Mankind May Be Impossible to Manufacture out Any Artificial Real Gravitational Black Hole (BH) Forever

---- Part 3 of "New Concepts to Big Bang and Black Holes" [6][7]----
----A incidental comment to BBC News about artificial BH on 3/17 /2005----

Dongsheng Zhang

Graduated in 1957 From Beijing University of Aeronautics and Astronautics. China. Permanent address: 17 Pontiac Road, West Hartford, CT 06117-2129, U.S.A. Email: *ZhangDS12@hotmail.com*

Abstract: Recently, many scientists in different countries did some alarmist talks to "artificial black holes". Probably, those scientists only depended upon their unreal image to talk about "artificial black hole". They might not conscientiously study the characteristics of a real gravitational BH, and not calculated out the exact values of various parameter of a real gravitational BH in detail. Most scientists hankered after new modern theories, such as string theory, but almost neglect to apply classical theories, such as Hawking's formulas about BHs in calculations of BHs. However, BH is the product of classical theories, it can be correctly explained only by classical theories. Some experimental scientists probably made up news about manufacturing artificial BHs for their special purpose. Thus, they did not apply the suitable formulas to calculate out correct value of every parameter of a real gravitational BH so that they might consciously or unconsciously obscured the principal differences between a real gravitational BH and non-BH with specious arguments. The calculated fundamental formulas in this article originate from GTR and Hawking about theory of BH, through qualitatively analyses and detailed calculations to various parameters of different real BHs, this article will show that, any "artificial BH " will have no possibility to be manufactured out by mankind forever. [The Journal of American Science. 2006;2(1):31-37].

Keywords: artificial black hole; real gravitational black holes; calculations to various parameters of black hole

Introduction
Previously, some Russian scientists had advertised to produce artificial bombs of mini BHs or so-called Otone, mass of 1 Otone = mass of 40 atoms = $40 \times 1.67 \times 10^{-24}$g $\approx 10^{-22}$g. Russian scientist Alexander Trofeimonko pointed out that, mini black holes could be manufactured out in laboratory as a "bomb of black hole", which could kill billion people. They said, it will be the century of "Otone" after 50 ~60yrs. They also advocated that, mini BHs inside earth would ignite volcanic eruption, and mini BHs would lead to spontaneous combustion in human body, etc.[1] In January 2001, English theoretical physicist Wolf Leonhart declared that he with his colleagues would make a black hole in a laboratory.[1]

On 3/17/2005, BBS reported that in RHIC—Relative Heavy Ion Collider sited at the Brookhaven National Laboratory in New York, "fire ball" caused by the collision of two gold-nuclei, which speed of smashing collision approached light speed, was striking similar with a micro black hole.[2][3][4] When the gold nuclei smashed into each other, they were broken down into particles called quarks and gluons. They formed a ball of plasma about 300 times hotter than the surface of the Sun.[2][3][4] The maker of "fire ball", Prof. Horatiu Nastase of Brown University in Providence of Rhode Island wrote: "We calculate the soliton (black hole) temperature, and get 175.76MeV, compared to the experimental value of the "fireball" ` freeze-out` of about 176 MeV, its lifetime is about 10^{-24}s. "[2][3][4] He

said: "There is something unusual about it. Ten times as many jets were being absorbed by the fireball as were predicted by calculations."[2][3][4]

English famous cosmologist, Martin Reez predicted in his book <The Last Century> that, the first one of 10 greatest catastrophes on earth in future would be "artificial black hole".[2]

Some Greek and Russian Scientists proposed in 2003 that countless short-lived micro BHs were produced from the collision of the universal rays with high energy to particles or molecules of our atmosphere, its mass was about 10×10^{-6}g, its lifetime was about 10^{-27}s. In addition, they pointed out that the new Super Hardon Collider of European Particle-physical Laboratory will work in 2007, and will have strong power enough to manufacture out about ten thousand micro BHs every day.[5]

1. Black hole (BH) and formulas for calculating various parameters of BH
According to the definition of GTR (general theory of relativity), black holes were objects, in which light would be bound by the extremely curved time-space and could not escaped out. Hawking discovered Hawking's radiation emitted out from BH and got formulas to calculate Hawking's radiation. Those theories and formulas are the calculated foundations in this article.

Only Schwarzchild's BHs (no charges, no rotating and spherical symmetry), which are real gravitational BHs, will be studied in this article.

In my former article "New Concepts to Big Bang and Black holes —Part two",[6] author pointed out clearly that, BH would be the simplest object in nature, the relationships between its various parameters are simple and single value, once the value of a parameter is given, the values of all other parameters would be solely decided with the first one. In that article, author further demonstrated that, any BH had no possibility to exist in nature, if its mass was less than 10^{-5}g.[6][7]

For a formed real gravitational BH, the formulas of its various parameters are below, if M_b —mass of a BH, R_b—its Schwarzchild's radius, T_b--temperature on Event Horizon, ρ_b --density on Event Horizon, G--gravitational constant, κ-- Boltzmann's constant, h—Plank's constant, M_θ--mass of sun $\approx 2\times10^{33}$g, C—light speed. According to the definition of GTR and Hawking's theory about BH, to a real gravitational black hole, formulas (1a), (1b), (1c) and (1d) below should not be violated.

