The Originative Blackhole-Cosmology
==From now on, the Black Hole Theory and Cosmogony may be better integrated==

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Descartes：We couldn't rely on other's authority to accept the truth, which should be sought by ourselves.

Abstract： What is a brand-new blackhole-cosmology? In brief, it would be a new branch of blackhole-theory developed by author, which could better explain and demonstrate the laws from the birth to growth、decline and up to death of our Universe. There are two Chapters in this article.Chapter I: <The new concepts and new formulas of the black-hole (BH) theory>. Chapter II: < The New Concepts and New Researches to Cosmology with New BH-theory >. According to the new concepts and formulas of BHs in Chapter I, they can be applied to better explain and solve many important problems about the origin and evolution of our Universe.

[Zhang D. **The Originative Blackhole-Cosmology-- From now on, the Black Hole Theory and Cosmogony may be better integrated Zhang Dongsheng.** *N Y Sci J* 2014;7(1):5-24]. (ISSN: 1554-0200).
http://www.sciencepub.net/newyork. 2

Key words： Hawking theory of black holes (BH); Hawking quantum radiation m_{ss}; minimum BH-- M_{bm}; Planck particles m_p; the origin and evolution of our Universe; cosmic-BH; Original Inflation of our Universe; information amount I_m of any BH; entropy S_B of any BH; minimum information unit—I_o;

【Author's new and important contributions in this article】：

In this article, all concepts, formulas, inferences and conclusions to BH-theory and cosmology in every paragraph and section are newly proposed and derived out by author as follows:

1: The exact and new general formula between m_{ss} and M_b is simply derived out, i.e, $m_{ss}M_b = hC/8\pi G = 1.187\times10^{-10}g^2$（1d）, which can develop and complete the BH-theory.

2: The author demonstrated exactly the physical significance of (1d), which shows the balance between the gravitational force of M_b to m_{ss} and the centrifugal force of m_{ss} on R_b.

3: Furthermore, according to the axiom of any part ≦its whole , at the limited condition, the exact new formula (1e) is simply derived out, $m_{ss} = M_{bm} =$ （$hC/8\pi G$）$^{1/2} = 1.09\times10^{-5}$**g. Thus,** owing to （$hC/8\pi G$）$^{1/2} \equiv m_p$. i.e, Planck particle, [3] the last destiny of all BHs could only **become $m_{ss} \equiv M_{bm} \equiv m_p \equiv$（$hC/8\pi G$）$^{1/2}$(1e), and disintegrated in Planck Era. So, any BH of M_b could impossibly contract into a Singularity.**

At the same time, since M_b and m_{ss} have nothing to do with the structures and states inside BHs**, EGTR (The Equation of The General Theory of Relativity) can be given up from the BH-theory in this article。**

4: The essential attribute of any BHs is that, once a BH was formed, it would be a BH forever until it finally becomes $m_p = M_{bm}$ and then disappears in the Planck Era,

5: The author proved that, the information unit I_o of any Hawking radiation m_{ss} is precisely equal **to $I_o = h/2\pi =$ the basic and the smallest information unit. Then, I_o of any m_{ss} is not related to the amount of m_{ss} or M_b. The total information amounts I_m of a BH of M_b is newly derived, $I_m = 4GM_b^2/C$ (63d)。**

6: A new formula of needed time ($^-d\tau_b$) for any BH to emit a m_{ss} is derived**, $^-d\tau_b \approx 3\times10^{-27}M_bhC/8\pi G$**

7: The author proved that, our Universe would be a really and completely gigantic cosmic-BH. Hubble law could just be the expansive law of our Universe caused from the combinations of new innumerable $M_{bm}= m_p$**.** For any BH and our Universe as a cosmic-BH (CBH), $\Omega \equiv 1$ is an inevitable result.

8: According to the principle of time symmetry, before the birth of our Universe, the Pre-universe supposedly had a Big Crunch, and its last collapsing law was equal to the expansive law of our Universe at its genesis, then, **once Pre-universe collapsed lastly to time, $--t_m = [k_1 (2G\kappa)/C^5]^{2/3} = --0.5563\times10^{-43}$s, all particles in the Pre-universe would break off their gravitational links, become Planck particles, $m_p = M_{bm}$,** and disappear in the Planck Era. After that, all the remains of the Pre-universe could reform into new innumerable $M_{bl} = 2m_p = 2M_{bm}$ at $+t_m$ to recover their gravities in the Planck Era at the highest density. The appearance and combinations of countless M_{bl} would instantly create the 'Original Inflation' and the continuous expansion of our Universe afterwards. As a result, The Pre-universe at **$--t_m$ could directly reach to our Universe at** $+t_m$ through Planck Era, but had no way reach to **$--t_m = 0$ of Singularity.**

9: The Author testified the 'Original Inflation' with a new and simple principle.

10: In Form 2, the extremely harmonious and precise relationships between all data of 7 different BHs in our Universe can confirm in that the new concepts and formulas of the BH-theory and cosmogony proposed by the author in this article are rather identical and effective.

【A few words from the author】: My maxim: The genuine scientific knowledge and new ideas may often come from the trivial numerical calculations. In this article although there are no profound theories nor complicated mathematical equations, the author can only forge ahead a little from some Hawking formulas of BHs with other classical formulas to derive out many new simple and basic but important formulas，such as the formulas (1d), (1e),(63a),(63d), etc and Form 2. Although scholars, experts and professors may not glance at my work in this article I believe, however, that the new formulas and Form 2 can be effective in explaining many important and practical problems in BHs and cosmogony which were unknown in the past, such as that of no Singularity appearance at the birth of our Universe, the origin of our Universe, the destiny of BHs, etc. In addition, those formulas are simple, reliable, harmonious, and are in better accordance with various observational data. Therefore, **let facts testify and judge of which new formulas and concepts gotten by the author in this article will be correct or not in the future.**

Chapter I: The New Concepts and New Formulas of BH-Theory

==In this article, only Schwarzschild (gravitational) BHs of no charges, no rotating and spherical symmetry will be studied.==

【Preface】。 It would not be possible to solve any important problems about black holes and the origin of our Universe with Einstein's Equation of the General Theory of Relativity **(EGTR),** because its general solutions had no way to be solved. From what Einstein said, his EGTR could be too perfect to have anything added into it. After that, scholars had to find out some special solution to EGTR. For that purpose, they wanted to simplify EGTR and to propose some hypotheses in which two common and important hypotheses were bound to **violate the thermodynamic laws; one was the movement and contraction of equal energy-matters; another was the isobaric universal model of zero pressure. Just those two hypotheses would lead to the appearance of Singularity from solving EGTR, and to other wrong concepts and conclusions,** such as Schwarzschild metric and Freidmann-Robertson-Walker metric, etc, which could be not in accord with the real conditions of our Universe, [6]

The basic principles and laws of black holes (BHs) were originated from the classical theories.

Laplace (1749--1827) first proposed the concept of Black Holes (BH) in 1796 on his book, 'The Universal System'. According to the principle of the second universal speed, $v_2 = (2GM_e/R_e)^{1/2}$, he supposed that a great star had diameter of 250 × **sun** diameter, and a density of 5.5g/cm^3, his calculated result was light as a particle at its boundary, the fleeing speed v2 was extremely approximately equal to light speed C, i.e, v2 = 3.1×10^{10}**cm/s** ≈ **(C=**3×10^{10}**cm/s)**.

In Dec.1915, Einstein's EGTR was just published and one month later Karl Schwarzschild, a German astronomer, got an precise solution from EGTR, i.e, the famous Schwarzschild formula **(1c)**--**$GM_b/R_b = C^2/2$, it is the existent condition of any spherical BH of no charges and non-rotating. It was the first formula for Black Holes (BHs).** However, according to the above Schwarzschild solution to EGTR, once a black hole (BH) was formed, it could only increase in its mass of M_b with engulfing energy-matters from outside, **and would exist in The Universe forever. It must violate the general law of everything having its life and death in the Universe.** Therefore, it has not been able to solve the important problems in BHs and cosmogony with EGTR for nearly 100 years, except solving a few special examples.

Hawking theories about BHs have been the epoch-making significances; they were built on the foundations of quantum mechanics and thermo-mechanics. Hawking proposed that there would be temperature T_b on the Event Horizon (EH) R_b of any BH, and on which the **Hawking quantum radiations (HQR) m_{ee}** would be emitted to outside. **Most importantly, Hawking derived out the famous temperature T_b formula (1a) on R_b of BHs, i.e, $T_bM_b = (C^3/4G) \times (h/2\pi\kappa)$—(1a),** As a result, BHs could lose its energy-matters M_b, reduce its R_b and disappear at last. It is said, that any BH could be in accordance with the same general law of life and death as anything else in The Universe.

However, two formulas (1c) and (1a) are still not enough to solve many important problems about the property and destiny of BHs, because the amount of m_{ss} --HQR on the Event Horizon R_b could not be solved by Hawking. He might be over-wholeheartedly busy in finding out m_{ss} from virtual

particles in Dirac sea. Hawking explanations about BHs to emit m_{ss} with virtual particles in Dirac sea would intentionally make a mystery of simple things. He neglected to apply classical theories and formulas.

The author's new and most important contributions to BH theories and cosmology are to derive out formulas (1d), i.e, $m_{ss}M_b = hC/8\pi G$ and (1e), as they are the other two important formulas to recognize and decide the essence of BH. As a result, the four parameters (M_b, R_b, T_b, m_{ss}) of any BH, if any one of them could be decided, the other three would be precisely calculated out with three formulas-- (1a), (1c) and (1d). **From hence on, the Black Hole Theory and Cosmology may be in more harmony and perfection.**

【1】。How to derive the new formulas (1d) and (1e), (1d)--$m_{ss}M_b = hC/8\pi G = 1.187\times10^{-10}g^2$; (1e)--$M_{bm} \equiv m_p = (hC/8\pi G)^{1/2} = 1.09\times10^{-5}$g:

m_p --Planck particles, M_b -- mass of a BH, **R_b --** radius of EH of a BH, **T_b--** temperature on EH (Event Horizon) R_b of a BH, **m_{ss} --** mass of a Hawking quantum radiation--HQR, **h**—Planck constant=$6.63\times10^{-27}gcm^2/s$, **C**--light speed =3×10^{10} cm/s, **G**--gravitational constant =$6.67\times10^{-8}cm^3/s^2{*}g$, **κ**—Bolzmann constant =$1.38\times 10^{-16}g{*}cm^2/s^2{*}k$, **$m_p$**--Planck particple, **$L_p$**--Planck length, **$T_p$**---Planck temperature, **M_{bm}**—mass of minimum BH in The Universe.

Owing to having temperature T_b on the radius R_b of any BH proven by Hawking, then, (1a) below is the famous Hawking temperature formula.

$$T_b M_b = (C^3/4G) \times (h/2\pi\kappa) \approx 10^{27}gk \text{ [1]} \quad (1a)$$

Let m_{ss} be Hawking quantum radiation (HQR) on R_b; according to formula of energy transformation,

$$m_{ss} = \kappa T_b/C^2 \text{ [2]} \quad (1b)$$

T_b is the valve temperature on R_b.

According to Schwarzschild special solution (1c) from EGTR, (1c) shows any light as energy revolves around on R_b, but would have no way to flee out to the outside of BH.

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

From (1a) and (1b), (1d) is easily derived,

$$m_{ss} M_b = hC/8\pi G = 1.187\times10^{-10}g^2 \quad (1d)$$

(1d) is a new、general and effective formula on R_b of any BH。Since $m_{ss}M_b$ = constant，**according to the third law of thermo-mechanics,** then certainly $T_b \neq 0$，from (1a) $M_b \neq 0$. Thus, from (1c) (1d), $R_b \neq 0$ and $m_{ss} \neq 0$. Consequently, it is impossible for m_{ss}, M_b and R_b to equal to zero or infinity. So then, m_{ss}, R_b and M_b must have its respective limit. From (1d)，**according to the axiom of any part ≦ its whole, at the limited condition,** $M_b = m_{ss} = M_{bm} = (hC/8\pi G)^{1/2}$. Owing to $(hC/8\pi G)^{1/2} \equiv m_p$= Planck particle, [3] then,（1e）is another new important formula of BH-theory,

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

$$\therefore m_{ss}R_b = h/(4\pi C) \quad (1f)$$

$$R_{bm} \equiv L_p \equiv (Gh/2\pi C^3)^{1/2} \equiv 1.61\times 10^{-33}cm \text{ [5]} \quad (1g)$$

$$T_{bm} \equiv T_p \equiv 0.71\times 10^{32}k \text{ [5]} \quad (1h)$$

Generally, Compton time t_c = Schwarzchild t_s,

$$\therefore t_c = t_s = R_{bm}/C = 1.61\times10^{-33}/3\times10^{10} = 0.537\times10^{-43}s \quad (1j)$$

$$\rho_{bm} \approx 10^{92}g/cm^3 \quad (1k)$$

From $M_b = 4\pi\rho R_b^3/3$ and (1c), for any BHs, (1n) is always a sufficient and necessary condition of all BHs.

$$\rho_b R_b^2 = 3C^2/(8\pi G) = \text{constant} \quad (1n)$$

Theoretically, the last contraction of M_b could only reach to a real minimum BH--$M_{bl} = 2M_{bm} = 2m_p = 2m_{ss} = 2\times1.09\times10^{-5}g \approx 2.2\times10^{-5}g$. Then **in reality, the last existent minimum BHs would be M_{bl}, but not M_{bm}, because after the last division of M_{bl}, it became two $m_{ss} = M_{bm} = m_p$, which could only be Planck particles m_p of the highest energy, so then,**

$$M_{bl} = 2M_{bm} \approx 2.2\times10^{-5}g \quad (1p)$$

It can be seen from the above formulas, the relationship between **M_b and R_b, T_b and m_{ss} are all the simplest and most linear relationship. Thus, BHs are the simplest objects in The Universe.**

【2】。Why would the final contraction of any BHs only become $m_{ss} = M_{bm} = m_p$ and disintegrate in Planck Era, but would be impossible to contract to become Singularity?

