planck 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 $t \leq [k_1 (2G/\kappa)^{2/3} (3c)]^{1/2} \approx 0.5563 \times 10^{-43}$ and temperature $T = 0.734 \times 10^{32}$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 ($M_{bm} = m_p = 1.09 \times 10^{-5} g$). 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.

【Key words】. the genesis of our universe; singularity; the Big Bang; black holes (BH); cosmology; minimum gravitational black holes ($M_{bm}$); Original Inflation; Planck Era; Planck particle ($m_p$); Hawking quantum radiations (HQR);

【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.

First, Figure 1 specifies the numerical values of time ($t$) corresponding to Temperature ($T$) at different time in our universe’s evolution.

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 $t = 1/3 \times 10^6$ years).

$$T t^{1/2} = k_1, \quad R = k_2 t^{1/2}, \quad RT = k_3, \quad R = k_4 \lambda \quad (1a)$$

$t$—Characteristic Expansion Time, $T$—Temperature of Radiations, $R$—Characteristic Size or Dimension of the Universe, $\lambda$—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]

$$T t^{2/3} = k_6, \quad R = k_7 t^{2/3}, \quad RT = k_8, \quad R = k_9 \lambda$$  \(1b\)

$k_6, k_7, k_8, k_9$ – 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**

**Time**

**Temperature**

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

$$R_1/R_2 = (t_1/t_2)^{2/3}, \quad R_1 T_1 = R_2 T_2, \quad R_1/R_2 = \lambda_1/\lambda_2.$$  \[3\] 

When $t_1 = (13 \times 10^9\text{yrs})$ to $t_2 = (4.0 \times 10^5\text{yrs})$, $t_1/t_2 \approx 32,500$, (t$_1$/t$_2$)$_{2/3} \approx 1,000$

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

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

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 (\(\lambda\)) 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^{-34} g\cdot cm\cdot s, C --light speed = 3\times10^{10} cm/s, G --gravitational constant = 6.67\times10^{-8} cm^2/g\cdot s^2, \kappa = 1.38\times10^{-16} g\cdot cm^2/s^2\cdot k, m_p -- Planck participle, L_p --Planck length, T_p --Planck temperature.

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

\[ T_b = \left(\frac{C^2}{4\pi GM_b}\right)^{1/4} \]

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From formulas (1a), (2b), R = k₂t'<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 Mₘₙ = mₚ in “universal package”. The strongest explosions of all Mₘₙ could certainly be formed and become the embryos of our present universe. The combinations of newborn Mₘₙ 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.

\[ t = \text{Characteristic Expansion Time}, \quad d_m = \text{Distance between two closest particles}, \quad C = \text{Light Speed} = 3 \times 10^{10} \text{cm/s,} \]

Let \( \rho \) = energy-matter density \( g/cm³ \), \( M = 4\pi \rho R^3/3 \), (3aa)

\[ H = \text{Hubble’s Constant}, \quad H = V/R = 1/t, \]

From \( 4\pi \rho R^3/3 = m \) and \( m = \kappa T/C^2 \), (3b)

\[ t^3 \leq 3\kappa T/4\pi \rho C^5 \]

From \( \rho = 3H^2/8\pi G = 3/(8\pi Gc^2) \), (3a)

\[ t \leq T(2Gc^3)/(C^2) \]

From (1a), \( Tt^2 = k_1 \)

\[ \therefore t^3 \leq k_1^2 (2Gc^3)/C^5 \text{ or } t \leq \sqrt[k_1^2]{(2Gc^3)/C^5} \]

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 \( t = 10^{-43} \text{ s} \), and corresponding to \( T = 10^{32}K \), from Figure 1, so,

\[ k_1 = Tt^2 = 10^{32} \times 10^{-43} = 1.732 \times 10^{10} \]

and from formula (3c),

\[ t^3 \leq k_1^2 (2Gc^3)/C^5 \]

\[ G = 6.67 \times 10^{-8} \text{cm}^3/\text{g}^2 \text{s}^2, \quad C = 3 \times 10^{10} \text{cm/s}, \quad \kappa = 1.38 \times 10^{-16} \text{gcm}^2 \text{s}^{-2} \]

\[ t^3 \leq [(2Gc^3)/C^5] \times k_1 = 1.732 \times 10^{10} \]

\[ t^3 = 0.0712717 \times 10^{-129} \quad = \quad 0.17217 \times 10^{-129} \]

Now let \( t = t_m \) below for convenient calculations,

\[ t_m = 5.563 \times 10^{-43} \]

\[ \therefore t_m \leq 0.5563 \times 10^{-43}, \quad \text{and} \quad t_m \geq 0.5563 \times 10^{-43} \]

Let \( t = t_m \) be the disintegrated time of all particles \( m_m \) in pre-universe. Correspondingly, \( T_m = k_1/t_m^2 = 1.732 \times 10^{10} \times (0.5563 \times 10^{-43})^{1/2} = 0.734 \times 10^{22}K \)

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

\[ r_m = (3m/4\pi \rho)^{1/3} = 1.67 \times 10^{-33} \text{cm,} \]

\[ d_m = C \times [2t] = 3.34 \times 10^{-33} \text{cm,} \quad d_m \geq 2r_m = (3.34 \times 10^{-33} \text{cm}) \]

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

The density \( \rho_u \) of the “universal package” formed by infinite particles \( m_m \),

\[ \rho_u = m_u/d_m^3 = 0.302 \times 10^9 \text{g/cm}^3 \]
It is said, once the Big Crunch of pre-universe collapsed into particles of above

Formula (3f) indicates that, in the “universal package”, the Crunched every particle \( m_m \) was a whole particle of particles 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 \( 0.734 \times 10^{32} \) in “universal package”,

Conclusions: The calculated values of \( t < 0.5663 \times 10^{-33} \) s, \( T = 0.734 \times 10^{32} \) (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 \( (m_m = 1.125 \times 10^{-5} \) g, \( r_m = 1.67 \times 10^{-23} \) cm, \( T_m = 0.734 \times 10^{32} \) K), pre-universe reached Planck Era and all particles \( m_m = m_b = M_{bm} = 1.09 \times 10^{-5} \) 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 \( \rho \approx 10^{32} \) g/cm\(^2\) \( \neq 0 \), and the actual radius of universe \( R \neq 0 \). 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. 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.

Minimum Gravitational (Schwarzschild) Black Hole \( (M_{bmn}) \), Planck particles \( m_b \) 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). \[1\]

\[
\begin{align*}
\frac{m_m}{M_{bmn}} = \frac{(hC/8\pi G)^{1/2}}{\rho_p} = 1.09 \times 10^{-5} g, \quad \frac{r_m}{L_p} = 1.61 \times 10^{-33} cm \quad (4a) \\
\frac{R_{bmn}}{L_p} = \left( \frac{m_m}{L_p^3} \right)^{1/2} = 0.71 \times 10^{32} k \quad (4b) \\
\frac{T_{bmn}}{T_p} = \left( \frac{L_p}{4\pi C} \right)^{1/2} = 0.71 \times 10^{32} k \quad (4c) \\
\frac{R_{bmn}}{M_{bmn}} = h/(4\pi C) \quad (4d) 
\end{align*}
\]

Let’s compare the numerical values between \( M_{bmn}, m_b \) 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. \( M_{bmn} \) was the minimum gravitational BHs come from the final collapse of BHs, they would finally become Planck particles \( m_b \), and explode in Planck Era. \[2\]

<table>
<thead>
<tr>
<th>( m_m ) of no gravity</th>
<th>( M_{bmn} )-minimum BH</th>
<th>( m_b )-Planck particles [4]</th>
</tr>
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<tbody>
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<tr>
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</tbody>
</table>

It can be seen from table 1, the numerical values of \( m_m \) have a little tolerance with values of \( M_{bmn} \) and \( m_b \). 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,

$$m_m \equiv M_{bm} \equiv (hC/8\pi G)^{1/2} = m_p$$  \hspace{1cm} (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 $M_{bm} \equiv m_p$. \[ \]

【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 $10^9g/cm^3$ 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 $\tau_b$ 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.

$$\tau_b = 10^{-27} M_b^3 \, (s) \hspace{1cm} (5a)$$

$$t_{bc} = R_b/C \hspace{1cm} (5b)$$

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

$$M_b = M_{bmn} \approx 2.2 \times 10^{-5}g (\approx 2 M_{bm}) \hspace{1cm} (5c)$$

$$T_b = (C^2/4GM_b)(h/2\pi c) \approx 10^{27}/ M_b = 0.45 \times 10^{12}k.$$  

From (5c) above, a $M_{bmn} \geq 2.2 \times 10^{-5}g \approx 2 M_{bm}$ can be got. It is said, once the new and original $M_{bmn} \geq (2.2 \times 10^{-5}g \approx 2 M_{bm})$ were formed and occurred, they could gloriously 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 $M_{bm} =1.09 \times 10^3g$ 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 $137 \times 10^3$ years, 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 $M_{bm} =1.09 \times 10^3g$ 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--$M_{bmn} = 2.2 \times 10^{-5}g$ 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【21】. once a BH was formed, it would be a BH forever until it finally contracted to become $M_{\text{bm}} \equiv m_p$ 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 $M_{\text{bm}}$ or $M_{\text{mbm}}$.