$R_b=2GM_b/C^2$ or $C^2=2GM_b/R_b$[6][7][8] (1a)

(1a) is the necessary condition for existence of any real gravitational BH. (1a)

According to Hawking's formula about BH,
$T_b = (C^3/4GM_b)\times(h/2\pi\kappa) \approx 0.4\times10^{-6}M_\theta/$
$\approx 10^{27}/ M_b$ [6][7][8] (1b)

According to Hawking's another formula about BH, the lifetime of a BH is decided by the energy emitting out Hawking's radiation from BH in unit time,
$\tau_b \approx 10^{-27} M_b^3$ (s) [6][7][8] (1c)

It can be seen from (1a), (1b) and (1c), $\tau_b \propto 1/T_b^3$.

Particle and radiation at extremely high temperature (energy) would have three forms of energy (E_1, E_2, E_3), in some special states or conditions, they might be identical and transform between each other.

$E_1 = m_pC^2$, $E_2 = \kappa T$, $E_3 = Ch/\lambda$ (1d)
$M_b = 4\pi\rho_b R_b^3/3$ (1e)

It can be seen that, R_b, T_b, τ_b, ρ_b, are all simple and single functions of M_b.

For convenient calculation, formula (1a) can be altered to
$M_b/R_b=C^2/2G\approx0.675\times10^{28}g/cm\approx10^{28}$g/cm (1aa)

Formulas (1a)×(1b) is equal to
$T_b\times R_b = (C^3/4GM_b)(h/2\pi\kappa)(2GM_b/C^2) =$
$Ch/ 4\pi\kappa \approx 0.1154$ cmk (1ba)

2. The collision of two gold-nucleons with approaching light speed in RHIC of New York cannot become a real gravitational micro BH at all

(A). To a particle m_o of speed v, its total energy E can be expressed as below, m_o—static mass of a particle,
$E = m_ov^2/2 + m_oC^2$ [9] (2a)

Suppose 2 gold-nucleons (Au) had formed a "fireball" in the collision in RHIC with speed v, v approached to light speed C, M_{oau}—mass of a Au:
$2M_{oau} = 197 H\times2 = 2\times197\times1.66\times10^{-24}g = 6.58\times10^{-22}g$

From (2a), the total energy-matters E_{au} of the formed "fireball" gotten from RHIC would be,
$E_{au} = 2M_{oau}v^2/2 + 2M_{oau}C^2 \approx 3M_{oau}C^2 = 1.5\times6.58\times10^{-22}\times(3\times10^{10})^2=0.89$erg $= 6.242\times10^{11} \times0.89$eV $= 555$GeV $=555\times10^9\times4.46\times10^{-26}$kW*h $= 2.5\times10^{-14}$kW*h (2b)

In ideal state, the highest temperature T_{au} of "fireball", $T_{au} = E_{au}/\kappa \approx 10^{17}$k (2c)

E_r—energy expended by RHIC for collision of 2 gold-nucleons (i.e. for 6.58×10^{-22}g),
$E_r=E_{au}/3 \approx 185$GeV $= 0.8\times10^{-14}$kWh (2d)

It shows that, **if mankind could successively manufacture a BH of mass = m_o with collision of particles on a Colliders, mankind should expend energy $E_r \approx m_oC^2/3$,terrible costs!**

$E_r \approx m_oC^2/3$ (2e)

$E_r \approx m_oC^2/3$, (2e)

Thus, if M_{bau} was a new formed real gravitational BH, its values of various parameters should be:
$M_{bau} =3M_{oau}=3\times197\times1.67\times10^{-24}g = 9.87\times10^{-22}g$,
From(1aa), $R_{bau}=M_{bau}/0.675\times10^{28}=1.5\times10^{-49}$cm,
From (1ba), $T_{bau} = 0.1154/R_{bau} = 0.77\times10^{48}$k,
From (1c), $\tau_{bau} \approx 10^{-27} M_{bau}^3$(s) $= 10^{-27} \times (9.87\times10^{-22})^3 \approx 10^{-90}$s
From (1d), $E_{bau}=\kappa T=1.38\times10^{-16}\times0.77\times10^{48}=10^{32}$erg (2e)
From (1e), $\rho_{bau} = 3M_{bau}/(4\pi R_{bau}^3) \approx 0.7 \times 10^{125}$g/cm^3

It can be seen that, above values of R_{bau}, T_{bau}, E_{bau} and τ_{bau} as a real gravitational micro BH had no possibility to appear in nature, because above values greatly exceed the beginning values of Plank's Era (Plank's mass $m_p = 10^{-5}$g, Plank's time $t_p = (Gh/2\pi C^5)^{1/2}$ $=0.539\times10^{-43}$s, Plank's length $l_p=t_p\times C=(Gh/2\pi C^3)^{1/2}$ $=1.6\times10^{-33}$cm,).[7] The deep interior of Plank's Era might not be known and not detected by mankind at all forever.

Assume "fireball" made in RHIC was still a BH after absorbing 10 times jets of particles as called by Prof. Nastase, values of various parameters of such BH (M_{10}) are respectively changed into different values below.
$M_{10} = 10M_{oau} = 10\times9.87\times10^{-22}g = 9.87\times10^{-21}g$, $R_{10} = 1.5\times10^{-48}$cm, $T_{10} = 0.77\times10^{47}$k, $\tau_{10} \approx 10^{-87}$s.