According to (1d) and（1e），$m_{ss} = M_{bm} \equiv m_p \equiv (hC/8\pi G)^{1/2} = 1.09\times10^{-5}$g，

Owing to that Planck Era could not be understood and observed by people at present or even ever, we would have no way to know the conditions after the disappearance of $M_{bm} = m_p$. We may only deduce from (1e), **M_{bl} might be the real minimum BH in The Universe, and Planck participle m_p might be the maximum energy-particle appearing in Planck Era. Thus, $M_{bm} = m_p$ might be the 'critical point' between our Universe and Planck Era.**

2-1*. Once a BH of M_b contracts its mass into M_{bm}, it becomes

$$M_{bm}C^2 = m_{ss}C^2 = \kappa T_b = 10^{16}erg,\ T_b = 10^{32}k \quad (2a)$$

$$M_{bm}C^2/\kappa T_b = m_{ss}C^2/\kappa T_b = 1 \quad (2b)$$

It can then be seen that M_{bm} had become a complete energy-ball of 10^{32}k. Then, $M_{bm} = m_{ss}$ of which contains no gravity inside would then explode wholly into γ- rays of high energy.

2-2*。 As $m_p = M_{bm}$, it was not a BH at all since it had no superfluous energy-matters as m_{ss} to be emitted out. Otherwise, it would lead to $m_{ss} > M_{bm}$,

and violate formula (1d)--$m_{ss}M_b = hC/8\pi G$ and formula（1e）.

2-3*。 Owing to Schwarzschild time t_s of ($m_p = M_{bm}$), $t_s = 0.537\times10^{-43} = R_{bm}/C = 1.61\times10^{-33}/3\times10^{10}$，then, $m_p = M_{bm}$ could not have enough time to transmit gravities between particles $m_p = M_{bm}$ and inside M_{bm}，so that it could have been the only way for them to be disintegrated by the highest temperature of 10^{32}k.

2-4*. According to Uncertainty Principle，

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

To M_{bm}, its $\Delta E = M_{bm}C^2 = \kappa T_b = \mathbf{10^{16}erg}$, its Δt = 2×Schwarzschild time $2t_s = 2R_{bm}/C = 2\times1.61\times10^{-33}/3\times10^{10} = \mathbf{1.074\times10^{-43}s}$。

$\therefore \Delta E\times\Delta t = 10^{16}\times(2\times0.537\times10^{-43}) = \mathbf{1.074\ 10^{-27}}$.

However, $h/2\pi = 6.63\times10^{-27}/2\pi = \mathbf{1.06\times10^{-27}}$。

It is said，if $M_{bm} = m_p$ could reduce its mass again, **it would let $\Delta E\times\Delta t < h/2\pi$, and violate Uncertainty Principle.**

2-5*; The information amount I_o of $M_{bm} = m_p$ is $I_o = h/2\pi$ = the minimum 、basic information unit and cannot be divided again in The Universe。

It can be seen, M_{bl} (= $2M_{bm}$) are BHs, but $M_{bm} = m_p$ = particles of the highest energy = Planck particles.

Conclusion: Any BHs could only emit m_{ss}, and reduce its mass finally into $M_{bl} = 2M_{bm} = 2m_p = 2m_{ss}$, and disintegrate in Planck Era, but impossible to contract its size (R_b) into 'Singularity' of infinite density. Thus, the density of $10^{92}g/cm^3$ and temperature of 10^{32}k of M_{bl} would be the highest limit in The Universe.

【3】。The most essential attribute of any BHs: Once a BH could be formed, it would be a BH forever until it finally become Planck particles $m_p = M_{bm} = (hC/8\pi G)^{1/2} = 1.09\times10^{-5}g$, then explode and disappear in Planck Era, no matter whether it had expanded because of engulfing energy-matter from outside or it had contracted because of emitting HQR --m_{ss} to outside in the past.

According to Schwarzschild solution to EGTR, from（1c），

$$R_b = 2GM_b/C^2, \qquad (1c)$$

$$\therefore C^2dR_b = 2GdM_b \qquad (3a)$$

$$C^2(R_b \pm dR_b) = 2G(M_b \pm dM_b) \qquad (3b)$$

Suppose another M_{ba} could collide and combine with M_b，then,

$$C^2R_{ba} = 2GM_{ba}$$

From (3a) +（3b）+ (1c)

$$\therefore C^2(R_b+R_{ba} \pm dR_b) = 2G(M_b+M_{ba} \pm dM_b) \qquad (3c)$$

From above formula (3c), when a BH could engulf in energy-matters from outside or combine with another BH, it would increase in its M_b and R_b，and decrease in its T_b and m_{ss}, it would be a real BH too. After a BH emitting its m_{ss} to outside，it would decrease in its M_b and R_b, and increase in its T_b and m_{ss}, but would remain a BH until it finally becomes $\mathbf{m_p = M_{bm}}$。

From (3a), $C^2dR_b = 2GdM_b$, let $dR_b/dt = V_b$,

$$\therefore V_b = (2G/C^2)(dM_b/dt) \qquad (3d)$$

V_b is the expansive speed of R_b of a BH, it is equal to the proportional increase in total mass of M_b in the unit time-- dM_b/dt.

From **(1c) and** ($M_b = 4\pi\rho R_b^3/3$),

$$C^2 = (8\pi G\rho_o/3)R_b^2 \qquad (3e)$$

Let $H_o^2 = 8\pi G\rho_o/3$ (3f)

$$\therefore C = H_o R_b, \text{ or } V = H_o R \qquad (3g)$$

Let $a_b = dV_b/dt$, from (3d),

$$\therefore a_b = dV_b/dt = (2G/C^2)(d^2M_b/dt^2) \qquad (3h)$$

Conclusion: It can be known from (3g), while R_b of a BH expanded due to engulfing energy-matters outside and under the condition of the speed of R_b is equal to light speed C, the expansive speed V at any point of R in BH had to accord with Hubble law.

【4】。The mechanism of BHs of mass M_b to emit Hawking quantum radiation (HQR-- m_{ss}). Only with classical theories can the mechanism of BHs to emit m_{ss} be correctly explained.

BHs emitting m_{ss}, or m_{ss} out from R_b of BHs to outside is the same mechanism with which stars or any hot objects emit radiation energy. They are all the same processes by which higher energy (high temperature) naturally flows to lower energy (low temperature).

4-1*. The gravitational force F_{bg} of mass--M_b to m_{ss} and the centrifugal force F_{bc} of m_{ss} **on the radius R_b.**

The physical significances of formula (1d).

$$m_{ss}M_b = hC/8\pi G = 1.187\times10^{-10}g^2 \qquad (1d)$$

From (1d), (right side and left side) × $2G/R_b^2$, thus,

$$2GM_bm_{ss}/R_b^2 = hC/4\pi R_b^2 \qquad (4a)$$

Owing to $m_{ss}M_b$ = const, thus, the gravitational force F_{bg} of M_b to m_{ss} is only inversely proportional to R_b^2, and does not have anything to do with mass M_b and m_{ss}. Let

$$F_{bg} = 2GM_bm_{ss}/R_b^2 \qquad (4b)$$

From (4a), (1c) and (1d), thus,

$$F_{bc} = hC/4\pi R_b^2 = m_{ss}\times(C^2/R_b) \qquad (4c)$$

$$\therefore m_{ss} = h/4\pi CR_b \qquad (4d)$$

Conclusion: From (4a), (4b) and (4c), F_{bg} shows the gravitational force of BH of M_b as a concentrative mass to m_{ss} revolving around BH on its R_b. F_{bc} shows the centrifugal force of Hawing quantum radiation—m_{ss} on R_b with light speed C, and C^2/R_b is just the centrifugal acceleration of (m_{ss} =

$h/4\pi CR_b$). Thus, (1d) may show that the reason why combinations of BHs could lead the expansion of their R_b is just to keep the balance of m_{ss} between its F_{bs} and F_{bc}.

Owing to that (4a) comes from (1d), mass M_b should scatter in the whole space of radius R_b, but not concentrate at the center of BH, it is the great difference between EGTR and Newton mechanics. Thus,

$$\mathbf{F_{bg}=F_{bc}=2GM_bm_{ss}/R_b^2=hC/4\pi R_b^2=m_{ss}\times (C^2/R_b)} \quad \mathbf{(4e)}$$

Similarly, applying Newton mechanics to get the balance between the gravitational force--F_{ng} to m_{ss} and its centrifugal force--F_{nc}, however, M_{bn} here is the concentrative mass at its center. Let,

$$F_{ng} = m_{ss}\times (GM_{bn}/R_b^2) \quad (4f)$$

$$F_{nc} = m_{ss}\times (C^2/R_b) \quad (4g)$$

$$(GM_{bn}/R_b^2) = m_{ss}\times (C^2/R_b) \quad (4h)$$

Owing to $F_{nc} = m_{ss}\times(C^2/R_b) = \mathbf{F_{bc}}$

$$\therefore M_b = M_{bn}/2, \text{ or } 2M_b = M_{bn} \quad (4i)$$

It can be seen from (4i), the gravitational effect of concentrated $M_{bn}/2$ can be equal to the effect of the scattered M_b. **It is said, suppose $M_{bn}=M_b$, the total gravity of M_b on R_b to m_{ss} can become greater than M_{bn}'s.** Since Newton mechanics can explain the balance between F_{bg} and F_{bc} on R_b of a BH, **is it necessary to apply a complicated concepts of EGTR to solve the problems about BHs and cosmology?**

4-2*。Three shapes of radiation energy of m_{ss} can be equally transformed with each other.

$$\mathbf{m_{ss}C^2 = \kappa T_b = Ch/2\pi\lambda_{ss} = \nu_{ss}h/2\pi} \quad \mathbf{(4j)}$$

m_{ss}—Hawking quantum radiation on the Event Horizon R_b of a BH, **ν_{ss}** frequency of m_{ss}, λ_{ss}—wave length of m_{ss}, **T_b**—temperature on R_b = valve temperature transforming m_{ss} into radiation energy.

The energy transformation of Hawking quantum radiation m_{ss} of BHs on R_b can be in accord with (4j).

As an example, the temperature on the surface of the sun is about 5800k. Let 5800k be the similar valve temperature T_b on R_b of BHs, the corresponding mass m_{sf} of the sun's radiation energy is: $m_{sf} = \kappa T_b/C^2 = 10^{-33}$g, and its equal wave length $\lambda_{sf} = h/(2\pi Cm_{sf}) = 10^{-5}$cm $=10^{-7}$m. It clearly shows that **the sun can only emit electromagnetic waves, visible light, and radio waves of $\lambda_{sf} > 10^{-7}$m.**

It shows that the mechanism of BHs to radiate m_{ss} is the same mechanism with which the sun radiates visible light, etc. However, sometimes the sun could radiate X-rays of high energy and project particles outward and due to strong explosions inside the sun, its thrust could push the particles of high energy into the universal space. Similarly, the explosions in large BHs might also project particles outwards as well.

From formulas (4d), (4j) and the following (63f),

$$\mathbf{m_{ss} = h/4\pi CR_b = h/2\pi\lambda_{ss}C} \quad \mathbf{(4k)}$$

$$\mathbf{\therefore 2R_b = \lambda_{ss} = D_b} \quad \mathbf{(4l)}$$

4-3*. How could Hawking quantum radiation--m_{ss} flee outward from R_b of BH ?

I think, any m_{ss} as energy and not matter particle on R_b of a BH has a certain mean temperature--T_b and wavelength λ_{ss}. However, m_{ss} could always have small vibration so that its speed and amplitude would have a little change at any instant. **Once m_{ss} vibrates to a low energy of wave trough, it might flow out from R_b.** The BH would immediately raise the temperature T_b on R_b slightly so that the outside m_{ss} of lower energy could not return to R_b of higher T_b, and could then only exist on the outside. Therefore, the process of m_{ss} fleeing outwards from R_b is just like the process by which the sun emits light, both processes are that which higher energy flows out naturally towards lower energy.

Hawking theory and laws of BHs to emit m_{ss} are correct and convincing, but the Hawking explanations to emit m_{ss} are unconvincing and seem incorrect.

Normally, Hawking and most scientists could explain BHs to emit m_{ss} with the concepts of vacuum energy in Dirac Sea. They recognized that virtual bi-particles would suddenly appear and annihilate in vacuum at any instant repeatedly. After a negative virtual particle of bi-particle captures a positive particle--m_{ss} on R_b of a BH and annihilate, the virtual positive particle of the bi-particle would then exist in vacuum. It shows that a m_{ss} of BH had fled outward. Such explanations are deliberate myths with the new physical concept. As **the energy value of m_{ss} on R_b of BH was uncertain, and m_{ss} was only decided by the changeable T_b on R_b** of M_b, **why then could virtual bi-particles in vacuum have the same energy value with m_{ss} on R_b and have both meet at the same time and place? In addition, since the numerical values of different M_b and m_{ss} have the greatest difference of approximate 10^{60} times in universal space, how much more could the greatest differences between virtual bi-particles in Dirac sea of anywhere have? It would certainly lead to the ridiculous conclusion that virtual bi-particles in Dirac Sea everywhere had to have extremely high energy as Wheeler calculated.**

In addition, at present the explanation of the so-called "virtual bi-particles" does not have a reliable and certain numerical value in any theory, and may have no way to be observed and examined.