1*. The real observational numerical values had demonstrated that, our universe is a ball to have various precise and reliable values. $A_u$, The real and precise age $A_u$ of our universe is: $A_u = 1.37 \times 10^9$ yrs.[8], then, the event horizon $R_u = C \times A_u = 1.3 \times 10^{28}$ cm, density $\rho_u = 3/(8\pi G A_u^2) = 0.958 \times 10^{-29}$ g/cm$^3$, so, the total mass of our universe is $M_u = 8.8 \times 10^{55}$g. Hubble constant is another reliable observational value, $H_0 = (0.73 \pm 0.05) \times 100$ kms$^{-1}$Mpc$^{-1}$, as a result, the density of our universe $\rho_r : \rho_r = 3H_0^2/(8\pi G) \approx 10^{-29}$ g/cm$^3$. The age of our universe is: $A_r = \sqrt{\frac{3\pi}{G}} \times \frac{R_u}{C}$. $A_r = 0.423 \times 10^{18}$s = $(13.4 \pm 0.67) \times 10^9$ yrs. The total mass $M_r = 8.6 \times 10^{55}$g.

Thus, Mass of our universe has a very precisely observational value. For convenient calculations, let $M_u = 8.8 \times 10^{55}$g, $A_u = 1.37 \times 10^9$ yrs, $R_u = 1.3 \times 10^{28}$ 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 $M_{\text{bm}}$ or $M_{\text{mbm}}$. Owing to (6f) = (6e), it demonstrates clearly that, $M_u$ are actually formed from $N_{\text{bu}} \times M_{\text{bm}}$, and $M_u$ is a real UBH.

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,

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

$$M_b = R_u / 2G$$

(6f)

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

$$M_b = R_b C^2 / 2G$$

$$M_{\text{bu}} = M_u / M_{\text{bm}} = 8.8 \times 10^{55} / 1.09 \times 10^8 = 8.0734 \times 10^{47}$$

(6d)

If our universe is a real UBH formed from $N_{\text{bu}} \times M_{\text{bm}}$, then, $N_{\text{bu}} = 8 \times 10^{60}$ should be suitable with the same precise proportion of their event horizon as below (if let $M_{\text{bm}}$ replace $M_{\text{bm}}$, the same result can be got):

$$N_{\text{bu}} = R_u / R_{\text{bm}} = 1.3 \times 10^{28} / 1.61 \times 10^{-33} = 8 \times 10^{46}$$

(6e)

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

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

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), our UBH has not lost any energy-matters at all, but only has matters not found out.

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 $\tau_b$ of our present universe will be about $\tau_b = 10^{-27} M_b$ (s) = $10^{-27} (8.8 \times 10^{55})^3 = 10^{132}$ yrs, due to emitting HQRs to finally become $M_{\text{bm}}$ 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 $M_{\text{bm}}$ and disappears in Planck Era.

【7】. In this paragraph, author propose a newest and simplest principle to calculate the mechanism, process and terminal of “Original Inflation”. It caused from “combinations of the newborn minimum BHs--$M_{\text{bm}},$”. Once all $M_{\text{bm}}$ 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 $M_u = 8.8\times10^{65}g$, which formed and expanded from original minimum BHs-- $M_{bm} \equiv m_b = 1.09\times10^{-5}g$, i.e. $M_u = N_{bu} \times M_{bm}$. Therefore, after “Original Inflation”, our universal expansion was just the completely expansive result of $N_{ub} \times M_{bbb2} = 2.2 \times 10^{60} \times 4 \times 10^{15}$ (7-4) through their combinations of $137 \times 10^6$ yrs.

For convenient calculations, let $M_{bbbm} = M_{bm}$. Now let’s know how $N_{bu} \times (M_{bm} \approx 5 \times 10^{-5})$ could combine them together. $R_{bm} = 1.61 \times 10^{-33}$ 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 $M_{bm}$, $t_{bmc} = R_{bm}/C = 1.61 \times 10^{-33}/3 \times 10^{16} = 5.37 \times 10^{-44}$ cm. In case light (gravity) went through $2 \times t_{bmc}$, $M_{bm}$ should link with numbers $N_{bm2}$ of $M_{bm}$, so,

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

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 $N_{bu} = 8.075 \times 10^{60}$ of $M_u (=N_{bu} M_{bm})$?

$$N_{bu} = 8.8 \times 10^{60} \approx 10^{61} = (8^{6.75}) \quad (7b)$$

Formula (7b) shows, after original $M_{bm}$ went through $(2^{6.75}) \times t_{bmc}$, all $N_{bu} (=8^{6.75} \approx 10^{61}) \times M_{bm}$ would be linked together to become an original “universal package” of $M_u$. However, $(2^{6.75}) \approx (10^{20.3})$, let $n_o = 10^{20.3}$.

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

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

$N_{bu} = 8.8 \times 10^{60} \approx 10^{61} = (2^{7.26})$, and $(3^{4.26}) \approx (10^{20.3})$, let $n_o = 10^{20.3}$, $n_o = n_{o2} = n_{o3} \approx (10^{20.3}) \quad (7e)$

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 $2^{2^2} = 2^4$, but $(2^3)^3 = 2^9$: when time from $t_{bmc}$ prolonged to $3 t_{bmc}$, the combined numbers of $M_{bm}$ was $3^3$.

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

Let $N_{mn} = n_o^9$, and $n_o = 10^x$.

But $N_{bu} \approx 10^{61}$, $n_o = 10^{20.3}$

$x_1 = 61/9 = 6.8, \quad n_{o1} = (10^{20.3}) \quad (7f)$

Formula (7-1a) shows, under the condition of “Inflation”, $t_{bmc}$ only needed to prolong $n_{o1} = 10^{6.8}$ times to link all $M_{bm}$ together. 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”.

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

$x_2 = 61/3$ is $20.3$, and $n_{o2} = 10^{20.3}$.

$c. \quad n_{o2} = 10^{20.3}$ or $n_{o2} = 10^{19} n_{o1} \quad (7-1c)$

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”,

$$t_{o1} = t_{bmc} \times n_o = 5.37 \times 10^{-44} \times 10^{6.8} = 0, 2 \times 10^{-36} s = 2 \times 10^{-37} s \quad (7-2a)$$

B. ” conventional expansion”: $t_{o2}$ was time of the end of ” conventional expansion”

$$t_{o2} = t_{bmc} \times n_o = 5.37 \times 10^{-44} \times 10^{20.3} = 2 \times 10^{-24} s \quad (7-2b)$$

$$n_{o2} = n_{o1} \quad (7-2c)$$

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

$$R_{bb1} = C t_{o1} = 6 \times 10^{-27} \text{ cm} \quad (7-3a)$$

$$R_{bb2} = C t_{o2} = 6 \times 10^{-14} \text{ cm} \quad (7-3b)$$

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

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

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“Inflation” of $n_{b2}/n_{b1}$ included its conventional expansion, after “Inflation of $t_{o1} = 2 \times 10^{-37}$ s, $R_{bb1} \times n_{b2}/B_{bb}$ turned equal to $R_{bb2} = 6 \times 10^{-14}$ cm, so, $2 \times 10^{-33}$ s was the end of “Original Inflation”. B. “Conventional expansion”: Through “conventional expansion” created by the combinations of all $M_{bbn}$ to form little BHs-- $M_{bb2}$, after $t_{o2} = 2 \times 10^{-24}$ s, $R_{bb2}$ of $M_{bb2}$ reached to $6 \times 10^{-14}$ cm.

Conclusions: Above A and B reached the same results to form $M_{bb2} = M_{bb1}$ 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 $2 \times 10^{-37}$ s, but $M_{bb}$ at the end of $2 \times 10^{-24}$ s.