It can be seen that practical values of "fireball" detected by Prof. Nastase is still too far away from a real gravitational BH.

(B). The almost same temperature value of that "fireball" or so-called BH calculated out and got from experiment by Prof. Horatiu Nastase was 176MeV, its lifetime was about 10^{-24}s, the surface temperature of "fireball" was about $T_{sur} = 300 \times5,800$ (surface temperature of Sun)$\approx1.74\times10^6$k. They are far away from values of a real gravitational micro BH above. Thus, "**fireball" was not a real gravitational BH at all**.

First, lifetime 10^{-24}s of "fireball" in RHIC showed that "fireball" is not a real gravitational BH at all. To a real gravitational BH, if its lifetime is 10^{-24}s,

correspondingly, its mass M_{-24} should be about 10g, because according to (1c), $10^{-24} \approx 10^{-27} \times M_{-24}^3$, $\therefore$ $M_{-24} \approx 10$g.

Then, what does lifetime 10^{-24}s of "fireball" mean? It may mean that, gold nuclei after collision rapidly formed a "fireball" and instantly decomposed into particles other than integrating a real BH, because the disappearance of a BH would be bound to follow a burst of strong explosion and to emit γ-rays of extremely high energy. The relatively quiet disappearance of "fireball" express that, the energy of "fireball" is not so high to become a real BH needed by the same mass.

If distance $d_{au} = 10^{-24}$C (light speed) $= 10^{-24} \times 3 \times 10^{10} \approx 3 \times 10^{-14}$cm, hence, $d_{au} = 3 \times 10^{-14}$cm may be approximately considered as the distance of the closest protons in gold-nuclei, or the distance of two closest gold-nuclei jetted from RHIC with approaching light speed, thus, lifetime 10^{-24} of "fireball" only shows the time from the beginning collision of the first pair of gold-nuclei to second pair of gold-nuclei, and to other 10 times gold-nuclei non-stop jetted from RHIC. That process is complete difference with a real micro BH to engulf energy-matters from outside. The existence of "fireball" could keep in 10^{-24}s only due to more gold-nuclei continuously jetted by RHIC. Therefore, lifetime 10^{-24} of "fireball" just indicate that "fireball" is not a real micro gravitational BH.

Second, what does 176MeV of soliton (black hole called by Prof. Nastase) got in experiment and calculated by Prof. Nastase mean? Let E_{pk} is the kinetic energy of a proton in gold nuclei, and $E_{pk} = m_{pro}v^2/2 < m_{pro}C^2/2 = 1.67 \times 10^{-24} \times (3 \times 10^{10})^2/2 = 7.5 \times 10^{-4}$erg $= 7.5 \times 10^{-4} \times 6.242 \times 10^{11}$eV $= 47 \times 10^7$eV $= 470$MeV,

$\therefore$ $E_{pk} < 470$MeV.

After collision, E_{pk} would not be completely altered into heat energy, greater part of E_{pk} transformed into other energies, such as radiation, so, **176MeV measured by Prof. Nastase are just heat energy transformed from partial kinetic energy of every particle in collision.** The process of manufacturing real BH should accumulate most energy-matters, however, greater part of energy has to lose in collision in RHIC. If "fireball" was a real BH, heat energy of 176MeV could not be measured by Prof. Nastase. **A real gravitational BH should have no way to be detected. A detected object is not a real BH.** It has conversely proved that "fireball" is not a real BH at all. Temperature T_{pro} corresponding to heat energy 176MeV should be: $T_{pro} = 176$MeV/$\kappa = 176 \times 10^6 \times 1.602 \times 10^{-12} /(1.38 \times 10^{-16}) = 2 \times 10^{12}$k

Third, what does the surface temperature ($T_{sur} = 1.74 \times 10^6$k) of "fireball" mean? Temperature on the surface of our Sun is about 5,800k, so, $T_{sur} = 1.74 \times 10^6$k was temperature on the surface of "fireball". It shows that, before or after collision of protons, interactions between protons or gold- nuclei exerted heat movement and formed a ball of blazing gas, i.e."fireball", because the practical collision was a process, **all protons in gold-nuclei of two sides had no way to participate in collision at the exact same time,** its wave length

$\lambda_{sur} = Ch/\kappa T_{sur} = 3 \times 10^{10} \times 6.63 \times 10^{-27}/(1.38 \times 10^{-16} \times 1.74 \times 10^6) = 8 \times 10^{-7}$cm.

According to $\lambda_{sur} = 8 \times 10^{-7}$cm, "fireball" should emit x-rays and become a real "fire ball".

Fourth, assume "fireball" were a real BH, it could not endanger anything as well as mankind, because its lifetime was just 10^{-90}s, if it could move with light speed C, it only went 10^{-80}cm. However, the real lifetime of "fireball" was 10^{-24}s as Prof. Nastase's said, it could only move 10^{-14}cm with light speed C, 10^{-14}cm is just the distance between two closest nucleons in any atom.

In a word, object produced by the collision of 2 gold-nuclei (Au) in RHIC was not a real gravitational micro BH at all, but just a "fireball" of mixed quarks and gluons, because a real BH could have no visibility and not be detected except Hawking's radiation, besides, the death of a real BH should have a burst of very strong explosion and emit γ-ray bursts with high frequency. However, visibility, very long lifetime and quiet disappearance of "fireball" have proved that, "fireball" produced by Prof. Nastase in RHIC had no any similar with a real gravitational BH.