【5】。The lifetime τ_b of any BH, the time gap

-dτ$_b$ needed by emitting two neighboring m$_{ss}$。

τ $_b$ ≈ 10^{-27} M$_b$^{3} [3]

（5a）

To minimum BH, $M_{bm} = m_{ss} = m_p = 1.09\times10^{-5}$ g, its lifetime $\tau_{bm} \approx 10^{-42}$ 秒 ≈ Schwarzschild time t_s of (1j), τ $_{bm}$ and t_s are at the same numerical grade. For star BHs, its mass $M_{bs} \approx 6\times10^{33}$g, so that, its lifetime τ$_b$ $_{bs}$ > 10^{66} yrs. If our Universe is a gigantic CBH, and no more energy-matters engulfed are from the outside, then its mass $M_{bu} \approx 10^{56}$g, so that its lifetime τ $_{bu}$ ≈ 10^{133}years。

Owing to $\tau_b = 10^{-27}M_b^3$, so, $-d\tau_b = 3\times10^{-27} M_b^2 dM_b$. **If let dM$_b$ = 1 m$_{ss}$**, then $-d\tau_b$ was just the time gap needed by emitting two neighboring m_{ss}。

-dτ$_b$ ≈ $3\times10^{-27} M_b^2 dM_b = 3\times10^{-27} M_b \times M_b m_{ss}$

≈ 0. 356×10^{-36}M$_b$ **（5b）**

Some conclusions:

1:* Our Universe is a really gigantic CBH（see【1】of Chapter II); if there are more energy-matters outside, then its mass M_{bu} will be more increased, and its lifetime becomes τ $_{bu}$ >> 10^{133}years。

2:* **According to BH theory , the destiny of our Universe is only decided by its mass--M$_b$,** but the General Theory of Relativity (GTR) recognized the destiny of our Universe was decided by unknown **(Ω = ρ$_r$/ρ$_o$ >1 or < 1). The conclusions of GTR are not right.**

3:* m_{ss} emitted out from star BHs ≈10^{-44}g is much less than any energy-matter particles in universal space. Thus, the big BHs (mass ≥ star BH) will always engulf energy-matters outside are like rapacious plunders, but emitting m_{ss} to outside are like misers. For example, our cosmic-BH would emit a weakest $m_{ssu} \approx 10^{-66}$g/every 10^{12} years.

4*; When a big BH--M_{bb} combined with a small BH--M_{bs}, M_{bs} would enter into M_{bb} , due to that particles in M_{bb} were always bigger than m_{ss} of M_{bs}, so, M_{bs} could engulf all energy-matters in M_{bb}, finally form a new bigger BH of (M_{bs} + M_{bb}) with the new bigger R_b of (R_{bs} + R_{bb}).

【6】。The total information amount I$_m$ and the total entropy S$_B$ of a BH of M$_b$. I$_m$ = I$_o$M$_b$/m$_{ss}$ = 4GM$_b$^{2}/C. S$_B$ = (π/I$_o$) I$_m$ = (π/I$_o$)×4GM$_b$^{2}/C = 2π^{2}R$_b$^{2}C^3/hG。 [1]

The total information amount I$_o$ of any m$_{ss}$, I$_o$= h/2π = basic and minimum information unit. The minimum entropy S$_{Bbm}$ of (M$_{bm}$ = m$_p$ = m$_{ss}$), S$_{Bbm}$ = π.

6-1*; According to the analogy of thermo-dynamics in the theory of BHs, the entropy--S$_B$ of any BH in Einstein gravity theory is as follows:

S$_B$ = A/4L$_p$^{2} [1] **= 2π^{2}R$_b$^{2}C^3/hG** **(6a)**

In the above (6a)，A--surface of a BH M_b，$A = 4\pi R_b^2$。L –Planck length，

$L = (HG/C^3)^{1/2}$ [6][3] (6b)

(6a) is the famous Bekenstein-Hawking formula.

From (1c)--$GM_b/R_b = C^2/2$，then,

$S_B = A/4L_p^2 = 4\pi R_b^2/(4GH/C^3) = 4\pi R_b^2\times C^3/4GH = \pi R_b R_b C^3/GH = \pi\times Ct_s\times 2GM_bC^3/GHC^2 =$ **πt$_s$×M$_b$C^2/H**

Let t_s be Schwarzschild time, $Ct_s = R_b$。So，

∴ S$_B$ × (h/2π)= π(2t$_s$×M$_b$C^2)，or

S$_B$ = π (2π/h)×(2t$_s$× M$_b$C^2) **(6c)**

In the above (6c)，H = (h/2π) = I$_o$. According to Heisenberg's Uncertainty Principle, two complementary physical dimensions, such as time and energy, location and momentum, angle and angular momentum, if neither can be precisely measured, then their product is equal to a constant $=H=h/2\pi=1.058\times10^{-34}Js=1.058\times10^{-27}$g*cm^2/s. At the limited condition of **(M$_b$ = M$_{bm}$),** then,

M$_{bm}$(=m$_{ss}$) C^2× 2t$_{sbm}$= h/2π = I$_o$ **（6d）**

ΔE × Δt ≈ h/2 π = I$_o$ **（6e）**

In the analogy between（6d）and（6e），(6e) is the mathematical formula of the Uncertainty Principle $2t_{sbm}$ corresponds to Δt，and $M_{bm}C^2$ corresponds to ΔE. It shows that any m_{ss} emitted from BHs are all quantum.

6-2*; The information amount I$_o$ and entropy S$_{Bbm}$ of M$_{bm}$ = m$_{ss}$ = m$_p$ = (hC/8πG)$^{1/2}$ are the minimum unit.

In above【1】, it was proven that,

M$_{bm}$ = m$_{ss}$ = m$_p$ = （hC/8πG）$^{1/2}$, and $R_{bm} \equiv L_p \equiv (Gh/2\pi C^3)^{1/2} \equiv 1.61\times10^{-33}$ cm, $t_{sbm} = R_{bm}/C = 0.537\times10^{-43}$s。Let the data of $M_{bm} = m_{ss} = m_p$, according to (6c) and（6d ）,

2t$_{sbm}$×M$_{bm}$(=m$_{ss}$) C^2 = $2\times0.537\times10^{-43}s\times1.09\times10^{-5}$ g $\times9\times10^{20}$ = **1. 054×10^{-27}gcm^2/s.** **（62a）**

h/2π=$6.63\times10^{-27}/2\pi$=**1.06×10^{-27}gcm^2/s** **(62b)**

∴（62a）=（62b）, then,

2t$_{sbm}$× M$_{bm}$ C^2 = h/2π = H **（62c）**

Thus, **h/2π = H = I is the minimum information unit in the Universe.** Owing to the lifetime of $M_{bm} = m_p$ being 0.537×10^{-43}s and I_o = the smallest unit, thus, $M_{bm} = m_p$ could only disintegrate themselves into many smaller energy-particles for prolonging their lifetime in Planck Era.

From (6c), the entropy S_{Bbm} of $M_{bm} = m_p$, due to $S_B (h/2\pi) = \pi\, 2t_{sbm}\times M_{bm}C^2$，as a result,

S$_{Bbm}$= π; I$_o$= 2t$_{sbm}$×M$_{bm}$C^2 = h/2π ;

S$_{Bbm}$ = (2π^2/h)I$_o$ **(62d)**

It shows the information amount < (I$_o$ = h/2π) would be impossible to exist in the Universe.

An amateur physicist, Ms. Fang (方舟の女) explained: On philosophy, existence is just perceived by sensory organs, and perceptibility is just the information to be got and transformed. Anything bringing no information could have no way to be perceived. Thus, information is just existence. [11]

∴Information＝Existence＝energy × time. [11]

Correspondingly, Planck constant H = energy Uncertainty × time Uncertainty

Why does existence ＝ energy × time ? It reflects that existence has two essential factors. Anything existent must have its energy and its living time. A thing of no energy or no living time would not really be in existence. [11] I think, her concepts to information are rather correct and accepted.

6-3* 。 The information amount of any m_{ss} radiated by any BH of M_b is equal to the same amount = $I_o = h/2\pi$, and does not have anything to do with the amount of M_b and m_{ss}。

To get the general formula of information amount of any m_{ss}, from (1d)， $m_{ss}M_b = hC/8\pi G = 1.187\times 10^{-10}g^2$。 Let I_{ss} = the information amounts of any m_{ss}，

$$I_{ss} = m_{ss}C^2\times 2t_s = C^2hC/(8\pi GM_b)\times 2R_b/C = [C^2hC/(8\pi GM_b)]\times 2\times 2GM_b/C^3 = h/2\pi = I_o \quad (63a)$$

The above (63a) shows any I_{ss} of any BH is always equal to $I_{ss} = I_o = h/2\pi$, no matter whether m_{ss} and M_b is big or small. Thus, I_o is the minimum and the basic information unit.

To get the total information amount **I_m and total entropy S_B of a BH of M_b,** let $n_i = M_b/m_{ss}$. Then,

$$I_m = n_iI_o;\ S_B = n_i\pi = (\pi/I_o)\ I_m = (2\pi^2/h)\ I_m, \quad (63b)$$

Owing to $M_b = n_i\, m_{ss}$， $I_m = I_oM_b/m_{ss}$， (63c)

From (1d) and (63c)，

$$I_m = I_oM_b/m_{ss} = 4GM_b^2/C \quad (63d)$$

From (63b) and (6a).

$$S_B = (\pi/I_o)\ I_m = (2\pi^2/h)\ I_m = (\pi/I_o)\times 4GM_b^2/C = 2\pi^2R_b^2C^3/hG = S_B, \quad (63e)$$

For example, to figure out total entropy S_{B10} of a BH $=10M_\theta = 10\times 2\times 10^{33}$g

$S_{B10} = (\pi/I_o)\times 4GM_b^2/C = 2\pi^2 4G\ (10\times 2\times 10^{33})^2/hC = 2\pi^2\times 4\times 6.67\times 10^{-8}\ (10\times 2\times 10^{33})^2 /(6.63\times 10^{-27}\times 3\times 10^{10}\times 10^7) = \mathbf{10.6\times 10^{71}J/k.}$

In §10.3.7 of References [2], Prof. Su Yi pointed out that, Hawking's calculations to $S_{B10} = 10.6\times 10^{71}$J/k.

From（4j）and (62c), $m_{ss}C^2 = (h/2\pi)\times C/\lambda_{ss}$, so, any **wave length λ_{ss} of m_{ss} is equal to the diameter of BH of M_b。**

$$\lambda_{ss} = 2t_cC = 2R_b = D_b \quad (63f)$$

6-4*; Some very significant and effective conclusions can be derived from above:

A. From (63e) ≡ (6a) it can be proved that 1; the total entropy S_B of any BH precisely equals to a constant × its total information I_m, **so that entropy is just information**. 2. All formulas derived above by author are **perfectly correct and very harmonious.**

B. The information amount I_m in combinations of two BHs ($M_{b1} + M_{b2}$) cannot be conservative.

From (63d), owing to $I_m \backsim M_b^2$, i.e., I_m are directly proportional to M_b^2, after combinations by two BHs of $M_{b1} + M_{b2}$, their total information amount $I_{m1+m2} \backsim (M_{b1} + M_{b2})^2$; but $I_{m1} \backsim M_{b1}^2$, and $I_{m2} \backsim M_b^2$, then, $I_{m1+m2} > I_{m1} + I_{m2}$. Similarly, if a BH of M_b, its original I_m of M_b, $I_m \backsim M_b^2$, after M_b emitting m_{ss} of 0.5 M_b, the rest of 0.5 M_b will only have 0.25 I_m, but the lost 0.5 M_b have brought away 0.75 I_m. However, the original total information amount I_m of M_b cannot be changed any more, and is equal to a constant in the process of emitting m_{ss}. Obviously, from (63a), owing to I_o of any $m_{ss}=h/2\pi$, the bigger M_b can emit the longer λ_{ss} of m_{ss}, and bring away the less mass. Entropy is the same conditions with the information above.

C. **Any small or large BH could emit only one m_{ss} with the equal I_o at the same instant,** although the mass amount of every m_{ss} would be different. On the contrary, for other bodies, such as stars, radio transmitters, even any hot objects, they could emit many information I_o and energy-matter particles outward at the same time, because there are different temperatures at different point on their surface.

D. **Any BH could only emit a radiation m_{ss} once a time as quantum, and bring out a $I \equiv h/2\pi_o$**

【7】。The significant conclusions from Hawking famous entropy formula (7a) of BHs.

7-1.* According to Hawking famous entropy formula (7a) of black holes, in the process of the collapse of any star it could increase in its entropy and decrease in its information amount. [1] Suppose S_b—the entropy before its collapse; S_a—the entropy after its collapse; M_θ—sun mass $= 2\times 10^{33}$g, then,

$$S_a/S_b \approx 10^{18}M_b/M_0 \ [1] \quad (7a)$$

Jacob Bekinstein pointed out that **under the ideal condition**, while in the collapse process of a star from its beginning to its end, if $S_a = S_b$ occurred, from (7a), a mini black hole of **$M_{bo} \approx 10^{15}$g** could be formed, it was so-called the **original mini BH** in the Universe proposed by Hawking in 1971.

The density ρ_{bo} of $M_{bo}=10^{15}$g, $\rho_{bo}= 0.7\times 10^{53}$g/cm^3, $R_{bo}=1.5\times 10^{-13}$cm, $T_{bo}=0.77\times 10^{12}$k, $m_{sso}=12\times 10^{-24}$g, the proton number n_{bo} of M_{bo} -- $n_{bo} = 10^{15}g/1.66\times 10^{-24} = 10^{39}$. $n_{bo}= 10^{39}$ is just a Dirac large number. The lifetime τ_{bo} of M_{bo}-- $\tau_{bo} \approx$ the age of our Universe

In the 1970s Hawking pointed out that although M_{bo} might remain in universal space, scientists could not seek them for about 10 years.

However, Bekinstein just performed a simple mathematical treatment to formula (7a), he did not research the profound physical meaning of (7a).

From Bekinstein's explanations to the entropy conservation in the collapse process of stars, very important and significant conclusions can be shown. First, formula (7a) shows that entropy could not keep a constant in the collapse process of stars > $M_{bs} \approx 10^{15}$g. It shows that protons as particles are not decomposed with densities--**$\rho_{bo} < 0.7\times10^{53}$ g/cm^3; so that they are not in the ideal conditions and still keep the structures of protons**. Second, the physical significance of entropy conservation shows that only after protons could be decomposed into 3 'uud' quarks, they could have no heat movement and no friction, and would enter in the ideal condition. It is said, **the ideal conditions must only be quarks existing either in a contractive or in an expansive process between densities from 0.7×10^{53}g/cm^3 of BHs to 10^{93}g/cm^3 of $M_{bm}=m_{ss}=m_p$.**

7-2*; No singularity could exist in any star of BH at all.