3* The other parameters of $M_{bb1}$ and $M_{bb2}$ known number; $R_{bb2} = C t_{o2} = 6 \times 10^{-14}$ cm,

\[
M_{bb1} = M_{bb2} = 0.675 \times 10^{28} R_{bb2} = 4 \times 10^{15} g
\]  \hspace{1cm} (7-4)

\[
\rho_{bb1} = \rho_{bb2} = 3 M_{bb2}/(4\pi R_{bb2}^3) = 4.4 \times 10^{-4} g/cm^3.
\]  \hspace{1cm} (7-5)

At the time of $t_{o1} = 2 \times 10^{-36}$ s or $t_{o2} = 2 \times 10^{-24}$ s, density $\rho_{bb}$ of $M_{bb}$ was equal to $\rho_{bb2}$ of $M_{bb2}$, the event horizon $R_{sh}$ of $M_u$ was:

\[
R_{sh} = (3 M_u /4\pi \rho_{sh})^{1/3} = 2.4 \text{ cm}
\]  \hspace{1cm} (7-6)

\[
N_{sh} = M_u /M_{sh} = 8.8 \times 10^{45}/4\times10^{15} = 2.2 \times 10^{30}
\]  \hspace{1cm} (7-7)

\[
N_{bbn} = M_{bb2}/M_{bb1} = 4 \times 10^{-5}/1.09 \times 10^{-5} = 4 \times 10^{20}
\]  \hspace{1cm} (7-7)

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

\[
R_{36} = 1.83 \times 10^{23} \text{ cm}^3/(10^{-36} s)^{1/2} = 3.8 \text{ cm}
\]  \hspace{1cm} (7-8)

\[
\rho_{shh} = 3 M_u / (4\pi R_{36}^3) = 3.8 \times 10^{53} g/cm^3
\]  \hspace{1cm} (7-9)

\[
R_{44} = (3 M_u /4\pi \rho_{shh})^{1/3} = 10^{-13} \text{ cm}
\]  \hspace{1cm} (7-10)

\[
R_{36}/R_{44} = 3.8 \times 10^{-13} = 3.8 \times 10^{19}
\]  \hspace{1cm} (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 $t = 1 \times 10^{-36}$ s, the numerical values of 3.8 cm and 2.4 cm 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 $t = 10^{-24}$ s, it might impossibly be observed by mankind forever. If “Original Inflation” before $t = 10^{-36}$ 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-- $M_{bb1}$ should be a convincing proposition. In reality, “conventional expansion” was also a “slower Inflation”.

6* From Figure 1 of page 2, $t_o = 0.2 \times 10^{-36}$ s was in GUT Era.

7* 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: $A_u = 137 \times 10^8 \text{ years}$,

Schwarz child’s radius of universe: $R_u = 1.3 \times 10^{28} \text{ cm}$,

Density $\rho_u = 3/(8\pi G)\gamma^2 = 0.958 \times 10^{-29} g/cm^3$.

The total mass of our universe is $M_u = 8.8 \times 10^{55} g$.

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

Our universe was born from new $M_{bbn} = (hC/8\pi G)^{1/2} = m_g = 1.09 \times 10^{-5} \text{ ge}$. The expansion of our universe was originated from the combinations of a large amount $N_{bbn} = 8 \times 10^{90}$ of new $M_{bb2}$.

The size of our original Universe of $M_u$ in Planck Era looks like the size of a present proton $R_{sh0} = 1.54 \times 10^{-13} \text{ cm}$,

The numbers of proton mass of the Universe are; $N_{op} = M_u/m_{proton} = 10^{26}/1.67 \times 10^{-24} \approx 10^{10}$.

After the end of “Original Inflation” at the universal expansive time of $0.2 \times 10^{-36}$ 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 $(N_{bb} = 0.33 \times 10^{5}) M_{bb}$.

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)--$t^{3/2} \leq \frac{k_1(2G\pi)^2}{C^5}$, and calculated out accurately the time ($t$) of final collapse of pre-universe into Planck Era. Once pre-universe finally collapsed to $t \approx -0.5563 \times 10^{-43}s$, all particles in pre-universe became minimum BHs of $M_{bm} = \frac{hC}{8\pi G} \approx 1.09 \times 10^{-5}g$, 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-- $M_{bm} \approx 10^{-5}g$. (<Planck Era>) was really the state at genesis of our universe.” 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 $t_{bb} = 0.2 \times 10^{-36}s$. 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 $\rho$, 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, $\rho = \rho_c$ or $\Omega = 1$ is its essential nature. Therefore, $\rho \neq \rho_c$ 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.

References:
1. Dongsheng Zhang: Part II of this article above.
5. Wang, Yong-jiu. Physics of Black Holes. Publishing House of Hunan Normal University, Hunan,
对宇宙起源的新观念和完整论证: 宇宙不可能诞生于奇点 (下篇)

我们宇宙诞生于在普朗克领域Planck Era新生成的大量原初最小黑洞

\[ M_{bm} \equiv m_p \equiv \frac{(hc/8\pi)}{G}^{1/2} \approx 1.09 \times 10^{-5} \text{g} \] 的合并, 而不是“奇点”或“奇点的大爆炸”

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1957年毕业于北京航空学院, 即现在的北京航天航空大学

笛卡儿: “我们不能依赖他人的权威而接受真理, 必须自己寻求。”

【内容摘要】: 本文根据近代宇宙天文学和物理学的一些基本规律和公式, 通过计算所得的数据, 证明了我们现在膨胀的宇宙不可能诞生于“奇点”或“奇点的大爆炸”。按照时间对称原理, 假设我们宇宙是从前辈宇宙的“大塌缩”而来, 其最后的塌缩规律与我们宇宙诞生时的膨胀规律相同, 那么, 本文重新推导出前辈宇宙的“大塌缩”公式。 (3c)式就是来的最重要的公式, 一旦前辈宇宙大塌陷到 (3c), 

\[ t \leq \frac{(2G\kappa)}{C^5}^{2/3} \], 即

\[ t = - 0.5563 \times 10^{-3} \text{s} \]时, 前辈宇宙中的每个能量-物质粒子 m 同时进入3种状态: 1。每个粒子 m 都与其相邻的粒子因无足够时间转递引力而失去了引力联系以至于无法继续塌缩。

2。每个粒子 m 都变成为 M_{bm} \approx 10^{-5} \text{g} 的史瓦西最小黑洞。

3。同时进入普朗克领域而成为普朗克粒子 m_p。于是, m = M_{bm} = m_p = 1.09 \times 10^{-5} \text{g}。正是“宇宙包”内每个粒子 m 的这3种状态的共同作用, 导致所有的 m 在封闭的“宇宙包”内停止收缩而爆炸解体, 并与整个前辈宇宙同步消失在普朗克领域, 从而共同阻止了前辈宇宙在普朗克领域继续塌缩成为“奇点”。同时, 前辈宇宙的爆炸解体造成“宇宙包”内的温度和密度的下降, 从而使宇宙中新生出来稍大而稳定的无数最小黑洞 2M_{bm}。它们就成为我们现在新宇宙的“胚胎”, 它们的合并就是我们宇宙的诞生, 同时造就了我们现在新宇宙的膨胀规律。”

本文还完全证实了我们现在宇宙是一个真实的宇宙大黑洞 (UBH), 这样, 宇宙诞生和演化中的各种难题就简化成为一般黑洞的生长衰亡规律。

【关键词】: 宇宙不是产生于“奇点”或者“奇点的大爆炸”; 宇宙诞生于 (M_{bm} \approx 10^{-5} \text{g}) 史瓦西最小黑洞; 宇宙的 “原初暴涨” (Original Inflation) 产生于大量最小黑洞的合并; 宇宙与黑洞的同一性; 我们宇宙本身就是一个宇宙大黑洞; 哈勃定律就是宇宙黑洞的膨胀规律。

【1】. 我们宇宙的演化规律与公式: (图一)

宇宙的演化规律可用两种不同的简单方式较精确地描述。这是根据粒子物理学和近代天文观测的成就而得出的结果。通称之为宇宙“大爆炸”标准模型。
首先，图一详细地标列出了宇宙在各个不同时期的演化过程中时间 $t$ 与温度 $T$ 的相互对应的关系，其各种数据简明，但不精确，而是近似的。

其次，下面的公式 (1a) 从量上定出了宇宙从辐射时代末期到大爆炸的过程中各个物理状态参数间的变化规律：

$$t = \pm 10^{-43} \text{ 秒到} t = 1/3 \times 10^6 \text{ 年}$$

$$T_t^{1/2} = k_1, \quad R = k_2 t^{1/2}, \quad RT = k_3, \quad R = k_4 \lambda, \quad \lambda = \text{辐射的波长}, \quad T = \text{宇宙辐射温度}, \quad k_1, k_2, k_3, k_4 \text{—常数}.$$  

(1a)

图一，宇宙演变的标准模型中温度 $T$ 与时间 $t$ 的关系；

9. 附录 A：图一，宇宙演变的标准模型中温度 $T$ 与时间 $t$ 的关系；

下面的 (1b) 式定出了宇宙在物质占统治地位时代各物理状态参数之间变化规律和相互关系 ($t = 1/3 \times 10^6$ 年到现今)

$$T_t^{2/3} = k_6, \quad R = k_7 t^{2/3}, \quad RT = k_8, \quad R = k_9 \lambda$$

(1b)

以上参数的初始值可见于图一，算出结果与近代观测数值相吻合。以上数值表明宇宙从物质占统治时代的最初时刻膨胀至今，时间膨胀了约 $32,500$ 倍，尺寸扩大了约 $1,000$ 倍，温度则降低约 $1,000$ 倍，符合 MBR（微波背景辐射）的观测数据。