(C). It can be known with the same reasons and calculations that, micro BH Otone advocated by Russian scientists would have more impossibility to be manufactured out by mankind forever, because mass of Otone is equal to mass of 40 atoms $\approx 1/10M_{bau}$. It is said, assume Otone is a real BH, its temperature would be higher and its lifetime shorter than above collision of gold-nuclei in RHIC.

(D). It can be seen from (2b), assume a bomb of artificial BH had been made out, its explosive total energy was E_{au}, but the expended energy in laboratory was $2M_{oau}v^2/2 \approx 1/3E_{au}$, it was the worst business for producer of BH.

(E). About energy of RHIC: It can be seen from above calculation, the energy of RHIC for the collision of 2 gold-nucleon is $1/3E_{au} \approx 1/3 \times 0.89$erg ≈ 0.3erg $\approx 0.3 \times 6.242 \times 10^{11}$eV $\approx 1.87 \times 10^{11}$eV ≈ 187GeV. It is rather high to RHIC.

(F). Assume M_{bau} became a real micro BH, could it exist in a long time? From above calculation, its lifetime was just 10^{-90}s, only if it could engulf energy-matters from its surrounding within time of 10^{-90}s, it would vanished certainly. $10^{-93} \times C = 3 \times 10^{-80}$cm, it is said, if energy-matters depart from M_{bau} beyond 3×10^{-80}cm, M_{bau} would have no way to grow up and vanish instantly.

(G). Could BH $M_{bu} = 10^{-5}$g,[7] (i.e. 10×10^{-6}g), which is equal to BHs at the genesis of our universe, be

manufactured artificially by the new Super Hardon Collider (SHC) of European Particle-physical Laboratory in 2007 or exist in atmosphere of our earth? No way, SHC will only manufacture a little bigger and more "fireballs" than RHIC. Short-lived micro BHs had no way to appear in our atmosphere, even if the energy of universal particle was high to 10^{11}GeV[11], but it only became a little bigger "fireball", because its mass is still too small.

From (2c), if energy E_{bu} is needed by artificially manufacturing a $M_{bu} = 10^{-5}$g, as a result, $R_{bu}=10^{-33}$ cm, $T_{bu} = 10^{32}$k, that state has been on the border of Plank's Era. $E_{bu} \approx 10^{-5}C^2/2 = 4,5 \times 10^{15}$erg $=3 \times 10^{18}$GeV.

(H). **Mankind can't triumph over nature**

"Fireball" made in RHIC by Prof. Nastase had no possibility to become a real gravitational BH. Mankind would have no way to attain energy of every particle high to (3×10^{18}GeV), which only appeared at the genesis of our universe forever. Such high energy was the result of gravitational collapse of our whole universe in its past life or could be considered as a God's masterwork.

Assume above micro BH of $M_{bau} = 9.87 \times 10^{-22}$g was a real BH, its temperature T_{bau} would attain $0,77 \times 10^{48}$k, however, the highest temperature of our Universe at its genesis was 10^{32}k.[7] Mankind has no way to restrain the energy emission of BH.

3. The necessary condition of existence and growth for a new-born micro BH, as assuming that an artificial real gravitational BH had been manufactured out

(A). A new-born micro BH, whether it is an artificial or a natural, always had too much high temperature and too much shorter lifetime, hence, the necessary condition of growth for a new-born micro BH (its mass = M_{b1}) is that, in its lifetime, its gravity at least could reach to energy-matters of its surrounding. τ_b—lifetime of BH, C—light speed, d_{bp}—distance from new-born micro BH to particles outside BH, then,

$\tau_b C > d_{bp}$ (3a)

From (1c), $M_{b1}>10^9 (d_{bp}/C)^{1/3}$ or $M_{b1} >3.2 \times 10^5 d_{bp}^{1/3}$ (3b)

Assume an artificial BH M_{b1} has been successfully manufactured in a laboratory, mass of M_{b1} is heavy enough and d_{bp} is short enough for increase in mass of M_{b1}. It is said, assume new-born M_{b1} instantly shoot or fall into some object, (such as atoms, white dwarf or neutron star in form 1) in which the distance d_p between two closest particles must be less or equal to d_{bp}. For comparison, three different objects will be offered. E_{eV}, E_{kwh}—energy needed by manufacturing a corresponding artificial BH.