In the last evolution stage of big stars, after all H_2 elements were exhausted in the nuclear fusion, the strong explosions of nova or supernova would appear. The exploded anti-pressure could turn the wreckage of a star into a star-BH or neutron star of density **$\rho_{bo}\approx 10^{16}$g/cm^3.** No more nova explosion could occur inside star-BH and no more energy-matters could flee out from star-BH except those of extremely weak Hawking radiations. Thus, the gravitational contractions of all energy-matters inside BH would have no way to contract into Singularity, because the heat resistances could balance the gravitational contraction. Obviously, according to the solution of the Equation of General Theory of Relativity (EGTR), the Penrose and Hawking proposition that Singularity could appear in any BH was a completely wrong inference.

【8】。Some other important conclusions:

A. After the new formulas (1d), (1e), (3a), (4a), (4d), (62d), (63a). (63d), (63e), etc., derived by the author are proved to be correct，the new theory of BHs will go to a rather complete system. Although **the states and structures inside any BH can be greatly different,** it will still be impossible for them to affect the nature of BH on R_b, because R_b, T_b, m_{ss}, are only decided by $\mathbf{M_b}$ amount.

B. It may be impossible for mankind to manufacture out any artificially real gravitational (Schwarzschild) black holes (BHs) ever.[9] Since all numerical values in the parameters of the minimum BH--$M_{bm}= m_p=1.09\times10^{-5}$g have reached the highest limit in the Universe，its $R_{bm}=1.61\times 10^{-33}$ cm，$T_{bm}= 0.71\times10^{32}$k, and its Compton time t_c = Schwarzschild time $t_{sbm}=0.537\times10^{-43}$s ≈ its lifetime τ_{bm}。Thus, BHs ≤ ($M_{bm}= m_p=1.09\times10^{-5}$g) would be impossible to exist in the Universe. Mankind would then only attempt to manufacture out some BHs ≥ ($M_{bm} = m_p$). But, a M_{bm} is formed by the mass of 10^{20} p_m (mass of a proton, $p_m = 1.66\times10^{-24}$g). Mankind may have no ability ever to let 10^{20} p_m collide together on future Collider at a same precise time. Most difficult of all, the distance between two close p_m has only 10^{-13}cm at the density of a neutron star. The time for transmitting gravity between them needs 10^{-24}s at most. However, the lifetime τ_{bm} of M_{bm} is just $\tau_{bm} \approx 0.537\times10^{-43}$s. It is said that although a successful collision was completed, it will be impossible for those many p_m can collide and combine together within 10^{-43}s. Therefore, many scientists in some countries had become alarmists to talk about 'artificial black holes'. Those talks are not convincing because they didn't know the exact formulas between parameters M_b, R_b, T_b, m_{ss} and τ_b on R_b of any BHs.

Chapter II: The New Concepts and New Researches to Cosmology with New BH-theory

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====The new concepts in this Chapter are built on the bases of above new concepts and formulas of BHs====

【Preface】. In Chapter I above, it was proven that once a BH was formed it would always be a real BH, until it finally becomes $M_{bm}\equiv m_{ss} = m_p$ and disappears in the Planck Era.

In this Chapter, it will be proven in【1】that our Universe would be a real gigantic cosmic-BH (CBH) of $M_u=10^{56}$g. From【2】to【6】, it will be demonstrated that our Universe was born in the Planck Era from a large number of new BHs-- $M_{bl} = 2M_{bm}\equiv 2m_p \approx 2.2\times 10^{-5}$g, but not born from the so-called 'Singularity' or 'the Big Bang of Singularity'. In【7】, a new mechanism of 'Original Inflation' of our Universe at its new-born time is proposed and demonstrated by the author. Form 2 in【8】, the expansive evolution of our Universe as a CBH can be actually and harmoniously illustrated with seven typical BHs. In【9】, we will be checking the correctness or incorrectness of data in the universal evolution of the standard model of 'Big

Bang' with the calculated data of new BH-theory and formulas proposed by author. In 【10】, some important inferences and conclusions about BH-theory and cosmology can be explored.

【1】。Above all, it must be proven that our Universe should have been a really gigantic Cosmic-Black Hole (Cosmic-BH; CBH);

1--1*. The precise data got from the modern astronomical observational instruments can prove that our Universal spheroid has been a real CBH.

(A). The precise age A_u of our Universe from observational instruments was $A_u = 1.37\times10^{10}$yrs. Calculating from this, the Event Horizon, $R_u = C\times A_u = 1.3\times10^{28}$cm, the average density $\rho_u = 3/(8\pi GA_u^2) = 0.958\times10^{-29}$ g/cm^3, then, the total mass of the Universe $\underline{\mathbf{M_u = 4\pi R_u^3\rho_u/3 = 8.8\times10^{55}g}}$.

(B). The precise Hubble constant, $H_o = (0.73\pm0.05)\times100$kms^{-1}Mpc^{-1} was recently **observed and calculating from this data,** the real density, $\rho_r = 3H_o^2/(8\pi G)\approx10^{-29}$g/cm^3. The practical age of our Universe, $A_r^2 = 3/(8\pi G\rho_r)$, ∴ $A_r = 0.423\times10^{18}$s = (134 ± 6.7) $\times10^8$yrs, then, the total mass of the Universe $\mathbf{M_r = 8.6\times10^{55}g}$。

(C)。It can be proved that our Universe has been a real Schwarzschild CBH. From formula (1m) in chapter I, any BH must be in accord with (1n) below.

$$\rho_b R_b^2 = 3C^2/(8\pi G) = 1.6\times10^{27}\text{g/cm}, \quad (1n)$$

Taken from the above data, $R_u = C\times A_u = 1.3\times10^{28}$ cm, $\rho_r = 3H_o^2/(8\pi G)\approx10^{-29}$g /cm^3, so,

$$\rho_r R_u^2 = 10^{-29}\times(1.3\times10^{28})^2 = \mathbf{1.7\times10^{27}g/cm} \quad (1a)$$

As a result (1n) = (1a)。

From (1c) in chapter I, $GM_b/R_u = C^2/2$,

$M_b = 8.7\times10^{55}$g can be gotten. Thus,

$$\underline{M_u = M_r = M_b} \quad (1aa)$$

(1n) = (1a) = (1aa) <u>can completely prove that our Universe has been a real CBH.</u>

For calculative convenience the main data of our Universe —CBH can be standardized as below:

<u>$M_u = M_b = 8.8\times10^{55}$g, $R_u = 1.3\times10^{28}$cm, $\rho_u = 0.958\times10^{-29}$ g/cm^3.</u>

1-2* 。The Hubble law about the expansive evolution of our Universe would have been the expansive law of our Universe as a CBH due to combine numerous small BHs and to engulf energy-matters outside.

Applying Hubble law on the Event Horizon R_u of our Universal spheroid,

$$\mathbf{M_u} = 4\pi\rho_o R_u^3/3 = 4\pi(3H_0^2/8\pi G)C^3t_u^3/3 = 4\pi(3H_0^2/8\pi G)C^3t_u/3H_0^2 = C^3t_u/2G = \underline{\mathbf{C^2R_u/2G}} \quad (1b)$$

From Schwarzschild formula (1c),

$$2GM_b = C^2R_b,$$

$$\mathbf{M_b} = R_bC^2/2G = C^3t_b/2G = \underline{\mathbf{R_bC^2/2G}} \quad (1c)$$

Since our Universe is the same spheroid with our CBH, R_u can be equal to the Event Horizon of the real universal age CA_u, and from **(1b),** R_u is also R_b,

$$\therefore \underline{t_u = t_b,\ R_b = R_u,\ M_u = M_b.} \quad (1d)$$

<u>Therefore, (1b) = (1c).</u> It is clearly proven that the expansive law of our Universe as a CBH can completely accord with the Hubble law. It is said that the universal expansive law with speed $R_u/A_u = C$ to engulf energy-matters outside is just the Hubble law to show the universal expansion. Hubble law has three forms below:

$$V = H_oR \quad (1e)$$

$$\text{While } V = C,\ \mathbf{R = R_u = Ct_u} \quad (1f)$$

$$\therefore \mathbf{H_o = 1/t_u} \quad (1g)$$

It shows that: 1. The Event Horizon R_u of our CBH would have expanded with speed C from its birth to the present, i.e., $\mathbf{R_u \equiv Ct_u}$. So, (1f) is just the Hubble law; 2. There could have been abundant energy-matters and small BHs outside engulfed by CBH, and let CBH always keep its expansion $\underline{Ct_u = Ct_b = R_b}$ to the present。

<u>When shall it reach $t_u \neq t_b$?</u> Once energy-matters decreased or had no more outside CBH, Hubble constant $\mathbf{H_o}$ would become smaller even decrease to zero.

1-3*。It can be a simple inference that our CBH of $M_u = M_b = 8.8\times10^{55}$g had to originate only from the combinations of countless minimum BHs--$M_{bl}=2m_p$.

It can be known from 'The most essential attribute of any BHs in 【3】of chapter I, **our expansive CBH could only originate from M_{bl} as it was impossible to have formed like a star-BH that contracted from a big star of** (5~8) M_θ and likewise **impossible for a giant BHs in the cluster of galaxies to have contracted from the huge energy-matters outside the galaxy. The age A_b of those great BHs are all** $CA_b >> R_b$—its Event Horizon。 Only the expansive speed of the Event Horizon **R_u of our CBH can have kept light speed C, and in accord with the Hubble law so that its age $CA_u \equiv R_u$。 <u>Undoubtedly, our CBH can only originate from the combinations of countless minimum BHs--$M_{bl}=2m_p=2M_{bm}$.</u>**

1-4*.* It can be simply be proved with exactness again, that our Universe have been a real and complete CBH formed from the continuous combination of countless $M_{bl} = 2M_{bm} \equiv 2m_p$。

Supposing that our Universe was a gigantic CBH, and then according to the law of energy-matter conservation, its total mass must certainly come from the continuous combinations of countless original minimum BHs ($m_m = M_{bm} = m_p$) from its birth-time to the present.

Taking known data from above, $M_{bm} \equiv m_p = 1.09\times 10^{-5}$g, its $R_{bm} = 1.61\times10^{-33}$cm, its $T_{bm} = 0.71\times 10^{32}$k, its Hawking radiations--$m_{ss} = 1.09\times10^{-5}$g. $\rho_{bm} \approx 10^{92}$g/cm^3.

Let N_{bu} be numbers of $N_{bu} = M_u/M_{bm}$。 If the calculations below **adopted $M_{bl} \approx 2M_{bm}$, then** it is the same results with M_{bm}.

$$N_{bu}=M_u/M_{bm}=8.8\times10^{55}/1.09\times10^{-5}=8.0734\times10^{60} \quad \textbf{(1h)}$$

If our Universe M_u come really from $N_{bu}\times M_{bm}$, then according to Schwarzschild formula of BHs, its R_{bu} must be precisely equal to $N_{bu}\times R_{bm}$,

$$N_{bu}=R_u/R_{bm}=1.3\times10^{28}/1.61\times10^{-33}=8.075\times10^{60} \quad \textbf{(1j)}$$

(1h) = (1j) is fully and clearly proven again that our Universe M_u is the complete combinations from $N_{bu}\times M_{bm}$, and has been a real CBH。

1-5. * The flatness ($\Omega = \rho_r/\rho_o \approx 1$) of our Universe is just the essential nature of any BH. So, $\Omega = \rho_r/\rho_o \neq 1$ was just the false proposition gotten from EGTR. From chapter I, the average density ρ_o of any BH is only decided by its mass--M_b, so that our Universe as a CBH can be a sealed spheroid, and have a sole ρ_u decided by its definite total mass--M_u. Therefore, ($\Omega = \rho_r/\rho_o \equiv 1$) is just the natural instinct of BHs.

Owing to the false proposition of ($\Omega = \rho_r/\rho_o \neq 1$) by Friedmann, it let many scientists to propose many new and incorrect viewpoints, such as finding 'the lost energy-matters in the Universe', 'zero point energy', 'dark energy', etc. It can be clearly seen from (1h) and (1j)，our CBH has neither decreased in its energy-matters any more nor increased in its extra energy-matters any more too.

It can be known from above 1-1*，$\rho_o = \rho_u = 0.958\times10^{-29}$ g/cm^3，and $\rho_r = \rho_r = 3H_o^2/(8\pi G) \approx 10^{-29}$ g/cm^3, so, $\Omega = \rho_r/\rho_o = 10^{-29}/0.958\times10^{-29} = 1.044$. However, $\Omega = 1.044$ is just the tolerances caused from observation, calculations and Friedmann's incorrect model. **For any BH included our CBH, $\rho_o \equiv \rho_r$ and $\Omega \equiv 1$ forever。**

【2】。What principle can be used to find the precise birth-time t_m of our Universe?

Since the expansive law of our Universe would have exactly accorded with Hubble law of

$$\mathbf{R_u = Ct_u} \quad \textbf{(2f)}$$

R_u –the Event horizon of our Universe as a CBH, t_u –-the age of our Universe. **We can suppose letting (2f) to return to its original point, which was the precise birth-time t_m of our Universe.**

Then, while t_u returned to $t_u = 10^{-43}$s = t_m = t_{sbm} of minimum BH—M_{bm}, could that t_m be the precise birth-time of our Universe?

It can be known from chapter I and above paragraph 【1】, our gigantic CBH could only originate and combine from countless $M_{bm} = m_p$, then, M_u as the total mass of our CBH could be only return back to the original point--minimum BHs ($M_{bm} = m_p$).