由于我们宇宙在创生期的密度异常大，那时的宇宙好似“原子”般的大小。关键问题在于这颗“原子”从何而来？来源不外乎两个：(一)，按照广义相对论，宇宙是从所谓的“奇点大爆炸”爆炸膨胀而来，无从到有，此路不通。因为它无法解释一个各种物理定律失效的“奇点”与一个如此有序的宇宙有任何物理量之间的
联系。(二)。是为认为这个“原子”由前辈宇宙收缩的塌陷经过“相变”转变而来。本文的论证与计算就在于于确证宇宙如何从前辈宇宙“塌陷相”转变为现今宇宙“膨胀相”，这种相变发生的条件机理和途径。

【2】黑洞的基本属性和黑洞在其视界半径R_b的守恒公式。我们宇宙是一个真实“宇宙黑洞”。所有黑洞在其视界半径上的公式完全适用于我们“宇宙黑洞”。(此节请参看本文上篇)[1]

1*. 最小黑洞—M_{bm}：根据霍金黑洞量子辐射的温度公式和史瓦西的黑洞公式，可以推导出来黑洞M_{b}在其视界半径R_b上准确的4个守恒公式，它们规定出所有黑洞的生长衰亡规律。

M_{b}—黑洞质量，R_b—黑洞的视界半径，T_b—黑洞视界半径R_b上温度，m_{as}—黑洞视界半径R_b上霍金辐射量子，h—普朗克常数=6.63×10^{-27}g·cm^2/s，C—光速=3×10^{10}cm/s，G—引力常数=6.67×10^{-8}cm^3/s^2·g，波尔兹曼常数=κ=1.38×10^{-16}g·cm^2/s^2·k，T_p—普朗克温度，R_p—普朗克长度，m_p—普朗克粒子，h—普朗克常数=6.63×10^{-27}g·cm^2/s，κ—波尔兹曼常数=1.38×10^{-16}g·cm^2/s^2·k，m_p—普朗克粒子，L_p—普朗克长度，T_p—普朗克温度。

霍金黑洞量子辐射的温度公式，

\[ T_b = \left( \frac{C}{4GM_b} \right) \left( \frac{h}{2 \pi \kappa} \right) \approx 10^{27/2} M_b, \quad \text{(2a)} \]

黑洞在其视界半径R_b的温度和能量转换公式，

\[ m_{ss} = \frac{\kappa T_b}{C^2}, \quad \text{(2b)} \]

从(2a)和(2b)得出，

\[ m_{ss} = M_{bm} = \frac{hC}{8\pi G} = 1.09 \times 10^{-5} g \quad \text{(2c)} \]

公式(2c)是在黑洞的视界半径R_b上普遍有效的公式。运用宇宙中事物部分不与全体的公理。黑洞视界半径R_b上霍金辐射量子m_{ss}不可能>M黑洞质量M_b，在极限情况下，最大的m_{ss}只能是宇宙中最小的黑洞M_{bm}，所以有，

\[ m_{ss} = M_{bm} = M_b = \frac{hC}{8\pi G} \approx 1.09 \times 10^{-5} g \quad \text{(2e)} \]

由于(\frac{hC}{8\pi G})^{1/2}≡普朗克粒子m_p=1.09×10^{-5}g，所以，m_{ss}M_b=hC/8\pi G=(hC/8\pi G)^{1/2}≡m_p，并立即在普朗克领域爆炸消失。

2*. 从上述推导出的公式(2l)可知，黑洞的一个基本属性就是：一旦黑洞形成，不管它是在吞噬外界能量-物质而膨胀，还是因发射霍金辐射而收缩，直到最后收缩成为最小黑洞M_{bm}，而且，M_{bm}=m_{ss}=(hC/8\pi G)^{1/2}=m_p，并立即在普朗克领域爆炸消失。

2G M_b = C^2 R_b \quad \text{(2c)}

假设有一个另外黑洞—M_{ba}与M_b合并或者碰撞，该黑洞，

2G dM_{ba} = C^2 dR_b \quad \text{(2i)}

2G(M_b + dM_b) = C^2(R_b + dR_b) \quad \text{(2k)}

3*. 等于普朗克粒子m_p的最小黑洞M_{bm}是必然在普朗克领域爆炸消失的原因，

由于在M_{bm}< (hC/8\pi G)^{1/2}≡m_p=1.09 \times 10^{-5} g，m_{ss}<1.09 \times 10^{-5} g。所以，m_{ss}M_b<hC/8\pi G<1.187 \times 10^{10} g^2，这违反了一般的黑洞公式(2d)，不能以黑洞形式存在，只能爆炸消失。

再按照量子力学的测不准原理，

\[ \Delta E \times \Delta t = \frac{\hbar}{2\pi} \quad \text{(2m)} \]

对于最小黑洞M_{bm}，\Delta E = M_{bm} C^2 = kT_b=10^{16} erg.

\[ \Delta t = \text{Compton time} = \frac{R_{bm}}{C} = 1.61 \times 10^{-33} \times 10^{10} = 0.537 \times 10^{-23} \]

\[ \Delta E \times \Delta t = 10^{16} \times 0.537 \times 10^{-23} = 5.037 \times 10^{-27}, \quad \text{but} \quad \hbar/2\pi = 6.63 \times 10^{-27}/2\pi = 1.06 \times 10^{-27}, \]

显然，\Delta E \times \Delta t < \hbar/2\pi，就是说，如果M_{bm}维持存在，或者变小后仍存在，它就必然也违反测不准原理。所以，M_{bm}≡m_p只能在普朗克领域爆炸消失。
【3】从前辈宇宙的“大塌陷”到现今宇宙的诞生的大膨胀的转变条件：根据时间对称原理，假设前辈宇宙的最后塌缩遵循我们宇宙新生时同样的膨胀规律。

如果将前辈宇宙的最后的“大塌陷”简单地假设为宇宙诞生前的时间镜像反演或时间对称，即假设将宇宙的最后塌缩遵循我们宇宙新生时的膨胀规律，即假设将用于描述我们宇宙诞生后的膨胀公式(1a)也可以反向地用于描述前辈宇宙最后的塌缩演化规律，而膨胀的结果，根据计算如果符合现在宇宙各种规律和演变实况的数据的话，那么，这种假设就是合乎逻辑和规律的，就应当是合理可靠而予以承认的。

从公式(1a) \( R = k_1 t^{1/2} \) 和(2a), (2b)可知，前辈宇宙走向大塌陷时其尺寸收缩，相应地其粒子温度增加，时间缩小很快。在大塌陷收缩过程中，当收缩到某个极限时，两个相邻的粒子传递其引力所需的时间小于各个粒子湮灭解体时间，使它们中心间的实际距离变得等于当时两相邻粒子的史瓦西半径之和。这时，所有相邻之间的粒子都会因为引力无时间到达而产生引力断链，而所有在某个“宇宙包”里的粒子都成为等于普朗克粒子的最小黑洞。它们之间因无引力而只能在高温下，使前辈宇宙停止收缩而爆炸解体，从而形成前辈宇宙的消亡。同时造成宇宙的膨胀和温度密度的下降。膨胀的结果，一方面使“宇宙包”内的温度和密度随着少许的下降，而使分散的能量重新集合转换为较大一点的稳定的新的最小黑洞。正是在宇宙包内各处的这些新产生的最小黑洞成为产生我们新宇宙的胚胎。它们恢复引力后的合并和碰撞形成了宇宙初始的“原初暴胀”和宇宙的诞生。这就是前辈宇宙“大塌陷”到普朗克领域解体后，又生成新最小黑洞而形成我们新宇宙的转变过程。

前辈宇宙从最后的“大塌陷”转变到现今宇宙最初的“大膨胀”发生的条件，按照上述的原理由以下公式(3a)来表述，

公式(3a), (3b), (3c)都是从公式(3)推导出来的，所以三式中的 \( t \) 是等值的。

现求 \( t \) 值如下：先从上面的图一中选取一对 \( t, T \) 值代入(1a)求 \( k_1 \) 当 \( \rho = 3/(8 \pi G t^2) = 0.5786 \times 10^9 \text{g/cm}^3 \) 时，取 \( t = 10^{-43} \text{s} \)，图中下面对应的温度 \( T = 10^{32} \text{K} \)，如是，

\[
(3a) \quad 3H^2/8\pi G = 3/(8\pi Gt^2), \quad \rho = 3/(8\pi Gt^2) = 0.5786 \times 10^9 \text{g/cm}^3
\]

\[
(3b) \quad 3H^2/8\pi G = 3/(8\pi Gt^2), \quad \rho = 3/(8\pi Gt^2) = 0.5786 \times 10^9 \text{g/cm}^3
\]

\[
(3c) \quad 3H^2/8\pi G = 3/(8\pi Gt^2), \quad \rho = 3/(8\pi Gt^2) = 0.5786 \times 10^9 \text{g/cm}^3
\]

可见，\( t \) 与 \( t_m \) 即是粒子与整个前辈宇宙同时解体的时间。相对应地：

\[
(3d) \quad t_m = 0.5563 \times 10^{-43} \text{s}
\]

\[
(3e) \quad m = m_0 = 0.734 \times 10^{10} \text{g}
\]

\[
(3f) \quad m = m_0 = 0.734 \times 10^{10} \text{g}
\]

\[
(3g) \quad m = m_0 = 0.734 \times 10^{10} \text{g}
\]

\[
(3h) \quad m = m_0 = 0.734 \times 10^{10} \text{g}
\]