Form 1

Objects	ρ_o (g/cm^3)	$d_{p \leq d_{bp}}$ (cm),	M_{b1} (g),	τ_b (s),	R_b (cm),	E_{eV} (eV),	E_{kWh} (kWh)
Atoms	10^1	10^{-8}	700	3.43×10^{-19}	10^{-25}	2×10^{26}GeV	9×10^9
White dwarf	10^6	10^{-10}	150	3.38×10^{-21}	2.25×10^{-26}	4×10^{25}GeV	1.7×10^9
Neutron star	10^{15}	10^{-13}	15	3.38×10^{-24}	2.25×10^{-27}	4×10^{24}GeV	1.7×10^8

Values of M_{b1} calculated from formula (3a) or (3b) on above form 1 were just a fictitious necessary condition for a new-born BH to have a possibility to engulf some energy-matters from outside in its lifetime. However**, Energy-matters of outside just felt the gravity of the new-born BH but had no more time to be surely engulfed, besides, the new-born micro BH was rapidly losing its energy-matters with Hawking's radiation.** Therefore, **M_{b1} were all still too small, their lifetime were all too short.**

Furthermore, the energy E_{eV} needed by Colliders for producing new-born BH is too much great. Now, energy of the strongest accelerator in the world is just less than 10^4GeV, but the energy of micro BH of mass = 10^{-5}g (i.e. single particle) at the genesis of our universe was 10^{19}GeV,[7] which might not be attained by mankind forever. The ability of mankind to manufacture a micro "artificial BH" would not exceed God's will at all.

(B). The real speed V_p of a particle of object under the gravitational effect to lash at new-born BH M_{b2} has no possibility to attain light speed C, hence, M_{b2} must

much heavier than M_{b1}, and then might engulfed some particles from outside, (3a) should be modified as below, $\tau_b V_p > d_{bp}$ (3c)

According to laws in physics, if a new-born BH shoot into an object, distance S—between particle of object and BH of M_{b2}, $a = GM_{b2}/d_{bp}^2$, a--- Accelerating speed, G—gravitational constant, from (1c) and

$V_p^2 = 2aS \approx 2ad_{bp}$ and $S = at^2/2$ [9]   (3d)

So, $M_{b2}^{7/2} > 10^{27} \times d_{bp}^{3/2}/(2G)^{1/2}$ (3e)

For example, let $d_{bp} = 10^{-8}$cm = distance of atoms, **$M_{b2} \approx 1.8 \times 10^5$g, so, M_{b2} $>>(M_{b1} = 700$g) (on form 1), because $V_p \approx (2ad_{bp})^{1/2} \approx 1.6 \times 10^3$cm, $V_p<<C$. Thus, L_{eV}** needed by Colliders for producing new-born bigger BH would be increased about 1,000 times than L_{eV} (form 1).

In case $M_{b2} \approx 1.8 \times 10^5$g, its $\tau_b \approx 10^{-27} M_b^3 = 10^{-27} \times (1.8 \times 10^5)^3 = 5.8 \times 10^{-12}$s. If object has much matters enough for being absorbed by M_{b2}, how much matters are absorbed in the whole lifetime of M_{b2}? From (3d), S $= at^2/2 = (GM_b/S^2) \times (\tau_b)^2/2$, S $= 0.58 \times 10^{-8}$cm, if density of object $\rho_o = 10$g/cm^3, M_o is mass of object absorbed by M_{b2}, hence,

$M_o = 4\pi\rho_o S^3/3 = 0.8\times10^{-23}$g.

As a result, $M_o << M_{b2}$, if M_{b2} shot into an big object, only its partial mass of $(M_o = 0.8\times10^{-23}$g) is engulfed by M_{b2}. So, M_{b2} has still no way to grow up, but just can prolong its lifetime a very little. In reality, $M_o = 0.8\times10^{-23}$g is more than mass engulfed really by M_{b2}, because M_{b2} is gradually decrease in its mass with emitting Hawking's radiation.

In case M_{b2} was shot in a neutron star, its density is 10^{15}g/cm^3, so, $M_o < 10^{-8}$g. M_{b2} could not grow up yet.

(C). **For the growth of a new-born BH, it needs more strict condition, the energy-matters engulfed by BH from outside object must be more than the energy-matters emitted by BH in the same time**.

Assume a new-born BH M_{b3} is formed, its lifetime $\tau_b = 10^{-27}M_{b3}^3$, $d\tau_b = 10^{-27}\times3M_{b3}^2 dM_{b3}$,

$$dM_{b3}/d\tau_b = 10^{27}/(3M_{b3}^2) \qquad (3f)$$

Assume outside object $M_o = 4\pi\rho_o R_o^3/3$, let $\rho_o = $ constant = density of M_o, R_o—radius of M_o,

$$dM_o/dt = 4\pi\rho_o R_o^2 dR_o/dt \qquad (3g)$$

Growing condition of new-born BH (M_{b3}) must be:

d M_{b3}/ dτ_b < dM$_o$/dt **(3h)**

So, $10^{27}/(3M_{b3}^2) < 4\pi\rho_o R_o^2 dR_o/dt$ (3i)

To find out dR_o/dt, from (3d), $S = at^2/2$, $S^{1/2} = (GM_b/2S^2)^{1/2}t$, suppose M_{b3}= constant (really $M_{b3} \neq$ constant, so, M_{b3} should be bigger),

$S^{3/2} = (GM_b/2)^{1/2}t$, $3S^{1/2}dS/2 = (GM_{b3}/2)^{1/2}dt$, hence,

$$dS/dt = (GM_{b3}/2)^{1/2}2/(3S^{1/2}) \qquad (3j)$$

dR_o/dt of (3i) may be considered to be equal to dS/dt of (3j), so, from(3i) and (3j),

$10^{27}/(3M_{b3}^2) < 4\pi\rho_o R_o^2(GM_b/2)^{1/2}2/(3R_o^{1/2})$, after simplifying,

$$M_{b3}^{5/2} > 10^{27}/[8\pi\rho_o R_o^{3/2}(G/2)^{1/2}] \qquad (3k)$$

Let $R_o = 100$cm, $\rho_o = 10$g/cm^3, hence,

$M_{b3} >> 1.366\times10^{10}$g.