The reason why all particles of energy-matters in our Universe could be linked together to a whole spheroid is that there would be enough time to deliver gravities between all particles in the whole M_u. The full and necessary condition must be $R_u = Ct \leq Ct_u$, here t— characteristic time of our Univer**se = Schwarzschild time of our CBH, under the general conditions,** $t \leq t_u$。 Along with t reduced continuously, R_u and M_u would proportionally be decreased, but the universal temperature T and density ρ_u could be proportionally increased. It is said that the universal mass M_u would be gradually decreased 、contracted and formed by a lot of balls m_m of high temperature and density. At last when their temperature and density were high enough to prevent R_u from further contraction then r_m of every ball--m_m would become $r_m \geq Ct$. Thus, the gravitational links inside every m_m and between every m_m could only then be broken and cause the great explosions at time t_m. Those explosions could prevent M_u and every m_m from contracting into Singularity**, but disintegrate into scattered radiation-particles of non-gravity in Planck Era. However, if it is seen in an opposite direction from the time of our universal expansion, t_m might be the birth-time of our Universe to recover the gravitational links inside and outside all particles —m_m, and become the embryo of our Universe.** Therefore, $r_m \neq 0$ at $t = t_m \neq 0$, and **t_m was the birth-time of our Universe.**

【3】。At the time t_m of newborn particles recovering its gravitational links, t_m was just the birth-time of our Universe, and it can be confirmed below that newborn particles were just really $M_{bl} = 2M_{bm} \equiv 2m_p = 2(hC/8\pi G)^{1/2}$ [3] $= 2\times1.09\times10^{-5}$g $\approx 2.2\times10^{-5}$g.

3-1*; Above all, according to the new achievements in modern cosmogony and physics there were generally two ways to describe the standard model of our universal 'Big Bang' by scientists.

(A). In Form 1, data from the universal evolution of the standard model of "Big Bang" as defined by the relationship between t and T are correct.

It must be pointed out that data in Form 1 and $Tt^{1/2} = k_1$ in (3a1) are all right before the end of Radiation Era, and they are a very good coincidence.

Form 1: Data of [t – T] of the standard model of our universal "Big Bang"[5][10]

t—characteristic time of our Univer**se,**

T—temperature of radiations

t—time;	**T—temperature;**	**explanations;**
1; t = 0;	**T--- ∞;**	a made-up Singularity
2; t=10^{-43}s;	**T=10^{32}k;**	**Planck Era**
3; t=10^{-35}s;	**T=10^{27}k;**	**G.U.T. Era**
4; t=10^{-6}s;	T=10^{13}k;	
5; t=10^{-4}s;	**T=10^{12}k;**	**Hardron Era**
6; t=10^{-2}s;	T=10^{11}k;	
7; t=0.11s;	T=3×10^{10}k;	
8; t=1.09s;	**T=10^{10}k;**	**Lepton Era**
9; t=13.82s;	T=3×10^{9}k;	
10;t=3m2s;	T=10^{9}k;	
11;t=3m46s;	T=9×10^{8}k;	
12;t=34m40s;	T=3×10^{8}k;	
13;t=4×10^{5}yrs;	**T=3000k;**	**Radiation Era**
14;t=to the present;	**2.7k;**	**Matter-Dominated Era**

(B). Formulas (3a1) below might describe our Universal evolution relevance from the so-called 'Big Bang' to the end of Radiation Era, (i.e, **from t = 10^{-43}s to t ≈ 4×10^{5} years).**

$Tt^{1/2} = k_1$, $R = k_2t^{1/2}$, $TR = k_3$, (3a1)

Formula (3a2) below might describe our Universal evolution that is relevant within the Matter-Dominated Era , **(i.e, from t ≈ 4×10^{5} years to the present**). K_1, k_2—constants,,

$Tt^{2/3} = k_6$, $R = k_7t^{2/3}$, $RT = k_8$, **(3a2)**

R—characteristic size, **k_n**---constants,

[Notes]: It will be proved with the new correct formulas of BH in【9】below that, formulas [$R = k_2t^{1/2}$, $TR = k_3$] in **(3a1) are incorrect, and can be changed into** [$R = k_2t$, $TR^{1/2} = k_3$].

3-2*; Finding the precise t_m of the new born time of our Universe, it was then time to recover the gravities inside and outside every m_m.

Let d_m—the distance between two neighboring particles, **m_m** — mass of the new particles having recovered its gravitational links, **r_m**—radius of m_m, **2t** —time needed between two neighboring particles to transfer their gravities, i.e, **t_s**—Schwarzschild time of m_m, **C** — light speed, **ρ**—density of M_u, **H**—Hubble constant. M_u—the total mass of our Universe, R_u—the Event Horizon of M_u. Then,

$d_m \geq C\times2t$, i.e, $d_m/2C \geq t$, or $R_u \geq Ct$ (3)

$d_m/2 = r_m$ is the radius of every m_m under the condition of gravitational links that are broken. Formula of M_u spheroid is as below:

$M_u = 4\pi\rho R_u^3/3$, (3aa)

H = Hubble constant, $H = V/R = 1/t$. (3ab)

Another decisive condition of M_u contracting to m_m is that while T was raised to valve temperature T_m, m_m would change into a complete energy-ball--m_m, which caused the broken gravitational links of every m_m at that time t_m. Every m_m could only disintegrate and explode. Then,

$m_m = \kappa T_m/C^2$, (3ac)

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

From Hubble law, H =1/t,

$\rho = 3H^2/8\pi G = 3/(8\pi Gt^2)$, **(3ad)**

∴ $t \leq T_m(2G\kappa)/(C^5)$, (3b)

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

In above formulas (3a), (3b), and (3c) are all derived from (3), so, **'t'** has equal numerical value.

Finding out k_1 from **(3a1),** $Tt^{1/2} = k_1$. Taking $t = 10^{-43}$s and its corresponding $T = 10^{32}$k from Form 1, then, **$k_1 = Tt^{1/2} = 10^{32}\times10^{-43}s = 3^{1/2}\times10^{10} \approx 1.732\times10^{10}$,**

From (3c),

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

$G = 6.67\times10^{-8}cm^3/gs^2$, $C = 3\times10^{10}$cm/s,

$\kappa = 1.38\times10^{-16}gcm/s^2k$,,

∴ $t^{3/2} \leq [(2\times6.67\times10^{-8}\times1.38\times10^{-16})/(3\times10^{10})^5]\times 1.732\times10^{10} = 0.075758\times10^{-74}\times1.732\times10^{10}$

$\approx 0.1312\times10^{-64}$, then,

$t^3 = \pm0.017217\times10^{-128} = \pm0.17217\times10^{-129}$,

For calculative convenience, let $t = t_m$,

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

Correspondingly, the temperature T_m of m_m,

$T_m = k_1/t_m^{1/2} = 0.734\times10^{32}$k, (3e)

∴ $m_m = \kappa T_m/C^2 = 1.125\times10^{-5}$g, (3f)

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

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

$d_m = C\times2t = 3.34\times10^{-33}cm = 2r_m$ (3i)

Conclusions: It can be seen that $t = \pm t_m$ was just the time to show the gravitational links of every m_m inside and outside that are broken or recovered, and was also the time of every m_m, which could transform gravities between all its gravitational energy and radiation energy; thus, $-t_m$ showed gravities that are broken, whereas $+t_m$ showed gravities that recovered.

【4】。Conclusion: Our CBH was surely born and formed from countless $m_m = M_{bm} = m_p$

Comparing data of m_m derived from above【3】with $M_{bm} = m_p = (hC/8\pi G)^{1/2} = 1.09\times10^{-5}$g

It can be shown from the above paragraph that when our CBH evolution returned back to its genesis with Hubble law at the birth-time t_m, the new-born particles m_m could recover their gravities and combine $2m_m$ into 1 $M_{nl}=2m_m$. Thus, the bigger M_{nl} with longer lifetimes could become the stable minimum BHs and cells to form our CBH.

Table: Comparisons to parameters between $M_{bm} = m_p$ and m_m

m_m = gravity renewed;	**$M_{bm} \equiv m_p$** [3]
$m_m = 1.125\times10^{-5}$g;	**$M_{bm} = 1.09\times10^{-5}g = m_p$**
$t_m = \pm0.5563\times10^{-43}$s;	**$t_{bm} = 0.539\times10^{-43}s = t_p$**
$T_m = 0.734\times10^{32}$k;	**$T_{bm} = 0.71\times10^{32}k = T_p$**
$r_m = 1.67\times10^{-33}$cm;	**$R_{bm} = 1.61\times10^{-33}cm = L_p$**

From the above figure, newborn particles $\mathbf{m_m = M_{bm} \equiv m_p}$. The differences of numerical values between their parameters are from the tolerances calculated from k_1 in (3a1), and m_m, t_m, T_m, r_m, etc。

【5】。How would Pre-universe disappear at $-t_m$ in Planck Era?

Since $M_{nl}= 2m_m = 2M_{bm}= 2m_p$ were minimum BHs and cells to form our present CBH, where could all energy-matters formed of newborn particles M_{nl} of our Universe come from?

According to the principles of time symmetry and energy-matters conservation, the most likely possibility and hypothesis in this article was that there was **a Pre-universe predecessor** of our Universe, which had a final 'Big Crunch' before the birth of our Universe. If the final collapse law to 'Big Crunch' of the Pre-universe was like the expansive law of our Universe at its genesis, then that 'Big Crunch' would have finally created countless old particles $\mathbf{m_m = M_{bm} = m_p}$ **of no gravity at $-t_m$; and** immediately explode into γ– rays in Planck Era; thus the collapse of Pre-universe could be prevented towards Singularity, because m_m did not have enough time to transfer gravity with each others. **Just below are three states of $m_m= M_{bm}= m_p$ of Pre-universe** caused by **'Big Crunch', which could provide all needed conditions for creating the original cells of our Universe.** **(A).** The 'Big Crunch' could certainly lead the 'phase change' of Pre-universe at $-t_m$ from the 'collapse phase' into the 'expansion phase' and stop the collapse of Pre-universe from going onto Singularity. **(B).** The 'Big Crunch' could certainly lead density to lower a bit in Planck Era, and let some bigger new BHs at $+t_m$ to form into stable cells--$M_{bl} = 2M_{bm}$ of our new Universe. **(C).** The 'Big Crunch' could certainly allow all old energy-matters of Pre-universe as remains to form into new particles of $M_{bl} =2m_m$ at $+t_m$ and recover their gravitational links at the highest density of 10^{92} g/cm^3 in Planck Era. **The countless newborn particles M_{bl} having just recovered their gravitational links could become the cells and birth of our Universe,**

Conclusion: Above 3 results of the 'Big Crunch' of Pre-universe in Planck Era could provide the full and necessary conditions for the birth of our new Universe and prevent Pre-universe collapse to Singularity.

【6】。How would our new Universe be born from the ruins of 'Big Crunch' of Pre-universe?

What conditions could let new particles $M_{bl}= 2m_m=2M_{bm}=m_p$ of our Universe to be born and grow up? As we know in Planck Era of the highest density of 10^{92}g/cm^3, radiations (energy) and particles (matter) would annihilate, compose and transform each other with extremely high speed. Therefore, the remains of Pre-universe reforming into new particles m_m and M_{bl} were certain. Furthermore**, if only new particles M_{bl} combined at time $+t_m$ by $2m_m$ which had a lifetime longer than its Compton time = Schwarzschild time,** M_{bl} would certainly become new minimum BHs and grow up because of their combinations at the extremely high pressure and density. **The key problem was under what conditions the newborn particles M_{bl} could grow bigger and bigger.** According to Hawking lifetime τ_b formula of BHs, Compton time t_{bc} of new particle $M_{bl} = 2m_m$,

$$\tau_b \approx 10^{-27} M_b^3(s) \quad (6a)$$

$$t_{bc} = R_b/C \quad (6b)$$

Obviously, only in the case $\tau_b > t_{bc}$, i.e,

$$10^{-27} M_b^3 > R_b/C, \quad (6c)$$

Let (1c) -- $GM_b/R_b = C^2/2$ of Chapter I enter **(6c)**, new particles--$M_{bl} = 2m_m = M_b$ could form into minimum BHs and grow bigger and bigger. Then,

$$M_b = M_{bl} = 2m_m = 2.2\times10^{-5}g\ (\approx 2\ M_{bm}) \quad (6d)$$

τ_{bl}—lifetime of M_{bl}.

$t_{sl} = R_{bl}/C = t_{sbm} = 2\times0.537\times10^{-43} = 10^{-43}$s

$$\therefore \tau_{bl} = 10^{-27}(2.2\times10^{-5})^3 = 1.06\times10^{-41}\text{s} \approx 100t_{sbm} \quad (6e)$$

$$\tau_{bl}/\tau_{bm} = (2.2/1.09)^3 = 8 \quad (6f)$$

Owing to the 'Big Crunch' caused from all old particles m_m of Pre-universe at $-t_m$, the universal space would expand a little and the density become lower a bit, **it could easily lead to form the bigger new BHs--$M_{bl} = 2m_m \approx 2M_{bm} = m_p = 2.2\times10^{-5}$g at $+t_m$.** After that, M_{bl} would combine with each other and become bigger and bigger BHs because they **are closely pasted together** at the condition of extremely high density, and $\tau_{bl} >> t_{sbm}$.

The first combinations of countless new-born $M_{bl} \approx 2M_{bm} \approx 2.2\times10^{-5}$g created the real "Big Bang" of our Universe, it was just the 'Original Inflation'. After that the non-stop normal expansion of our Universe up to the present was very good according to Hubble law.

Conclusions: 1*. Only the new minimum BHs--$M_{bl} = M_b = 2M_{bm}$ at $+t_m$ formed with the longer lifetime than its Compton (=Schwarzchild t_{bl}) time could grow bigger and bigger and their continuous combinations created a present expansive cosmic-BH. **2*. From time $-t_m$ to time $+t_m$, the old and the new Universe was connected through Planck Era as a bridge, the Universe could transition from '$-t_m$' of "collapse phase" directly to '$+t_m$' of "expansive phase" through Planck Era, but in no way would appear time of t = 0 and Singularity. 3*.** Comparing $M_{bl} = 2m_m = 2M_{bm} = 2m_p \approx 2.2\times10^{-5}$g with formula (1p) in Chapter I, obviously, new $M_{bl} =$

$2M_{bm} \approx 2.2\times10^{-5}$g of longer lifetime could become the stable cells forming our Universe.