可见，\( t \) 与 \( t_m \) 即是粒子与整个前辈宇宙同时解体的时间。相对应地：

\[
(3i) \quad \rho = 3/(8\pi Gt^2) = 0.5786 \times 10^9 \text{g/cm}^3
\]
（3i）表明前辈宇宙塌陷到$m_m$时，$2$邻近粒子之间的引力却是断链了。粒子$m_m$爆炸解体后，由粒子$m_m$组成“宇宙包”里的密度ρm，
$$\rho_m = m_m / d_m^3 = 0.302 \times 10^{39} \text{g/cm}^3$$
(3k)

由于$\rho_m < \rho$，表明前宇宙解体后，整个“宇宙包”里的密度由于粒子爆炸后填满了空隙而降低了。$n_m$表明“宇宙包”里的$m_m$就是一个整体的一堆内外都无引力的能量，所以只能爆炸解体。
$$m_m C^2 = 1.125 \times 10^5 \times 9 \times 10^9 = 1.013 \times 10^{16}, \text{ 同时, } \kappa T = 1.38 \times 10^{-16} \times 0.734 \times 10^2 = 1.013 \times 10^{16}$$
\[ n_m = m_m C^2 / kT = 1 \]

结论：计算值$t \leq 0.5563 \times 10^{43} \text{s}$。$T = 0.734 \times 10^{53} \text{K}$几乎精确地符合附录图一（Plank's Era）普朗克时期末端值。对于时间反转的前辈宇宙来说，就是塌陷到进入普朗克时期的开始端。上述计算值表示前辈宇宙一旦收缩到大坍陷时，$t = t_m = 0.5563 \times 10^{43} \text{s}$，$T = T_m = 0.734 \times 10^{53} \text{K}$时，整个“宇宙包”内的粒子都塌陷成为一个个单独的内外都无引力联系的宇宙的最高能量粒子，进入普朗克领域，即$m_m = m_p = M_{bn} = 1.09 \times 10^{-5} \text{g}$（见下节）。无引力就无收缩的动力。所有粒子和整个“前辈宇宙”只能在普朗克领域爆炸消失。根本不可能再继续塌陷成为“奇点”。

在上述设想中，宇宙从前辈宇宙收缩坍陷到新宇宙的产生和膨胀的转变过程中，也会出现$t = 0$的点，但这并非人们所认知的“奇点”，而只是前辈宇宙从收缩坍陷点（$-10^{43} \text{s}$，$R$）到新宇宙膨胀起始点（$+10^{-43} \text{s}$，$R$）之间的过渡桥梁，因为，$t = 0$ 点，宇宙尺寸$R \neq 0$，温度$T \neq 0 \text{K}$，而且不是无限小，宇宙密度$\rho_m$不是无限大，而是$3 \times 10^9 \text{g/cm}^3$。这种观点使宇宙演化合乎能量守恒、合乎因果律（热力学第二定律）、不违反现存的各种天体物理定律与经典理论，反而与它们之间的无缝结合。

由于无数粒子$m_m$聚集所形成的“宇宙包”，并非自由空间，前辈宇宙无数最小黑洞$m_m$的爆炸解体湮灭是在密闭的宇宙包内完成。它们在普朗克领域同时的爆炸解体可以称之为诞生我们宇宙的“大爆炸”。其结果就是“宇宙包”内的温度和密度降低，使分散的能质量能够重新结合成稍小而稳定的最小黑洞$M_{bn}$，它们就是产生我们新宇宙的胚胎。它们的长大和合并就造就了我们新宇宙的诞生和膨胀。

【4】最小引力（史瓦西）黑洞$M_{bn}$与普朗克粒子$m_p$和上节所提出的前辈宇宙的最终塌缩粒子$m_m$完全是同一种东西，这说明霍金黑洞理论与量子引力论和近代粒子理论等有殊途同归的互恰性。下面的公式(4a)，(4b)，(4c)和(4d)来源于前面的(2f)，(2g)，(2h)和(2i)。

$$m_m = M_{bn} = (hC / 8\pi G )^{1/2} = m_p = 1.09 \times 10^{-5} \text{g} \quad (4a)$$
$$R_{bn} = L_p = (Gh^2 / 16\pi C^4)^{1/2} = 1.61 \times 10^{-33} \text{cm} \quad (4b)$$
$$T_{bn} = T_p = 0.71 \times 10^{-43} \text{K} \quad (4c)$$
$$R_{bn} = h / (4\pi C) \quad (4d)$$

比较$M_{bn}$，$m_p$和$m_m$的数值列在下面的表1 中。$m_m$是前辈宇宙塌缩到最后失去引力状态时的计算数值，$M_{bn}$是最大黑洞，$m_p$是普朗克粒子。<ref>

| 表：$M_{bn}$，$m_p$和$m_m$的各种参数的比较 |
|-----------------|-----------------|-----------------|
| $m_m$  | $M_{bn}$ | $m_p$  |
| 无引力状态 | $M_{bn}$=1.09×10^{-5}g, | $m_p$=1.09×10^{-5}g, |
| $t_m$=0.5563×10^{-43}s, | $T_{bn}$=0.71×10^{-43}K, | $t_p$=0.539×10^{-43}s, |
| $R_{bn}$=1.61×10^{-33}cm, | $L_p$=1.61×10^{-33}cm, |

从上面的表1，可以$M_{bn}$和$m_m$是完全等同的$\Rightarrow$，但是$m_m$的数值与$M_{bn}$和$m_p$有一点小的误差，原因在于$m_m$来自公式(3f)，但在推导(3f)的过程中，由于时间$t$和温度$T$的数值均取自于不精确的图1。所以，实际中，$M_{bn}$，$m_m$和$m_p$三者应该是相等的。也就是说，$m_m$就是最小黑洞$M_{bn}$。$m_m$所有的参数都应该等于相应的$M_{bn}$的参数。所以有，
$$m_m=M_{bn}=(hC / 8\pi G)^{1/2} = m_p \quad (4e)$$

由此可见，(4e)式表明，前辈宇宙最后塌缩成为$m_m$时，即成为$m_m = M_{bn}=m_p$，而只能爆炸解体消失在普朗克领域。<ref>

【5】在前辈消失在普朗克领域之后，我们的新宇宙是如何从普朗克领域诞生出来的？
从公式 (4e) 可见, 一旦前辈宇宙最后塌缩成为 m_b 而进入普朗克领域时，所以在“宇宙包”里的粒子 m_m = M_bmn= m_b，而立即在普朗克领域爆炸消失。如果说，有人喜欢将我们宇宙的诞生说成是来自于一次“大爆炸” 的话，那么，这所有 m_b 在普朗克领域的爆炸就是诞生我们新宇宙的大爆炸。因为构成我们宇宙所有的能量-物质都是来自前辈宇宙爆炸后的遗物。所以说，没有前辈宇宙的死亡，就没有能量-物质成为我们宇宙的物质基础。

我们新宇宙是如何从旧宇宙的废墟中诞生的呢？关键问题在于从旧宇宙解体的废旧能量-物质能够重新结合成为新的最小引力（史瓦西）黑洞— M_bmn。其实，在 10^{35} k 和密度 10^{28} g/cm^3 的普朗克领域本来就是能量与粒子随时都在湮灭和产生的互相转换的。我们知道它们湮灭和产生的时间就是康普顿时间。因此，只有当新生粒子的寿命 τ_b 大于康普顿时间 t_{kc} 时，该粒子才能存活下来，而成为稳定的小黑洞。前面【2】节中已经论证过，黑洞一旦形成，除最后变为普朗克粒子 m_b 而爆炸消失外，它将永远是一个黑洞。按照霍金的黑洞寿命公式，黑洞寿命 τ_b,

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

\[ t_{kc} = R_b/C \]  

\[ \text{(5b)} \]

因此，只有在 τ_b > t_{kc} 时，即 10^{-27} M_b^3 > R_b/C 时，新产生的黑洞 M_b 才能存活，并吞噬外界能量-物质而不断变大。从 (2c) 式所得，我们

\[ M_b = M_{bmn} = 2.2 \times 10^{-5} g = 2 M_bmn \]  

(5c)

前面【3】节中已经论证过，前辈宇宙的最小黑洞 M_{bmn} = m_m 的爆炸消失，使“宇宙包”内的温度密度降低。从 (5d) 式可知，当 M_{bmn} 增加到 2 M_{bmn} = M_{bmn} 时，10^2 k 高温相应的减半即可。因此 M_{bmn} 是很容易而必然形成的。1* M_{bmn} 可以由 2 个或更多个 M_{bmn} = 1.99 \times 10^{-5} g 碰撞结合而成，因为温度降低后 M_{bmn} 会随温度降低而容易形成较大的新最小黑洞 M_{bmn} ≃ 2 M_{bmn}。3* 若温度降低后容易形成较大的新最小黑洞 M_{bmn} ≃ 2 M_{bmn}