Above calculations may indicate that, if a formed new-born BH of $M_{b3} > 1.366\times10^{10}$g could be shot into a metal ball M_o of radius $R_o = 100$cm, and its density $\rho_o = 10$g/cm^3, M_{b3} would become bigger and prolong its lifetime τ_b until all mass of metal ball absorbed by M_{b3}, because energy-matters emitted from M_{b3} were less than matters of M_o absorbed from the metal ball.

Let's check up the result below.

Let **$M_{b3} = 2\times10^{10}$g > 1.366×10^{10}g** below.

In case **$M_{b3} = 2\times10^{10}$g,** its lifetime $\tau_b = 10^{-27} M_{b3}^3 = 8,000$s, its Schwarzchild's radius $R_b = M_{b3}/0.675\times10^{28} = 2.96\times10^{-18}$cm, absorbed mass of metal ball $M_o = 4\pi\rho_o R_o^3/3 = 4.2\times10^7$g, time t is needed by BH to absorb metal ball, $R_o = at^2/2$, $a = GM_{b3}/R_o^2$, so, $t = 0.387\times10^2$s = 38.7s.

However, $\tau_b - t = 8,000 - 38.7 = 7961.3$s, the rest mass M_{br} of M_{b3} corresponding to the rest lifetime ($\tau_b - t$) is $7961.3 = 10^{-27} M_{br}^3$, so, $M_{br} = 1.997\times10^{10}$g, if M_{bd}

is the decreased mass of BH in the period t = 38.7s, hence,

$M_{bd}= M_{b3} - M_{br} = 2\times10^{10} - 1.997\times10^{10} = 3\times10^7$g, as a result, $M_{bd} (3\times10^7$g$) < M_o (4.2\times10^7$g$)$.

If M_o is bigger than 4.2×10^7g, it can be completely engulfed by M_{b3} within longer time.

All above calculation are approximate, they may be considered as estimated calculations and qualitative analyses, because the state and structure of BHs have almost be unknown.

(D). Assume a new-born BH M_{b4} has been manufactured by a collider or an accelerator, what conditions could ensure the growth of M_{b4}? **For the growth of M_{b4}, matters continuously shot in a row by a accelerator should be more than energy-matters emitted from M_{b4} at the same time.**

From (3f), d $M_{b4}/d\tau_b = 10^{27}/(3M_{b4}^2)$ (3l)

Suppose M_o —mass shot by a accelerator, m_p —mass of a particle in M_o, n—total numbers of shot particles, l_p—distance between two closest particles, l—length of n particle in a row, hence,

$M_o = m_p n$, d $M_o = m_p dn = (m_p/l_p)dl$

$\therefore dM_o/dt = (m_p/l_p)dl/dt$

let $dl/dt \approx$ light speed C, so,

d $M_o/dt \approx C m_p/l_p$ (3m)

For the growth of M_{b4}, d $M_{b4}/d\tau_b < $ d M_o/dt, as a result, $10^{27}/(3 M_{b4}^2) < C m_p/l_p$ (3n)

Let $m_p = 3.29\times10^{-22}$g (mass of a gold-nucleon), $l_p \approx 10^{-13}$cm, $\therefore$ **$M_{b4} > 0.18\times10^{13}$g.**

4. Analyses and conclusions

Different real gravitational BHs, bigger or smaller, are calculated on above paragraphs, they are: $M_{bau} = 9.87\times10^{-22}$g, $M_{bu} = 10^{-5}$g, $M_{b1} = 15\sim700$g**,** $M_{b2} \approx 1.8\times10^5$g, $M_{b3} = 2\times10^{10}$g, $M_{b4} > 0.18\times10^{13}$g, but no one can be artificially manufactured out in future. Why? Analyses and demonstrations are seen below.

(A). All calculations in this article are on the basis of formulas (1a), (1b) and (1c), which originate from GTR and Hawking's theory about BH as well as the application of thermodynamics, author had got already many principal conclusions on the past article—"New Concepts to Big Bang and Black holes, Both had No Singularity at All". [6][7] Some important conclusions can be accurately applied in this article to solve greatly difficult problems about artificial BHs.

First, the relationships between each other of various parameters of a BH are single and sole correspondence. It is said, **to a real gravitational BH, whether it is natural or artificial, if a certain value of a parameter has been determined, such as its mass M_b, the sole and certain values of all other parameters are respectively and solely determined by M_b from formulas (1a), (1b) and (1c). There would be no any two different BHs, which could have the same value**

of only one parameter, but have the different value of all other parameters.

Second, owing to that, lights in BH could not shake off the very strongly gravitational trammel of BH, a real gravitational BH had no way to emit out any information, which could be directly detected by external world. Of course, BH emits Hawking's radiation, but right now, it cannot be detected yet. Therefore, if any so-called "BH" included artificial BH was advocated by some people either in the past or in future to have been directly detected, it would not be a real gravitational BH at all.