【7】。**In this section, author proposes a new and simple mechanism causing the 'Original Inflation' of our Universe at the beginning of its birth-time. The new mechanism of 'Original Inflation' should cause the sudden and violent space expansion created from the combinations of countless newborn $N_{bu}\times M_{bm}$. The concluded time t_o of 'Original Inflation' should be the time of gravitational linking together of all M_{bm} ($N_{bu}\times M_{bm} = M_u$) in the whole Universe.**

Explanations: 1; In this section, M_{bm} are still taken as the minimum BHs to replace M_{bl}. 2; According to (1c), a isolated BH cannot cause expansion, only combinations of 2 or more BHs can cause the strong expansions of R_b. 3; I think, owing to 'our universal packet' might be just one of many universal packet. So, single M_{bm} in the packet could not freely expansion, but only all $N_{bu}\times M_{bm}$ were linked together as a whole packet, it could cause the sudden and violent space expansion as the 'Original Inflation'.

According to the above statements of new mechanisms, the total mass of our CBH, Let **$M_u = 8.8\times10^{55}$g** come from the combinations of **($N_{bu} = 8\times10^{60}$) $\times$ ($M_{bm} \equiv m_p$). Let t_o be the concluded time of 'Original Inflation'.**

If t_{bms} was Schwarzschild time of a newborn M_{bm}, its $t_{bms}=R_{bm}/C=1.61\times10^{-33}/3\times10^{10} = 5.37\times10^{-44}$s then, (2 or 3)$n_o\times t_{bms}$ showed the time needed by all $N_m\times M_{bm}$ connecting together. $R_{bm} = 1.61\times10^{-33}$cm.

7-1*. Suppose gravity went through $2\times t_{bms}$ of a M_{bm}, and $N_{m2}\times M_{bm}$ would be connected together, then,

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

(7a) shows that the gravity of a M_{bm} could connect with other 8 M_{bm}, while time of M_{bm} from t_{bms} prolonged to 2 t_{bms}. Thus, how long of a time is needed by a M_{bm} connecting all $N_{bu}\times M_{bm}$ to a whole? **$M_u = 10^{56}$g is a known number , $N_{bu} = M_u/M_{bm} \approx 8.8\times10^{60}$.**

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

(7b) shows after the gravity of a M_{bm} went through n_o times of $2^{67.5}\times t_{bms}$, all $M_u = N_{bu}$ $(= 8^{67.5})\times M_{bm}$ could link together to a 'original universal packet'.

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

Now, seeking N_{m3} with the same method above,

$$N_{m3}\, R_{bm}{}^3 = (3R_{bm})^3, \qquad N_{m3} = 27 \qquad (7d)$$
$$N_{bu} = 8.8\times10^{60} \approx 10^{61} = (27^{42.6}),$$
$$\text{but } (3^{42.6}) \approx (10^{20.3}), \quad \text{let } n_{o3} = 10^{20.3},$$
$$\therefore n_o = n_{o2} = n_{o3} \approx (10^{20.3}) \qquad (7e)$$

From (7a) and (7d), after a M_{bm} connected other $8\times M_{bm}$, its volume would prolong to eight times, i. e, $8 = 2^3$ times。At the same time, from (7d), its volume would also prolong to $27 = 3^3$. **However,** after t_{bms} prolonged to $2t_{bms}$, it could lead to much more than 2^3 M_{bm} to be connected**,** the numbers connecting M_{bm} were not only 2^3, but probably $(2^3)^3 = 2^9$. **It is said those M_{bm} had no time to do the normal expansion would also be included in expanded M_{bm}.** Similarly, the numbers connecting M_{bm} were 3^9, while t_{bms} prolonged $3t_{bms}$.

It can be known from (7c) and (7e), no matter how many M_{bm} could be connected together at one time, the total time needed by connecting all $N_{bu}\times M_{bm} = M_u$ would be the same, i. e, $10^{20.3}$ s. From (7a) and (7d), **owing to the combinations of $N_{bu}\times M_{bm}$ creating the sudden and violent space expansion, it was the cause of 'Original Inflation' at the beginning of the birth-time of our Universe,**

With the same method to seek the general law of n_o times of t_{bms} -- $n_o\times t_{bmc}$,

$$\text{Let } N_{mn} = n_o^9, \text{ and } n_o = 10^x \qquad (7f)$$
$$\text{However, } N_{bu} \approx 10^{61}, \; 10^{61} = 10^{9x} \qquad (7g)$$
$$\text{Let } x_1 = 61/9 = 6.8, \quad n_{o1} = (10^{6.8}) \qquad (7\text{-}1a)$$

n_{o1} in (7-1a) was the times of $n_{o1}\times t_{bmc}$ under the condition of "**Original Inflation**" 。Now, according to the principle of (7e) , another x_2 and n_{o2} under the condition of "**general combination Expansion**" might be existent。

$$x_2 = 61/3 = 20.3 \qquad n_{o2} = 10^{20.3} \qquad (7\text{-}1b)$$
$$n_{o2} = n_{o1}{}^3 \quad \text{or} \quad n_{o2} = 10^{13.5}\, n_{o1} \qquad (7\text{-}1c)$$

7-2*; (7-1a) and (7-1b) testify that there might be two ways to connect all $N_{bu}\times M_{bm} = M_u$ together **to form a whole 'original universal packet'.** No matter which expansive way it was, the concluded time t_{o1} or t_{o2} of 'Original Inflation' or 'general combination expansion' was only decided by the total mass M_u of our Universe.

[A]. 'Original Inflation' created by 'violent space expansion and its concluded time t_{o1};

$$t_{o1} = t_{bmc}\times n_{o1} = 5.37\times10^{-44}\times10^{6.8} = 10^{-36.5}\text{s.} \qquad (7\text{-}2a)$$

[B]. 'General combination expansion' and its concluded time t_{o2}**:**

$$t_{o2} = t_{bmc}\times n_{o2} = 5.37\times10^{-44}\times10^{20.3} = 10^{-23}\text{s} \qquad (7\text{-}2b)$$
$$\therefore t_{o2}/t_{o1} = n_{o2}/n_{o1} = 10^{-23}/2\times10^{-36.5} = 10^{13.5} \qquad (7\text{-}2c)$$

7-3.* From (7-1a) and (7-1b) to (7-2a) and (7-2b), it seems to be inferred that there might be two ways of "Inflation". **However, the highest-speed 'Original Inflation' could certainly let 'General combination expansion' to have no opportunity to occur. Therefore, the numerical values of 'General combination expansion' can only be the better reference to 'Original Inflation'** ,

[A]。The first way was "Original Inflation" in accordance with (7-1a) and (7-2a), its expansive time was from $t_m=5.37\times10^{-44}$s of the birth-time to $t_{o1}=10^{-36.5}$s. But its expansive effect reached the same result with ($t_{o2}=10^{-23}$s) of '**general combination expansion**'. **It is said that the Event Horizon R_b of CBH at the time of $10^{-36.5}$s reached the same Event Horizon of ($t_{o2}=10^{-23}$s)**. However, in the period from $t_{o1}=10^{-36.5}$s to $t_{o2}=10^{-23}$s, CBH seemed to have a normal expansion.

[B]. The second way was the '**general combination e**xpansion' in accordance with (7-1b) and (7-2b). Its time was from 5.37×10^{-44}s successively to $t_{o2}=10^{-23}$s. The Event Horizons of the above two ways reached the same numerical value at the different time of $t_{o1}=10^{-36.5}$s and $t_{o2}=10^{-23}$s.

[C]. From $t_{o2}=10^{-23}$s to the present, the expansion of CBH was regular and accorded with Hubble law due to the combinations between many of small BHs growing bigger and bigger.

Conclusion: The concluded time $t_{o1}=10^{-36.5}$s and $t_{o2}=10^{-23}$s of 'Original Inflation' were almost equal to the numerical values observed by NASA/WMAP。

7-4*。Let me compare the calculated data based on the author's new mechanism of "Original Inflation" with another's corresponding data

According to the calculations to the 'Original Inflation' by Prof. Su Yi in chapter 12.7 of his book《An Introduction to New Astronomy》,[2] he applied the formula, $\mathbf{R=k_1t^{1/2}}$, R—characteristic size of our Universe，t—characteristic time (age), his calculated results were: **at $t=10^{-36}$s, $R_{-36}=3.8$ cm.** R_{-36} -- the size of our Universe after 'Original Inflation'. However, he couldn't point and calculate out the concluded time of 'Original Inflation' because scientists didn't find the correct mechanism causing 'Original Inflation'.

(7-4a) below was Prof. Su's results.

$$\mathbf{R_{-36}} = 1.83\times10^{25}\text{cm}\times(10^{-36}\text{s})^{1/2}/(7\times10^5\times3.156\times10^7\text{ s})^{1/2}=\mathbf{3.8cm}\ [5] \quad (7\text{-}4a)$$

Author's check to Su's calculated results as below:

Owing to the total mass: $M_u=10^{56}$g, at $R_{-36}=3.8$cm, the density ρ_{-36},

$$\rho_{-36}=3M_u/(4\ R_{-36}^3)=4.4\times10^{53}\text{g/cm}^3 \quad (7\text{-}4b)$$

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

$$R_{-36}/R_{-44}=3.8/10^{-13}=3.8\times10^{13} \quad (7\text{-}4d)$$

Su said that the volume of the Universe inflated $(3.8\times10^{13})^3=10^{40}$ is right. [2]

Now comparing Su's results with the author's calculated results below:

The known numbers: **$M_{bm}=10^{-5}$g，its** $R_{bm}=1.61\times10^{-33}$cm，$\rho_{-bm}=10^{93}$g/cm^3, $M_u=10^{56}$g, [2]

Finding R_{44} at the birth time of our Universe,

$$\mathbf{R_{-44}=2.8\times10^{-13}cm} \quad (7\text{-}4e)$$

It was proved above that while our Universe reached to $\mathbf{t_{o1}=10^{-36.5}s}$ after 'Original Inflation', all M_{bm} could link together and concluded the 'Original Inflation' states that the whole Universe was formed from all bigger BHs--$M_{bo}>M_{bm}$.

Finding M_{bo} at the time $\mathbf{t_{o1}=10^{-36.5}s}$. Owing to the expansive times of R_{bm} and t_{bm} of M_{bm} are the same after 'Original Inflation', then R_{bo} of M_{bo} was,

$$\mathbf{R_{bo}}=n_{o2}R_{bm}=10^{20.3}\times1.61\times10^{-33}=\mathbf{3.2\times10^{-13}cm},$$

$$\mathbf{M_{bo}=C^2R_{bo}/2G=2\times10^{15}g},$$

$M_{bo}=2\times10^{15}$g were the original mini BHs.

$\therefore\rho_{bo}=3M_{bo}/4\pi R_{bo}^3=1.46\times10^{52}$g/cm^3,

Here ρ_{bo} was also the universal density at the time of $t_{o1}=10^{-36.5}$s after 'Original Inflation', and R_{ub} ($R_{-36.5}$) of the Universe-- $\mathbf{M_{bo}}=M_u$ was:

$$R_{ub}^3=3M_u/4\pi\rho_{bo},\ \therefore\mathbf{R_{ub}=12cm} \quad (7\text{-}4f)$$

$$\mathbf{R_{ub}/R_{-44}}=R_{-36.5}/R_{-44}=12/(2.8\times10^{-13})=\mathbf{4.3\times10^{13}} \quad (7\text{-}4g)$$

Conclusions： Prof. Su's data might be a typical case of 'Original Inflation'. **Comparing (7-4a) and (7-4e) with (7-4f) and (7-4g), they are almost no difference. It can be seen that author's new mechanism of 'Original Inflation' is correct and accords with the calculated data of scientists in the past.**

【8】. To recognize the evolution of our comical-BHs (CBH) from seven different typical BHs with new BH-theory by author。

In Form 2 the harmonious and precise relationships between all numerical values of different parameters of various BHs in our Universe can confirm that the new BH theory and the new cosmogony proposed by author in this article are identical and effective.

From above statements once newborn $M_{bl}=2M_{bm}$ appeared in Planck Era, they could paste closely at the highest density of 10^{92}g/cm^3. Their combinations would cause violent space expansion, i.e, **'Original Inflation' from the birth-time of $t_m=5.37\times10^{-44}$s to $10^{-36.5}$s and then to 10^{-23}s**. Thus, countless $M_{bl}=2m_p$ could grow up to mini BHs of 2×10^{15}g. After that mini BHs had to continuously combine, grow, and finally become a gigantic CBH at present. For recognizing the nature of our CBH, seven typical BHs with its numerical values of their parameters were listed on Form 2 below.