【6】。完全论证我们现有宇宙是一个质量为 10^{35} g 的真正巨无霸宇宙黑洞 (UBH)。我们宇宙的膨胀就是巨大的最小黑洞 M_{bmn} ≃ M_{bmn} 在宇宙初期合并产生膨胀的结果。Hubble 定律就是我们宇宙吞噬外界能量-物质而膨胀的规律。宇宙的平均密度 p_{uc} 的可靠的数据。A. 我们宇宙真实可靠的年龄 \( A_u = 137 \text{ 亿年} \) 于是，由此计算出，其视界半径 R_u = C × A_u = 1.3 \times 10^{28} cm，密度 \( \rho_u = 3/(8\pi G A_u^3) = 0.958 \times 10^{-29} g/cm^3 \)。B. Hubble 常数的可靠的观测数据表是 H_0 = (0.73±0.05) \times 100 km/s/Mpc [19]，由此算出宇宙的平均密度 \( \rho_r = 3 H_0^2/(8\pi G) \approx 10^{28} g/cm^3 \)。得出色宇宙年龄 A_u = 3/(8\pi G \rho_r) = 134±6.7 亿年。结果，宇宙的总质量 M_u = 8.6 \times 10^{35} g。由此可见，两种不同的精确测量数据所得出的结果几乎完全一致。因此，取我们宇宙的数据如下作为以后的计算。取宇宙总质量 M_u = 8.8 \times 10^{35} g，宇宙年龄 A_u = 137 亿年。视界半径 R_u = 1.3 \times 10^{28} cm，宇宙密度 \( \rho_u = 0.958 \times 10^{-29} g/cm^3 \)。2* 假如我们现有宇宙是一个真实的巨无霸宇宙黑洞 (UBH)，它就必然来自巨大宇宙最小黑洞 M_{bmn} 与 M_{bmn} 合并。可以为计算方便，现在取 M_{bmn} = m_p = 1.09 \times 10^{37} g，其 R_{bmn} = 1.61 \times 10^{-33} cm，其 T_{bmn} = 0.71 \times 10^{-8} k，其
霍金辐射量子 \( m_a = 1.09 \times 10^{-5} \, \text{g} \). 令 \( N_{bu} \) 是 \( M_{bu} \) 拥有 \( M_{bm} \) 的数目。当然如果取 \( M_{bm} \) 作为计算, 结果与取 \( M_{bu} \) 是一样的。因为 \( M_{bu} \approx 2M_{bm} \)。

\[
N_{bu} = \frac{M_a}{M_{bm}} = \frac{8.8 \times 10^{65}/1.09 \times 10^{-5}}{8.0734 \times 10^{60}} = 8 \times 10^{66}
\]

（6d）

假如我们宇宙是一个由 \( N_{bu} \) 个 \( M_{bu} \) 合并而成的宇宙黑洞，那么，宇宙的 \( R_a \) 也应该准确地是 \( R_{bm} \) 的 \( N_{bu} = 8 \times 10^{66} \) 倍。计算结果如下: 从 \( 6a \)

\[
N_{bu} = R_a/R_{bm} = 1.3 \times 10^{-33}/1.61 \times 10^{-33} = 8.075 \times 10^{60}
\]

（6e）

由于 (6d) = (6e), 这很清楚地证明, 我们宇宙 \( M_a \) 确实是由 \( N_{bu} \) 个最小黑洞 \( M_{bm} \) 合并膨胀而成的宇宙黑洞。

3*. 宇宙膨胀的 Hubble 定律就是宇宙黑洞吞噬外界能量-物质而膨胀的规律。

将 Hubble 定律运用到我们宇宙球体的视界，

\[
M_a = 4\pi \frac{1}{3} R_a^3 = 4\pi (3H_0^2/8\pi G) C^3 t_a^3/3 = 4\pi (3H_0^2/8\pi G) C^3 t_a = 2 G = C^2 R_a /2 G
\]

（6a）

从史瓦西对广义相对论方程的特征，公式 (2c)，

\[
2G M_b = C^2 R_b
\]

（6b）

现在由于 \( t_a = t_{bu} \), \( R_a = R_{bu} \), \( M_a = M_{bu} \) (6a)。而我们宇宙是一个真正的宇宙黑洞，黑洞只有在吞噬外界能量-物质或者与其它黑洞合并才产生膨胀。因此 Hubble 定律所反应的宇宙质量随时间的增长而正比例增长的规律，正是黑洞吞噬外界能量-物质的膨胀规律。这是一个确定值。我们宇宙作为一个真正的宇宙黑洞就是由一个密封的巨大球体，所以 \( (\Omega = \frac{\rho_0}{\rho_0} = 1) \) 是黑洞的本性，是必然的结果。不能例外。因此，50 年来，科学家们对 \( (\Omega = \frac{\rho_0}{\rho_0} = 1) \) 的争论是一个毫无意义的伪命题。

4*. 关于宇宙学的“平衡性”问题，即 \( (\Omega = \frac{\rho_0}{\rho_0} = 1) \)。黑洞的平均密度 \( \rho_0 \) 在确定的 \( M_b \) 下只有一个确定值。我们宇宙作为一个真正的宇宙黑洞就是由一个密封的巨大球体，所以 \( (\Omega = \frac{\rho_0}{\rho_0} = 1) \) 是黑洞的本性，是必然的结果。不能例外。因此，50 年来，科学家们对 \( (\Omega = \frac{\rho_0}{\rho_0} = 1) \) 的争论是一个毫无意义的伪命题。

由于提出了错误的命题 \( (\Omega = \frac{\rho_0}{\rho_0} = 1) \), 已经导致许多科学家提出某些错误的观念，比如最明显地是“寻找宇宙丢失的能量-物质”，其它“零点能”与“暗能量”等也与此有关。因此，从公式 (6d) 和 (6e) 来看，我们就宇宙黑洞 UBH 点的能量-物质也未丢失，一点也不错，当然也不多。

从现在起，如果宇宙黑洞外面没有能量-物质，宇宙黑洞就会开始发生霍金辐射而不停地收缩，直到最后收缩成为最小黑洞--M_{bm} 而爆炸消失，宇宙的年龄就是约为 \( \tau_b = 10^{-27} \, M_b \) (s) = \( 10^{-27} (8.8 \times 10^{65})^3 \approx 10^{132} \) 年。如果外面还有能量-物质，宇宙黑洞会继续吞噬外界能量-物质而扩大，只有在吞噬完所有外界能量-物质后，才会不停地发射黑洞霍金辐射而最后收缩成为 M_{bm} 爆炸消失。其年龄按 (5a) 式计算。

【7】。作者用宇宙诞生于“最小黑洞 M_{bm} 的合并”原理，对宇宙“原初暴涨”的机理、过程和终结提出了最新最简单的解释和计算。认为宇宙“原初暴涨”终结的时间 \( t_a \) 就是宇宙 \( M_a \) 内所有原生最小黑洞--M_{bm} 连成一整体的宇宙时间。

从上节可知，我们现在黑洞宇宙的总质量是 \( M_a = 8.8 \times 10^{65} \text{g} \)。它来自宇宙诞生时 \( N_{bu} = 8 \times 10^{66} \) 个最小黑洞 \( M_{bm} \) 的合并。因此，宇宙黑洞 \( 137 \) 亿年的膨胀就是那诸多最小黑洞合并所产生的膨胀。如果将宇宙诞生到现在所有组成 \( M_a \) 的最小黑洞 \( N_{bu} \times M_{bm} \) 连成一整体的时间定为 \( t_a \)。

由于 \( M_{bm} \) 的视界半径 \( R_{bm} = 1.61 \times 10^{-33} \text{cm} \)，假设 \( M_{bm} \) 在诞生后需要 2 或者 3 倍的 \( t_{bmc} \) 时间 将其邻近的 \( M_{bm} \) 个 \( M_{bm} \) 连接起来，

\[
\begin{align*}
R_{bm} = C \frac{t_{bmc}}{v_{bmc}}, & \quad R_{bm} = R_{bm} / C = 1.61 \times 10^{-33}/3 \times 10^{10} = 5.37 \times 10^{-44} \text{cm} \equiv 1.61 \times 10^{33} \text{cm} / 3 \times 10^{10} = 5.37 \times 10^{-44} \text{m}
\end{align*}
\]

当光 (引力) 走 2 \times t_{bmc} 时，宇宙中所能连接的其它的 \( M_{bm} \) 的数目为 \( N_{mbm} \)

\[
N_{mbm} = (2R_{bm})^3 = \frac{N_{bm}^3}{N_{bm}^3} = 8
\]

（7a）

（7b）

（7c）

（7d）
\[ N_{bb} = 8.8 \times 10^{60} \approx 10^{61} = (27^{42.6}), \text{而 } (3^{42.6}) \approx (10^{20.3}), \text{令 } n_{o3} = 10^{20.3}, \]
\[ \therefore n_{o} = n_{o2} = n_{o3} \approx (10^{20.3}) \quad (7e) \]