Third, real micro gravitational BHs of (mass = 10^{-5}g = M_{bu}) formed our new-born Universe at its genesis. **$M_{bu}= 10^{-5}$g was, and still will be, the heaviest particle and the minimum BH in our universe.**[7][6] Energy E_{bu} of every M_{bu}, $E_{bu} = 10^{19}$GeV, [7] it was the greatest energy for a particle (BH) in our universe, and cannot be reached by mankind forever. It is said, mankind will absolutely have no way forever to reach energy $>10^{19}$GeV in one collision to manufacture out an artificial BH (particle), which mass $\geq 10^{-5}$g.

Could mankind manufacture out any smaller artificial BH, which mass $< 10^{-5}$g) in future with smaller energy than E_{bu} (i.e. $< 10^{19}$GeV)? No way, according to formula (1b), for a BH of mass $< 10^{-5}$g, its temperature must be $> 10^{32}$k. On the contrary, suppose its $E_{bu} < 10^{19}$GeV, i.e. its really temperature = $E_{bu}/\kappa < 10^{32}$k. Thus, the created particle of (mass $< 10^{-5}$g) would not be a real gravitational BH at all. It's really a pity that many modern scientists are still attempting to manufacture out micro BHs of (mass $<<10^{-5}$g) with strong collider according to such incorrigible idea.

Fourth, theories of BH are built up on the foundations of gravity and stability of protons (quarks). It is said, in a real gravitational BH, its composition and state are protons and accordance with GTR as well as Hawing's theory. In a BH of $M_{bu} = 10^{-5}$g, its $R_{bu} = 10^{-33}$cm, $T_{bu} = 10^{32}$k, $\tau_{bu} = 10^{-43}$s. Those states are at the border of Plank's Era,[7][11] which is the limit of our real physical world. As assuming that, a real gravitational artificial BH of (mass $< 10^{-5}$g) could be manufactured, its temperature $> 10^{32}$k, its Schwarzchild's radius $< 10^{-33}$cm, its lifetime $< 10^{-43}$s. It shows that, **in a BH of mass $< 10^{-5}$g, its physical states has entered a complete Plank's Era,[11] i.e. Plank's quantum states, it is another unknown physical world. In that world, protons (quarks) have not existed, the present gravitational theory may have lost its some important effects, can some present important theories and formulas about BH be applied? That world has neither been detected nor demonstrated by a correct theory of common sense, thus**, any real gravitational BH of (mass $< 10^{-5}$g) might not appear and exist in Plank's Era (another physical world) at all. In string theory, the size of strings are smaller than 10^{-33}cm, so, the researched object and foundation of string theory are Plank's physical world, but not our real world of (BH's size $> 10^{-33}$cm), thus, those scientists hankered after new modern theories seem to write out the insufficient prescriptions for solve problems of BH of our physical world**. Whether in the past or in future, if any formed particle (its mass $<< 10^{-5}$g) with high energy (temperature) is a detected collision on collider (for example, on RHIC), values of its parameters would have no possibility to accord with formulas (1a), (1b) and (1c), because its temperature had no way higher, and its Schwarzchild's radius had no way smaller than what a real gravitational BH should have. Therefore, the greater collider of higher energy in future can only manufacture out greater or more "fireball", but not a real gravitational BH at all.

Now that any smaller real BHs of (mass $< 10^{-5}$g) could not be manufactured out by any Collider in future, it would only be a small "fireball" and be impossible to become a bigger BHs of (mass $> 10^{-5}$g) with sustained jetting particles in a collider, because the lifetime of "fireball" was still too short, even if "fireball" could become a little bigger, it would not have enough gravity inside to become a real BH at all, just because "fireball" was not a real BH, particles in "fireball" after collision would be instantly ejected back and dispersed each other, and the caused "fireball" must be immediately disintegrated.

Fifth, furthermore, even if at the collision of 2 gold-nuclei in RHIC, all protons in gold-nuclei of each side **did not collide at the exactly same time**, hence, lifetime 10^{-24}s of a formed "fireball" in RHIC might really only reflect the time of sustained collision of protons in 2 gold-nuclei, but not be the lifetime of a real gravitational BH

(B). It may be a fundamental principle that, the collision produced by objects of any two non-BHs would have no possibility to become a real gravitational BH. **No matter whether a star-formed BH or any much smaller BH, their most common characteristic is that, plasma in BH would have extremely high density,** on the layer of radius of same curvature, the heat pressure should keep balance with gravity. However, gravity is a very even central force, the heat state of extremely high density on every layer should be even and approximately ideal state. Thus, any BH could only be formed by the gravitational collapse of a large amount of matters in nature, but not by the collision of two objects with high speed, just as the collision of two bodies of movement with high speed could not form an even body.

In a word, the process of forming a real BH is an accumulative process of energy-matters, but any collision of particles with the highest speed can only let accumulated energy-matters before collision to be

instantly diffused after collision, thus, manufacturing a real BH with any collision of the highest speed is principally impossible.

(C). For getting an artificial BH, the sole way for scientists may be to put very high circular pressure to original materials as to be able to attain the extremely high density needed by an artificial BH in its Schwarzchild's radius. Can mankind overcome all difficulties to do so?