Form 2: Numerical values of various parameters of 7 typical BHs on R_b [4]

BHs;	# 1 M_{bm}	#2 mini BH -	#3 middle BH-	#4 moon BH-	#5 star BH-	#6 giant BH-	#7 our CBH
M_b (g),	10^{-5}g	10^{15}g	2×10^{18}g	10^{26} g	$6\times10^{33}(3M_\theta)$	10^{42}g(10^9M_θ)	10^{56}g
R_b (cm),	**1.6×10^{-33},**	**1.6×10^{-13},**	**3×10^{-10}**	**1. 5× 10^{-2}**	**9×10^5**	**1.3×10^{14}**	**1.3×10^{28}**
T_b (k),	0.8×10^{32} ,	0.8×10^{12}	0.4×10^9	8	1.3×10^{-7}	7×10^{-16}	7×10^{-30}
τ_b (s,yrs),	**10^{-42}s**	**10^{10}yrs**	**8×10^{27}**	**10^{44}yrs**	**10^{66}yrs**	**10^{92}yrs**	**10^{134}yrs**
ρ_b(g/cm^3),	7×10^{92}	7×10^{52}	2×10^{46}	7×10^{30}	1.5×10^{15}	7×10^{-2}	7×10^{-30}
m_{ss} (g),	**10^{-5}**	**10^{-24}**	**10^{-27}**	**10^{-36}**	**1.6×10^{-44}**	**10^{-52}**	**10^{-66}**
t_s (s),	**0.5×10^{-43}**	**0.5×10^{-23}**	**10^{-20}**	**0.5×10^{-12}**	**3×10^{-5}**	**0.5×10^4**	**0.5×10^{18}**
λ_{ss}(cm),	**3×10^{-33}**	**3×10^{-13}**	**6×10^{-10}**	**3×10^{-2}**	**1.8×10^6**	**3×10^{14}**	**3×10^{28}**
$d\tau_b$(s)	3×10^{-42}s,	3×10^{-21}	10^{-18}	3×10^{-11}	1.7×10^{-3}	3×10^5	10^{12}yrs
ν_{ss} (s^{-1}),	**10^{43}**	**10^{23}**	**0.5×10^{20}**	**10^{12}**	**0.17×10^5**	**10^{-4}**	**10^{-18}**
ni,	**1**	**10^{39}**	**4×10^{46}**	**10^{62}**	**4×10^{77}**	**10^{94}**	**10^{122}**
E_r(erg),	10^{16}	10^{-3}	10^{-7}	10^{-15}	10^{-23}	10^{-31}	10^{-45}
I_m (I_o), I_o=h/2		**10^{39} I_o**	**$4\times10^{46}I_o$**	**10^{62} I_o**	**$4\times10^{77}I_o$**	**$10^{94}I_o$**	**10^{122} I_o**

In Form 2: M_b—mass of a BH, **R_b**—radius of EH of a BH, **T_b**–temperature on **R_b**, **τ_b**—lifetime; **ρ_b**— average density of BHs, **m_{ss}**—mass of Hawking radiation; their numerical values are obtained from formulas (1a), (1b) , (1c), (1d), (4c), (5a) （5b） of Chapter I。

Let $n_i = M_b/m_{ss}$ **(8a)**

Wave length λ_{ss} of m_{ss} ; **$\lambda_{ss} = Ch/(2\pi m_{ss}C^2)$**, owing to $m_{ss}C^2\times2t_s = h/2\pi = I_o$, so,

$\lambda_{ss} = 2Ct_s = 2R_b$, frequency $\nu_{ss} = C/\lambda_{ss}$ **(8b)**

$t_s = R_b/C$ **(8c)**

$E_r = m_{ss}C^2$ **(8d)**

I_o is information unit of m_{ss}, i.e, the minimum unit of information, $I_o = h/2\pi$, and not decided by mass of M_b or m_{ss}. I_m –the total information amount of a BH, $I_m = 4GM_b^2/C$ (63d).

Various numerical values in Form 2 are the abundant treasure-house and rather harmonious for studying BHs and cosmology. They fully show that the expansion and evolution of our Universe as a CBH has been the result of combinations and growth of the continuous original $M_{bl}=2m_p=2M_{bm}$, just as the author derived and calculated.

§1. Form 2 shows the continuously expansive history of our Universe as a CBH in 137×10^8years. In the expansive process of CBHs, they grew successively from #1M_{bm} of 10^{-5}g ⇒ #2 ⇒#3 ⇒#4 ⇒#5 ⇒#6 ⇒#7 our cosmic-BH(CBH) of 10^{56}g. Any one of the seven BHs would have some special significance.

§2。From #1-#6, the original BHs could impossibly exist in our Universe because in the evolution **from 10^{-44} s of Planck Era to about $t_{up} = 4\times10^5$ years** of the end of Radiation Era, the difference of energy-matter density in the whole cosmic-BH varies **from 10^{92}g/cm^3 to $\rho_{bu} = 10^{-20}$g/cm^3 was very even,** it was observed from microwave background radiations (MBR).

$t_{up} = (3/8\pi\rho_{bu}G)^{1/2}$ **(8a)**

However, the density of #6 BHs--$\rho_{b6} > 10^{-1}$ g/cm^3. In the rapidly expansive process of The Universe the very uniform energy-matters would have impossibly contracted to resist the speedy universal expansion and let original BHs exist and remain in universal space.

After CBH entered the Matter-dominated Era, matters could separate off from radiation energy, the radiation temperature lowered quicker than matter-particles' because of cosmic expansion, and led to the contractions of matter-particles to become #5 and #6 BHs, but **they were second-born BHs.**

No matter how much mass the BH has, BHs of the same mass M_b can have the same numerical values of all parameters on their EH--R_b, **but the states and structures inside any BH may be greatly different.**

§3。#1 minimum BH of $M_{bl} = 2M_{bm} = 2{,}2\times10^{-5}$g. They were the original cells of our Universe come from Planck Era. The successive combinations of countless $2M_{bm}$ created the **'Original Inflation', i.e. so-called 'Big Bang'.** After that our cosmic-BH went on the non-stop expansion to the present. After no energy-matters could be engulfed outside, our Universe as a CBH will lastly go to contract to M_{bm} and disappear in Planck Era**. That will be a complete life-death circle of our Universe.**

§4。#2 mini BHs or so-called original mini BH, $M_{bo} \approx 10^{15}$g, they were formed at the concluded time of "Original Inflation". Their lifetime ≈ the

age of our Universe. In 1970s, Hawking predicted, M_{bo} might exist in universal space; however, scientists could not find them for more ten years. Mass of a m_{ss} of $M_{bo} \approx$ mass of a proton, Mass of a $M_{bo} \approx$ mass of 10^{39} proton. 10^{39} was the large number of Dirac's hypothesis**.**

§5。 #3 middle BHs, its mass $\approx 10^{19}$g: mass of its HQR-- $m_{ese} \approx 10^{-28}$g ≈ mass of a electron。

§6。 #4 moon BHs, its mass ≈ 10^{26}g; temperature on its R_b, $T_b \approx 2.7$ k, ≈ temperature of microwave background of radiations(MBR) of our Universe at present. It is said that if there could be an isolated BH of mass $<10^{26}$g in universal space，it would emit $m_{ss} > 10^{-36}$g to outside and contract its size R_b; if its mass $> 10^{26}$g, it would absorb in radiation energy from universal space and expand its size R_b. Although their final destiny would be the same and become $M_{bm} = m_p$ and disappear in Planck Era, but their lifetime could be very different.

§7。 #5 star BHs, their mass $M_b \approx 6\times10^{33}$g ($3M_\theta$) or more. They could just be the **second–born and real objects existing in universal space after our Universe entered in the Matter-dominated Era.** After nuclear fusion finished through supernova explosion the remnants of the original stars of mass > （5~8）M_θ might become a star BH of mass ≈ $3M_\theta$. Besides, if a neutron star could engulf energy-matters outside or collide with its companion-white dwarf (or another neutron star), it might also become a star BH of mass ≈ $3M_\theta$. Then **$3M_\theta$ is the so-called Oppenheimer-Volkoff limit.**

However, those two conditions are just theoretical inferences and no real observations could provide reliable evidences.

The lifetime of **#5 star BHs** > 10^{66} years. Temperature on R_b, $T_b \approx 10^{-7}$k. Their Hawking radiations are very weak, $m_{ss} \approx 10^{-44}$g. They mostly hide in bi-stars system.

§8; #6 Giant BHs, mass $M_b \approx (10^7 \sim 10^{12}) M_\theta$: They could exist in the center of star clusters and the galaxy. They could increase in its mass and grow bigger due to having much energy-matters outside. Stars and star BHs might be in the #6 Giant BHs. They might be formed in the earlier period of the Matter-dominated Era**. Quasars would be the precursor of some #6 giant BHs.** Their lifetime will be > $10^{76\sim101}$ years.

§9; #7 Our gigantic cosmic-BH(CBH), its mass M_{bu} ≈10^{56}g. It has been proven that the Universe would have become a real BH, i.e, CBH ever. If no energy-matters on the outside were to be engulfed, our CBH could continuously emit Hawking radiations m_{ss} up to when it becomes $M_{bm} = m_p$ and then would explode in Planck Era. The lifetime of our CBH may be about 10^{134}years. If having energy -matters outside, they can be thoroughly engulfed by our CBH afterwards. After that CBH will contract its size due to emitting non-stop m_{ss}. Finally, it'll become $M_{bm} \approx 10^{-5}$g and vanish in Planck Era**.** However, its lifetime must >>10^{134}years。**The destiny of our Universe as a BH will be completely different with the forecast of General Theory of Relativity.**

Hawking radiation $m_{ss} \approx 10^{-66}$g. Emitting a m_{ss} could take 10^{12} years. That time may be longer than 100 times of the age of our Universe.

§10; m_{ss} of different BHs have greatly different properties.

A. #1 minimum BHs-- $M_{bm} = m_p$ could only explode in Plank Era, and create γ-rays of the highest energy in Planck Era**.**

B. m_{ss} emitted by #1 minimum BHs ~ #2 mini BHs of 10^{15}g; m_{ss} could be γ-rays from the highest energy to even bigger energy than $p_m = 1.66\times10^{-24}$g of the mass of a proton**.**

C. m_{ss} emitted by #2 mini BHs of 10^{15}g ~ #3 middle BHs of 2×10^{18}g; m_{ss} could be γ-rays from $p_m = 1.66\times10^{-24}$g of mass of a proton to $e_m = 10^{-28}$g of mass of a electron.

D: m_{ss} emitted by #3 middle BHs of 2×10^{18}g ~ #5 star BHs of 6×10^{33}g; m_{ss} are x-rays ~ the longest radio waves including light waves。

E: m_{ss} emitted by #5 star BHs of 6×10^{33}g ~ #7 our gigantic CBH, m_{ss} may be all gravitational waves 。

§11; Comparing the numerical values of the parameters between #1 minimum BHs of $M_{bm} = m_p = 10^{-5}$g and #7 our gigantic CBH of $M_{bu} \approx 10^{56}$g below:

Ratio of parameters of #7M_{b7} /#1M_{b1}

Ratio of the average temperature;(see below)

$T_{u1}/T_{mw} = 0.71\times10^{32}/2.7 = 10^{31.4}$

T_{mw} = 2.7k is the temperature of microwave background of our Universe at present. T_{u7} is the average temperature of our Universe at present. According to the theoretical law, $T_{u7} = 0.71\times10^{32}/10^{30.5} = 22.4$k. Now $T_{u7} > T_{mw}$, it shows that the practical temperature T_{mw} is lower than the theoretical temperature T_{u7} due to the separation of matters from radiation in Matter-dominated Era.

Ratio of mass; $M_{b7}/M_{b1} = 10^{56}/10^{-5} = 10^{61} = n_i$;

Ratio of radius of EH-- R_b**;**

$R_{b7}/r_{b1} = 1.5\times10^{28}/1.5\times10^{-33} = 10^{61}$,

Ratio of Schwarzschild time;
$t_{s7}/t_{s1} = 0.5\times10^{18}/0.5\times10^{-43} = 10^{61}$;
Ratio of temperature on R_b;
$T_{b7}/T_{b1} = 7\times10^{-30}/0.8\times10^{32} = 10^{-61}$,
Time ratio of emitting a m_{ss};
$d\tau_{b7}/-d\tau_{b1} = 3\times10^{19}/3\times10^{-42} = 10^{61}$
Ratio of m_{ss} mass; $m_{ss1}/m_{ss7} = 10^{-5}/10^{-66} = 10^{61}$,
Ratio of m_{ss} numbers --ni; $ni_7/ni_1 = 10^{122}/1 = 10^{122}$;
Ratio of average density ρ_b(g/cm^3) inside BHs;
$\rho_{b1}/\rho_{b7} = 7\times10^{92}/7\times10^{-30} = 10^{122}$,
Ratio of total information amount;
$I_{m7}/I_{m1} = 10^{122}/1 = 10^{122}$
Lifetime ratio; $\tau_{b7}/\tau_{b7} = 10^{142}/10^{-42} = 10^{184}$;

[Explanatory notes]: 1: T_{u7} is not the temperature of microwave background radiations of our Universe at present. 2: $TR^{1/2} = k_3$ in (9aa) originates from $R = k_2t$ in the same (9aa). However, $R = k_2t$ is just another manifestation of Hubble law in the evolution of our Universe. Therefore, $R = k_2t^{1/2}$ in (3a1) in many famous books, but it must violate Hubble law, so, it is incorrect and should change into $R = k_2t$.

. It can be seen from the data of the above ratios that many new formulas between parameters may be derived, such as:

$M_b = k_1A_u$; $A_u = t_u = R_b/C$; $t_uT_b = k_2$; $t_u = k_3I_m^2$; $t_u^3 = k_4\tau_b$。 (8b)

A: It can be known from §11 that ratios of all numerical values proportional to mass M_b of BHs are 10^{61}. Ratios of all numerical values proportional to mass M_b^2 are $10^{61\times2} = 10^{122,}$ and ratios of M_b^3 are 10^{184}. Thus. it testifies once more that **our present CBH should exactly come from the combinations of $N_{bu}\times$ (# $1M_{b1} = 2M_{bm} = 2m_b$).**

B: The same mass of all BHs can have the same numerical values of all parameters on their EHs--R_b, and those BHs have the same properties and destiny, but the states and structures of every BH inside may be completely different. The relationship of all numerical values of each BHs parameter is very identical and harmonious. It may prove that all **new concepts, formulas and conclusions proposed by author in this article are all right.**

【9】; Checking the correctness or incorrectness of (3a1) of the standard model of our universal "Big Bang" with the new BH-theory and formulas proposed by author.