由(7c)和 (7e)可知, 不管t_{bmc}以几倍的时间延长, 连接整个M_{u}所需的时间是一样的, 即10^{26.3}秒。但从(7a)和(7d)看, 由于黑洞的合并必然会产生“空间膨胀”, 从(2c)式可知, 这种空间膨胀就产生了宇宙的““原初暴涨””)。从(7a)看, 当M_{bmc}连接其它的8个M_{bmc}时, 其R_{bmc} 也会延长8倍, 即8 = 2^{3}倍。同样在 (7d), R_{bmc} 也会增长27 = 3^{3}倍。也就是说, t_{bmc} 延长到2 t_{bmc} 时, 其所连接的M_{bmc} 数就不会是2^{3}, 而是(2^{3})^{3} = 2^{9}。同样, 当时间t_{bmc} 延长到3 t_{bmc} 时, 其所连接的M_{bmc}的数目应是3^{3}。

下面用同样的方式求一般规律的n_{o},

令 \[ N_{mm} = n_{o} \times 10^{9}, \text{和 } n_{o} = 10^{8} \quad (7f) \]

但 \[ N_{bb} \approx 10^{61}, \quad \therefore 10^{61} = 10^{6e} \quad (7g) \]
\[ x_{1} = 61/9 = 6.8, \quad \therefore n_{o2} = (10^{6e}) \quad (7-1a) \]

(7-1a)是“暴涨”情况下t_{bmc} 延长的倍数n_{o1}。现在从(7e)式按照的原理, 得出一个在没有“暴涨”情况下的x_{2}和n_{o2}, 可称为“正涨”。

\[ x_{2} = 61/3 = 20.3, \quad \therefore n_{o2} = 10^{20.3} \quad (7-1b) \]
\[ \therefore n_{o2} = n_{o1}^ {2} \text{或者 } n_{o2} = 10^{42} \times n_{o1}^{2} \quad (7-1c) \]

18*。公式(7-1a)和(7-1b)证明了将所有M_{bmc}连成一体而组成整个“宇宙包”的有2种方式: 不管以何种方式, 将所有M_{bmc}连成一体为M_{u}所需的时间都是由M_{u}的值所确定的。

A. 暴涨: \[ t_{o1} = t_{bmc} \times n_{o} = 5.37 \times 10^{-44} \times 10^{6.8} = 0 \times 2 \times 10^{-23} s = 2 \times 10^{-37} s. \quad (7-2a) \]

B. 正涨: \[ t_{o2} = t_{bmc} \times n_{o2} = 5.37 \times 10^{-23} \times 10^{6.8} = 2 \times 10^{-24} s \quad (7-2b) \]
\[ \therefore t_{o2} / t_{o1} = n_{o2} / n_{o1} = 2 \times 10^{-25} \times 10^{37} = 10^{12} \]

由t_{o2}和t_{o1}所能生成的小黑洞M_{bb2}和M_{bb1}的视界半径R_{bb2}和R_{bb1}分别:

\[ R_{bb1} = C t_{o1} = 6 \times 10^{-22} cm \]
\[ R_{bb2} = C t_{o2} = 6 \times 10^{-14} cm \]

\[ R_{bb2} / R_{bb1} = 10^{12} \]

\[ \therefore t_{o2} / t_{o1} = n_{o2} / n_{o1} \approx 10^{2} \quad (7-3c) \]

(7-3)。从(7-2a)和(7-2b)可知, 初生宇宙的最小黑洞M_{bb} 有2种合并的方式使初生宇宙M_{u}产生大膨胀, 而将M_{u}内所有M_{bmc}连成一体。

A. 暴涨: \[ t_{o1} = t_{bmc} \times n_{o} = 5.37 \times 10^{-44} \times 10^{6.8} = 0 \times 2 \times 10^{-23} s = 2 \times 10^{-37} s. \quad (7-2a) \]

B. 正涨: \[ t_{o2} = t_{bmc} \times n_{o2} = 5.37 \times 10^{-23} \times 10^{6.8} = 2 \times 10^{-24} s \quad (7-2b) \]
\[ \therefore t_{o2} / t_{o1} = n_{o2} / n_{o1} = 2 \times 10^{-25} \times 10^{37} = 10^{12} \]

2* 几种合并的方式使初生宇宙M_{u}产生大膨胀, 而将M_{u}内所有M_{bmc}连成一体。A. 暴涨: \[ t_{o1} = t_{bmc} \times n_{o} = 5.37 \times 10^{-44} \times 10^{6.8} = 0 \times 2 \times 10^{-23} s = 2 \times 10^{-37} s. \quad (7-2a) \]

B. 正涨: \[ t_{o2} = t_{bmc} \times n_{o2} = 5.37 \times 10^{-23} \times 10^{6.8} = 2 \times 10^{-24} s \quad (7-2b) \]
\[ \therefore t_{o2} / t_{o1} = n_{o2} / n_{o1} = 2 \times 10^{-25} \times 10^{37} = 10^{12} \]

由t_{o2}和t_{o1}所生成的小黑洞M_{bb2}和M_{bb1}的视界半径R_{bb2}和R_{bb1}分别:

\[ R_{bb1} = C t_{o1} = 6 \times 10^{-22} cm \]
\[ R_{bb2} = C t_{o2} = 6 \times 10^{-14} cm \]

\[ R_{bb2} / R_{bb1} = 10^{12} \]

\[ \therefore t_{o2} / t_{o1} = n_{o2} / n_{o1} \approx 10^{2} \quad (7-3c) \]

结论: 上面A和B两种情况所达到的结果是一样的, 即M_{bm}的合并结果都成为R_{bb2}的小黑洞, 即M_{bb2} = M_{bm}和R_{bb2} = C t_{o2}。只不过在“暴涨”时, M_{bm}在t_{o1} = 2 \times 10^{-37} s时就形成了。而在“正涨”时, M_{bb2}是在t_{o2} = 2 \times 10^{-24} s时才形成的。

3* 小黑洞M_{bb1}和M_{bb2}的其它参数: 已知R_{bb2} = C t_{o2} = 6 \times 10^{-14} cm, M_{bb2} = M_{bb1} = 0.675 \times 10^{25} g, R_{bb2} = 4 \times 10^{15} g, \rho_{bb2} = 3 M_{bb2} / (4 \pi R_{bb2}^{3}) = 4.4 \times 10^{14} g/cm^{3}. \quad (7-4)

在那时, t_{o1} = 0.2 \times 10^{-36} s 或者 t_{o2} = 2 \times 10^{-24} s时, M_{u}的密度\rho_{bb} 与M_{bb2}的 \rho_{bb2} 是一样的。M_{u}在那时的视界半径R_{ab}是:

\[ R_{ab} = (3 M_{u} / 4 \pi \rho_{bb})^{1/3} = 2.4 cm \quad (7-6) \]

\[ N_{ab} = M_{u} / M_{bb} = 8.8 \times 10^{6} / 4 \times 10^{15} = 2.2 \times 10^{46} \]

\[ N_{bb} = M_{bb} / M_{bm} = 4 \times 10^{15} / 1.09 \times 10^{-5} = 4 \times 10^{20} \quad (7-7) \]

4*。现在来探讨有“原初暴涨”情况: 按照苏宜《新天文学概论》中 12.7 节中的资料和计算, \[ k_{t} = 10^{1/2}, R \text{为初时的尺度, } t \text{为宇宙生成的年龄, 在 } t = 10^{-36} s, \text{宇宙经过“暴涨” 的尺寸为 } R_{-36} = 3.8 \text{ cm.} \]

此时, 求出宇宙密度 \rho_{bb} = 3.8 \times 10^{13} g/cm^{3}, 宇宙在M_{bm} 时的尺寸, 即 t = 5.37 \times 10^{-24} s时的尺度 R_{-44}:

\[ R_{-36} = 1.83 \times 10^{23} cm / (10^{-36} s)^{1/2} / (7 \times 10^{5} \times 10^{15} s)^{1/2} = 3.8 cm \quad (7-8) \]

\[ \rho_{bb2} = 3 M_{u} / (4 \pi R_{-36}^{3}) = 3.8 \times 10^{13} g/cm^{3} \quad (7-9) \]

\[ R_{-44} = (3 M_{u} / 4 \pi \rho_{ab})^{1/3} = 10^{-13} cm \quad (7-10) \]
必须指出，苏宜教授书中的宇宙“暴涨”的数据是很有代表性的。它指出，当宇宙从初始暴涨到$t = 10^{-36}s$时，宇宙尺寸增大$10^{13}$倍，体积暴涨$10^{40}$倍。

5*. 结论：A. （7-8）式中提出的宇宙在$10^{-36}s$时的“暴涨”尺寸是3.8 cm, 作者在（7-6）中同是在约$10^{-36}s$时，宇宙的“暴涨”尺寸是2.4 cm, 二者是极其接近的。这说明作者提出宇宙“原初暴涨”的机理是：所有宇宙$M_u$中的原初最小黑洞$M_{bm}$的合并造成了宇宙的“原初暴涨”，而所有$M_{bm}$合并将$M_u$连成一体后，就是“原初暴涨”的终结。作者前所未有的对“暴涨”发生的机理、过程和终结都做出了明确的规定和计算，其数据符合现有的理论和观测数据。