Assume high pressure to manufacture a real gravitational BH could be reached. Might mankind probably expend smaller energy to get bigger BH? How can the limit of high pressure be got by mankind in remote future?

$$P = n\kappa T = \rho\kappa T/m_p \quad {}^{[6][9]} \quad (4a)$$
$$E_p \approx M_b \times GM_b/R_b = M_b \times C^2/2 \quad (4b)$$

In above formula (4a), T—temperature on Event Horizon, n—numbers of particles in unit volume, κ--Boltzmann's constant, ρ--density, m_p —mass of particle in BH, let m_p = mass of a proton = 1.66×10^{-24}g, E_p—expanded energy, C—light speed.

Pressures P (atm) are calculated by different BHs on its Event Horizon (Border) on form 2.

The pressure in the core of our sun is about 3×10^{11}atm,[10] so, mankind may have no way to manufacture any artificial BHs with high pressure needed in form 2 in remote future.

Form 2

Mass of M_b(g)	R_b (cm)	T_b (k)	τ_b (s)	ρ_b (g/cm^3)	P (atm)	E_p (eV)	E_p (kwh)
$M_{bau} = 10^{-21}$? *	10^{-49}?	10^{48}?	10^{-90}?	10^{125} ?	10^{175} ?	10^2G ?	10^{-15}?
$M_{bu} = 10^{-5}$,	10^{-33}	10^{32}	10^{-43}	10^{94}	10^{128}	10^{18}G	10
$M_{b1} = 15$,	10^{-27}	10^{26}	10^{-24}	10^{80}	10^{108}	10^{24}G	10^7
$M_{b2} = 10^5$	10^{-23}	10^{22}	10^{-12}	10^{74}	10^{98}	10^{28}G	10^{11}
$M_{b3} = 10^{10}$,	10^{-18}	10^{17}	10^3	10^{64}	10^{83}	10^{33}G	10^{16}
$M_{b4} = 10^{15}$ **,	10^{-13}	10^{12}	$10^{18}(10^{10}$yrs)	10^{53}	10^{67}	10^{38}G	10^{21}

* M_{bau} made in RHIC was a "fireball" and had no way to attain above various values needed by a fictitious gravitational BH. All values are hypothetical and just for reference.

**Energy for manufacturing any M_b with high pressure $\approx$ total energy emitted by sun in 3 minutes.

(D). Even if an micro artificial BH could be manufactured by mankind in future, how might it be controlled? For example, assume that, an artificial BH of $M_{bu} = 10^{-5}$g or $M_{b1} = 15$g had been successfully manufactured out, how could its short-lived lifetime τ_b and very high temperature T_b be controlled? It is said, such short-lived micro BHs have no way to exist and to grow up. For bigger BHs, such as M_{b3} or M_{b4}, they might have possibility to grow up, but their needed energy might not be reached by any collider forever.

Black holes (BH) were produced from gravitational collapse of massive mass in nature, they had no possibility to be produced from collision of particles with extremely high speed in collider or produced in machines of extremely high pressure. Therefore, mankind may not be able to manufacture out any artificial BHs at all. All declarations or propaganda about artificial BH were alarmist talks in the past and must not be trusted in future.

If theories, formulas, demonstrations and calculations used in this article have no theoretically mistakes and can be passed by the experimental examinations in future, it will conversely prove that, those new concepts in author's former article (New Concepts to Big Bang And Black Holes—Both Had No Singularity at All) may be all right.

References

[1]. Micro BHs existed in earth everywhere. Weapon made by a micro BH could kill a billion people. http://www.seawolfnet.com/forum/recommend-show.php3?id=5566&page=&history-url. 12/18/2002

[2]. The Epoch Times, 3/25~27/2005, P.O.Box 381426, Combridge, MA 02238-1426

[3]. Horatiu Nastase: The RHIC fireball as a dual black hole, Http://arxiv.org/abs/hep-th/0501068

[4]. BBC NEWS | Science/Nature | Lab fireball 'may be black hole', Thursday, 17 March, 2005,11: 30 GMT http://news.bbc.co.uk/1/hi/sci/tech/4357613.stm

[5]. Scientists proposed that there would be countless short-lived micro BHs in atmosphere of our earth. http://tech.sina.com.cn/other/2003-12-15/1811268554.shtml

[6]. Dongsheng Zhang: New Concepts to Big Bang And Black Holes—Both Had No Singularity at All (Part 2). Nature and Science, 3(1), or debate-001, 2004, ISSN:1545-0740, Published by Marsland Company, P.O.Box 753, East Lansing, Michigan, MI 48826 U.S.A. Or http://www.sciencepub.org/nature/debate

[7]. Dongsheng Zhang: New Concepts to Big Bang And Black Holes—Both Had No Singularity at All (Part 1) Nature and Science, 2(4), or debate-001, 2004, ISSN:1545-0740, Published by Marsland Company, P.O.Box 753,East Lansing, Michigan, MI 48826 U.S.A. Or http://www.sciencepub.org/nature/debate

[8]. Wang, Yong-Jiu: Physics of Black Holes; Hunan Normal University Publishing House, China. 2000.

[9], Xiang, Yi-huo: The Physical Instructions of University. Publishing House of Qinghua University, Beijing, China.1999

[10]. John & Gribbin: Companion to The Cosmos, ISBN 7-5443-0145-1, Hainan Publishing House, China, 2001, 9.

[11]. He, Xiang-tao: Observational Cosmology. Science Publishing House. Beijing, China. 2002.