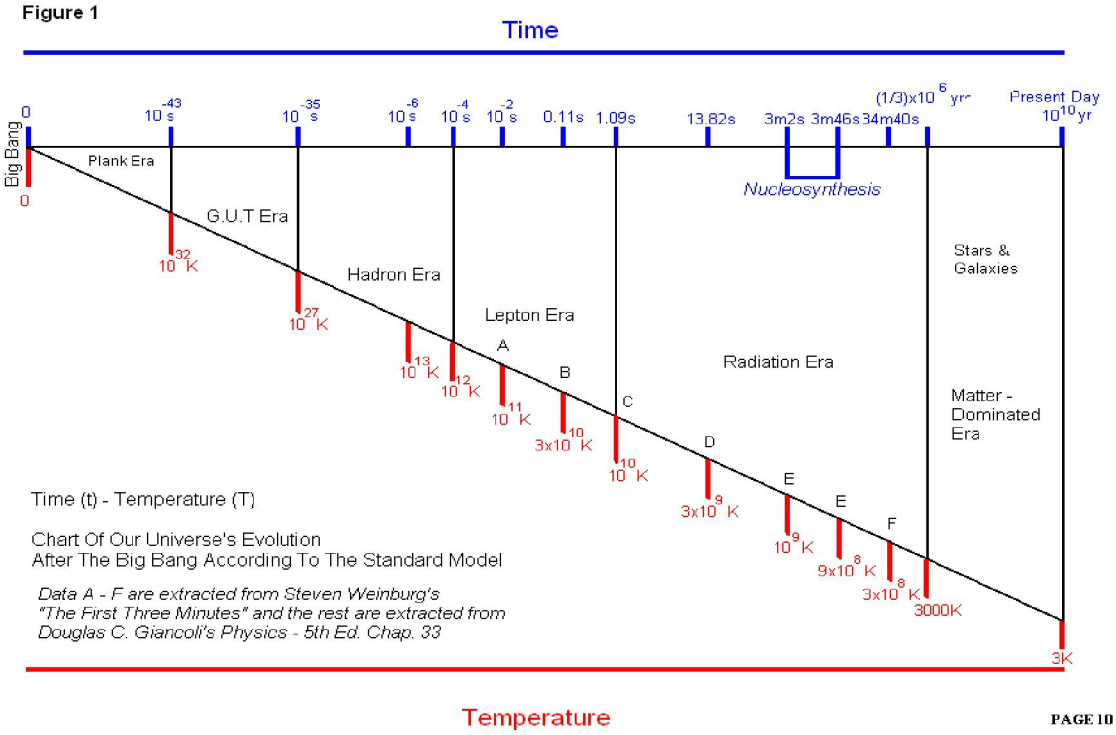
$Tt^{1/2} = k_1$, $R = k_2t^{1/2}$, $TR = k_3$, (3a1)

Generally, $Tt^{1/2}$ in formula (3a1) and the figures of (t—T) in Form 1 are correct and coincide in the period from Planck Era to the end of Radiation Era, but formula **$R = k_2t^{1/2}$ and $TR = k_3$ in (3a1) are incorrect, and must be changed to**

$Tt^{1/2} = k_1$, $R = k_2t$ and $TR^{1/2} = k_3$. (9aa)

§12; Some other conclusions to our CBH:

Figure 1;The relationship between T and t in the evolution of standard model of our universal "Big Bang" [10]



For example, let us check the figures in Figure 1 with the BH-theory and formulas as below:

1*: Taking the figures of a group (t—T) in Hardron Era of Form 1, such as: **$t_u = 10^{-6}$s; $T_u=10^{13}$k;**

From Hubble law, due to **$t_u = 10^{-6}$s;**

$\rho = 3H^2/8\pi G = 3/(8\pi Gt^2)$ (9a)

$\rho_u t_u^2 = 3/(8\pi G) = 1.79\times10^6$ (9b)

Due to $t_u = 10^{-6}$s, so, $\rho_u = 1.79\times10^{18}$g/cm^3,

$\mathbf{R_u = Ct_u = 3\times10^4}$cm, (9c)

$\mathbf{M_u = 4\pi\rho_u R_u^3/3 = 2.023\times10^{32}}$g, **(9d)**

2*: Finding the universal temperature T_u in M_u **from （3a1）, $Tt^{1/2} = k_1$,**

From【1】in Chapter 1, the figures of $M_{bm} = m_p$ $R_{bm} \equiv L_p = 1.61\times10^{-33}$cm ; $T_{bm} \equiv T_p = 0.71\times10^{32}$k;

Compton time t_c= Schwarzchild time t_s of M_{bm}

$t_c=t_s=R_{bm}/C=1.61\times10^{-33}/3\times10^{10}=0.537\times10^{-43}$s

$T_{bm}(t_s/ t_u)^{1/2} = T_u$;

$\mathbf{T_u}=0.71\times10^{32}(0.537\times10^{-43}/10^{-6})^{1/2} = \mathbf{1.65\times10^{13}k}$;

Thus, $T_u=1.65\times10^{13}$k of CBH is almost equal to **$T_u=10^{13}$k given in Form 1.**

Checking R_{bm}/t_s and R_u/t_u,

$\mathbf{R_{bm}/t_s}=1.61\times10^{-33}/0.537\times10^{-43}=3\times10^{10}$cm/s= C

$\mathbf{R_u/t_u} =3\times10^4/10^{-6} = 3\times10^{10}$cm/s = C

Obviously, $R = k_2t^{1/2}$ of (3a1) is wrong, because $\mathbf{R_{bm}/t_s^{1/2}=0.7\times10^{-11}}$; but $\mathbf{R_u/t_u^{1/2}=3\times10^7}$.

3*: $M_u = 2.023\times10^{32}$g of (9d) being a complete Schwarzchild BH can be proved as below.

According to (1c) in Chapter 1, $GM_b/R_b = C^2/2$.

$\mathbf{R_b} = 2GM_u/C^2 = 2\times6.67\times10^{-8}\times2.023\times10^{32}$g $/9\times10^{20} = 3\times10^4$cm $= \mathbf{R_u}$.

In reality, from figures of (9d)，(9a) and (9c), **M_u and R_u** can be placed into (1c)--$GM_u/R_u = C^2/2$. It shows that our expansive Universe **M_u** could have been a complete CBH at any time.

Owing to **$R = k_2t^{1/2}$ of (3a1) in the standard universal model is wrong, it must be changed into the correct formula (9e) below,**

$R = k_8t$, Correspondingly,

$R^{1/2}T = k_9$, **(9e)**

Checking **$R^{1/2}T$ of** M_u;

$\therefore (3\times10^4)^{1/2}\times\mathbf{10^{13}k=1.7\times10^{15}}$

Checking **$R^{1/2}T$ of** M_{bm}**:**

$(1.61\times10^{-33})^{1/2}\times0.71\times\mathbf{10^{32}} = \mathbf{4\times10^{15}}$

4*: Average temperature T_u in CBH--M_u has always and completely been different with T_b on R_b of CBH.

According to **(3a1), $Tt^{1/2} = k_1$, $T_ut_u^{1/2} = T_{bm}t_{sbm}^{1/2}$.**

But from (8b), $t_uT_b = k_2$;

$T_bt_u = T_{bm}t_{sbm}$.

Then, to $M_u = 2.023\times10^{32}$g of (9d); so,

$T_b = 0.38\times10^{-5}$k; but **$T_u=1.65\times10^{13}$k;**

5*: Conclusion:

All above calculations show that figures in form 2 are completely right. However, figures of (t--T) and (3a1）--$Tt^{1/2} = k_1$ are right, but $R = k_2t^{1/2}$ and $TR = k_3$ in (3a1) are wrong.

Moreover, from the numerical values of $M_{bm} = m_p$, it can be seen that their $R_{bm}/t_{sbm} = 1.61\times10^{-33}/0.537\times10^{-43} = 2.998\times10^{10}$cm/s ≡ C—light speed.

Obviously, only R = Ct should be in complete accord with the expansive law of our Universe as a CBH, i.e, Hubble law.

[Annotations]. Formula $R = k_2t^{1/2}$ originates from References [2] and [5].

【10】; Explanations、analyses and conclusions to some important problems in BH-theory and cosmology

§1: Singularity was defined as a point having infinitely great density. Owing to particles as point structures in EGTR that have no heat resistance to oppose its gravities; and supposing the universal model have equal pressures and contraction of equal energy-matters for solving EGTR, it could certainly lead the equal energy-matters contract to Singularity. In this article, applying Hawking and other classical formulas about BH theory, the author can further derive out many new formulas about BHs, such as (1d) $m_{ss}M_b = hC/8\pi G$ and (1e) in Chapter I, which **has completely proved that our Universe as a real CBH could only originate from the combinations of countless minimum BHs--$M_{bl} = 2M_{bm} = 2m_p$, but impossible from Singularity. Similarly, a ball of equal energy-matters in BH can impossibly contract themselves to Singularity too.**

The author's new BH-theory shows that it is unnecessary in order to solve the complicated problems of BHs and cosmology to research the complicated structures and states inside BH and to solve ETGR.

§2: In reality, John and Gribbin pointed out in his book ***Companion to the Cosmos***，that "Our Universe might originate from particles of $M_{bm} \approx 10^{-5}$g" [7]. (Planck Era）was the new-born state of our Universe."[7] In this article, author can better testify about John and Gribbin's supposition with new formulas and complicated calculations.

§3: According to formula（1c）, $R_b = 2GM_u/C^2$, and $M_u=4\pi\rho_uR_u^3/3$; formula (1n)--$\rho_bR_b^2 = 3C^2/(8\pi G)$ can be got. Thus, for our Universe of M_u as a CBH, its real average density ρ_u can be easily and exactly calculated out.

$\rho_u = \rho_{b1}(R_{b1}/R_{b7})^2 = 10^{92}(10^{-61})^2 = 10^{-30}$g/cm^3

$\rho_u = 10^{-30}g/cm^3$ can completely accord with the real observational values. It do clearly prove that our expansive Universe as a CBH can surely originate from the combinations of countless M_{bm}. It clearly denies that, applying Friedmann's model of ($\Omega = \rho_r / \rho_o \neq 1$) to decide the open or close of our Universe is a wrong proposal.

§4; In 1998, two scientist groups of Australia and America discovered the accelerating expansion of our Universe through their observation to the explosion of remote super-star Ia. The accelerating expansion appeared about 9×10^9years ago. The main stream of present scientists proposed that, dark energy of exclusive force appeared in our Universe 9×10^9 years ago and led our Universe create accelerating expansion. Their hypothesis may be hardly observed and testified. According to that, **BHs in the process of accelerating engulfing energy-matters outside would cause the accelerating expansion of its $R_u = R_b$, author proposed a simple hypothesis, that our CBH might collide and combine with another CBH about 9×10^9 years ago.** Author's explanations and calculations may provide another visual angle to recognize our CBH. According to the fact of accelerating expansion, it shows the real existence of multi-universes. [8]

§5。The existence of multi-universes could have the greatest possibility.

Our present Universe is a #7 CBH of $M_{bu}\approx10^{56}$g. According to the exact calculations, the size of our CBH was just like a atomic nucleus of r $\approx10^{-13}$cm at its new-born time in Plank Era. **It shall hardly imagine that, the gigantic Pre-universe could only collapse a sole Universe of ours so small like an atom.** The greatest possibility was that our Universe could only be one of multi-Universe. Besides, the expansion of our Universe with speed C all the time could show clearly that, there would be full energy-matters outside for our CBH to be engulfed. Energy-matters existing outside could not belong to our Universe , but another Universe.

Early in 2005, theoretical physicist, Laura Mersin Horton in the U.S. University of North Carolina at **Chapel Hill and prof. Richard Horman in Carnegie Mellon University put forward the theory of the cosmic radiation abnormal phenomenon and estimated that this situation is due to other universes gravity attract resulting.**

In March 2013, the European Space Agency announced the Planck telescope captured data to map out the Omnimax cosmic microwave background radiation pattern. Piece by far the most accurate radiation patterns show that the universe 13.8 billion years still exists before the radiation emitted by the Big Bang. [13]

Horton accepted an interview and said: "This abnormal phenomenon caused by the gravitational attractions of another Universe to our Universe, that attractions had existed at the time of "Big Bang". It is a realistic evidence of the existence of another Universe discovered by us up to now."[13]

§6。The universal structure may be the smaller BHs covered by the greater BH, layer by layer.

Since there might be a greater Universe outside our Universe as a CBH and a smaller BH in the center of any cluster galaxy as well as many star BHs inside our CBH, it can be seen, the known structure of BHs from outside our CBH to inside our CBH are just the structures of BHs layer upon layer , i.e., a greater BH can often cover in many smaller BHs. We may know that the star BHs and #6 giant BHs in our Universe, but mankind cannot know forever how greater CBH could wrap our CBH and how many CBHs might be parallel to our CBH outside .

§7。Obviously, **the BH-theory and cosmology came from classical theories, many important problems can be better solved by author with classical theories and formulas. It shows,** the classical theories and formulas can have not gone to the end yet. Hawking said recently in California Institute of Technology: "Our Universe was born from Big Bang, this process did not need the helps from God at all," Author clearly demonstrated that our Universe as a CBH could only originate from countless $M_{bl} = 2M_{bm} = 2m_p$ in Planck Era. Thus, **Some false conclusions about our Universe created from Singularity and Singularity existing in BHs, etc, can be given up.**

§8。The material structures of the great Universe may be divided many different states and levers or layers, just as water in the different states of solid、liquid or gas. Every state needs and suit to apply different formulas. It can be seen from this article, there may be 3 different great states at least: first, Planck Era of extremely high density might accord with string theory, supersymmetry and string theory, quantum field **t**heory**, e**tc,. Our material world must firstly accord with Newton mechanics, thermodynamics, quantum mechanics and Special Theory of Relativity. After all BHs in our Universe disappear and change into Hawking quantum radiations m_{ss} in the remote future, it may be a ice-cold、silent and lethargical world.

§9; In near 100 years, many scientists exhausted all their energies, but could not propose the exact data of

various parameters in some important evolution period of our Universe, **because they didn't know the complete theory of BHs and formulas (1d) (1e) derived by author**. From Form 2, the numerical values of different parameters of 7 BHs can exactly describe the actual evolution of our Universe as a CBH, it has been an expansive process of $R_u = R_b$ of our CBH engulfing the suficient energy-matters outside with speed C and according to Hubble law. Besides, in this article, author better proved and explained that, our Universe as a CBH was born from $M_{bl} = 2M_{bm} = 2m_p$; the new mechanism of 'Original Inflation' and all calculated data do not violate the current records observed by modern telescopes and the formulas of all classical theories.

Thus, **'Blackhole-cosmology' as the title of this article is worthy of the name.**

====The End====

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12/27/2013