B. 因为“暴涨”发生在宇宙初生时的$10^{-24}s$之前，其发生的真实情况也许永远不可能被人类观测到。因此，如未来在“暴涨”被否定的情况下, 作者还提出了“正涨”的机理、过程和终结的理论。就是说，只要宇宙出生于最小黑洞$M_{bm}$，由$M_{bm}$合并产生的膨胀只能二者必居其一。

6*. 从第2页的图1, 看,$t_{bb} = 0.2 \times 10^{-36}s$在宇宙演变的大统一时代，即GUT Era。

【8】. 对我们宇宙过去现在和将来的数据的一些简单的陈述。

我们现在的宇宙是一个真正的巨无霸宇宙黑洞，他的生长衰亡完全符合一般黑洞的规律。他因吞食外界能量-物质或与其它大小黑洞合并而增加$M_u$和$R_u$，只有外界无能量-物质可吞食时，就发射霍金辐射，直到最后收缩成为最小黑洞$M_{bm}$= $m_p$而消亡。这时，宇宙的年龄将是$L_u \approx 10^{132}$亿年。如果宇宙尚有能量-物质可吞食，它们被吞噬完后，宇宙才收缩，结果同上。只不过宇宙年龄将是$L_u >>> 10^{132}$亿年。

我们宇宙黑洞现在的年龄为$A_u = 137$亿年。视界半径$R_u = 1.3 \times 10^{28}cm$，宇宙黑洞的总质量是$M_u= 8.8 \times 10^{55}g$，宇宙现在的的平均密度$\rho_u = 3/(8\pi G A_u^2) = 0.958 \times 10^{-29}g/cm^3$。宇宙中遍布着大小黑洞，还有大黑洞套住小黑洞。平直性($\Omega = \rho_r/\rho_o = 1$)是宇宙黑洞的本性。

宇宙黑洞诞生于普朗克粒子$m_p$的最小黑洞$M_{bm}$，即$M_{bm} = m_p$。由$N_{bu} = 10^{61}$个$M_{bm}$合并而成，宇宙诞生时的尺寸只有现在的质子大小，即$R_{u0} = 10^{-13}cm$. $M_{bm}$在出生时的合并造成了宇宙的“原初暴涨”，宇宙在$t_{o} = 2\times 10^{-37}s$时结束“原初暴涨”，将整个$M_u$连成一体，形成许多$M_{bb1} = 4 \times 10^{15}g$的小黑洞。宇宙黑洞现在的膨胀就是这些小黑洞$M_{bb1}$的合并造成的。

人类现在生活在宇宙黑洞中，不知道宇宙黑洞$M_u$视界之外的宇宙，但在宇宙黑洞内的空间，散布者许多黑洞，最小的黑洞是约$3M_{\theta}$的恒星级黑洞，最大的黑洞是($10^8~10^{12}$)$M_{\theta}$的超级大黑洞，它们都处在星团和星系的中心。

【9】. 进一步的解释、分析和结论：

1*. 奇点被定义为具有无穷大密度的点。广义相对论方程中粒子的点结构、粒子没有热压力作为对抗力，零压宇宙模型和定质量物质粒子的收缩必然造成奇点的出现。就是这些假设使S•霍金 和 R•彭罗斯在40年前证明了我们宇宙诞生于奇点或奇点的“大爆炸”，证明了黑洞里有奇点。本文运用霍金的黑洞理论公式和其它经典理论公式，推导出来一个新的重要公式(3c)，精确地计算出，当前辈宇宙塌缩到时间$t \approx -0.5563 \times 10^{-43}s$时，所有前辈宇宙中的粒子塌缩成为最小黑洞$M_{bm} = (hC/8\pi G)^{1/2} = m_p = 1.09 \times 10^{-5}g$，即普朗克粒子$m_p$，而爆炸消失在普朗克领域。由于爆炸使充满能量-物质的“宇宙包”产生膨胀和温度的降低，于是能量重新聚集成稍大的稳定的最小黑洞$2M_{bm}$，它们成为产生新宇宙的胚胎，他们的合并造成了宇宙的“原初暴涨”和我们现在宇宙黑洞的膨胀。

2*. 实际上John & Gribbin已在他的《大宇宙百科全书》书中指出，“我们宇宙可能来源于$M_{bm} \approx 10^{-5}g$的粒子”<7> “（普朗克领域）实际上是我们宇宙诞生时的状态”<7> 作者在本文中只不过用正确的理论公式和数据通过严密的计算准确地证实了John & Gribbin 的这个猜想而已。

3*. 我们宇宙是一个真实的宇宙黑洞(UBH)，它完全遵循一般黑洞的参数$M_u, R_u, T_u, m_{ss}$在其视界半径$R_u$上的守恒公式。因吞食外界能量-物质而膨胀，发射霍金辐射而收缩。

4*. 本文首次提出了产生“原初暴涨”的机理，并论证了我们新生宇宙的“原初暴涨”是由于新生的最小黑洞$M_{bm}$的合并而造成的，其终结的时间为$t_{bb} = 0.2 \times 10^{-36}s$。

5*. 无论我们现在宇宙是膨胀还是收缩，或者说开放还是封闭，不像弗里德曼对广义相对论方程的解所指出的那样，取决于宇宙的实际密度$\rho$, 这种$\rho = \rho_c$或$\Omega = 1$的假设是从错误的理论中得出的伪命
题。对于一个真正的宇宙黑洞，只有一个取决于\(M_s\)的确定密度，\(\rho_r = \rho_c\) 或\(\Omega = 1\) 是黑洞的本性。科学家几十年对\(\rho_r \neq \rho_c\) 的争论时毫无意义的。

6*. 宇宙学中有 4 大难题，即奇点、平直性疑难、视界疑难和磁单极疑难，他们困扰了科学家们数十年，作者在本文中解决了奇点和平直性疑难之后，其它 2 个疑难就容易了。况且本文对“原初暴涨” 的正确解决可能对视界疑难提供了解决的钥匙。

7*. 本文虽未创建新理论或创立新方程, 但在解答现今存在的科学难题上却似乎胜过其它的任何一种单独的经典理论或新理论，由于所运用的各种经典理论的基本公式基础坚实，在自然界行之有效，故本文对宇宙学提出的所有新概念新论证新解释和新结论有比较圆满的自洽性，与现今的观测数据完全相符合。本文也不排斥任何新理论的现有成果和结论。

8*. 如果本文排除了宇宙诞生于 “奇点” 或者 “奇点的大爆炸”，那就没有必要在宇宙创生时给于任何特殊的边界条件, 也不必乞灵于上帝或奇迹或新物理学如量子引力论，弦论或超对称理论等对我们宇宙起源或对“宇宙大爆炸”的诸多牵强附会的解释. 根据现有经典理论就能阐明和推算出我们宇宙诞生时的演变机理, 条件和过程，这种演变过程完全符合现有的物质世界的规律和物理定律，如因果律，质能转变守恒定律，和我们现在宇宙黑洞的膨胀。

9*. 本文计算中所得出的数据与现有理论，公式和观测结果是相当一致的。这表示本文中新观念是宇宙的实际演化规律的一幅较好的自洽图像。或许本文中的新观念和论证方法由于缺乏深奥的新理论，复杂的数学方程和违反常规而难于为绝大多数科学家所接受和信服。但本文由于所用的理论和公式却是可靠而有效的，所以其独特而简单的证明方式与所计算的结果是符合宇宙演变中各种现有的规律的。这为运用几个简单而可靠的经典基本公式以解决复杂的问题提供了一个实例。爱因斯坦曾警告说：“万事万物应该尽量简单，而不是更简单。” 本文中新的观念和新的论证方法也许可以作为一种抛砖引玉吧。

参考文献:
1. 张洞生：“对黑洞内部没有奇点的完整论证”。本文上篇。
   http://www.sciencepub.net/newyork/0202
5. 王永久：“黑洞物理学”，湖南师范大学出版社，2000.
6. 何香涛：“观测宇宙学” 科学出版社，2002 年
7. 丹尼斯.奥弗比：“环宇孤心” 北京中信出版社，2002 年
8. 宗群：“宇宙常数、超对称和膜宇宙论”。 http://www.changhai.org/2003-08-17
9. 王义超：暗能量的幽灵。中国《财经》杂志，总 176 期，2007-01-08.
10. 张洞生：《对黑洞的新观念和新的完整论证：黑洞内部根本没有奇点（上篇）》。对黑洞的新观新的完整论证：黑洞内部根本没有奇点（本文的
11. 张洞生：《对宇宙加速膨胀的最新解释：由于在宇宙早期所发生的宇宙黑洞间的碰撞造成》。
12. 卢昌海：宇宙常数, 超对称和膜宇宙论。
   http://www.changhai.org/2003-08-17

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