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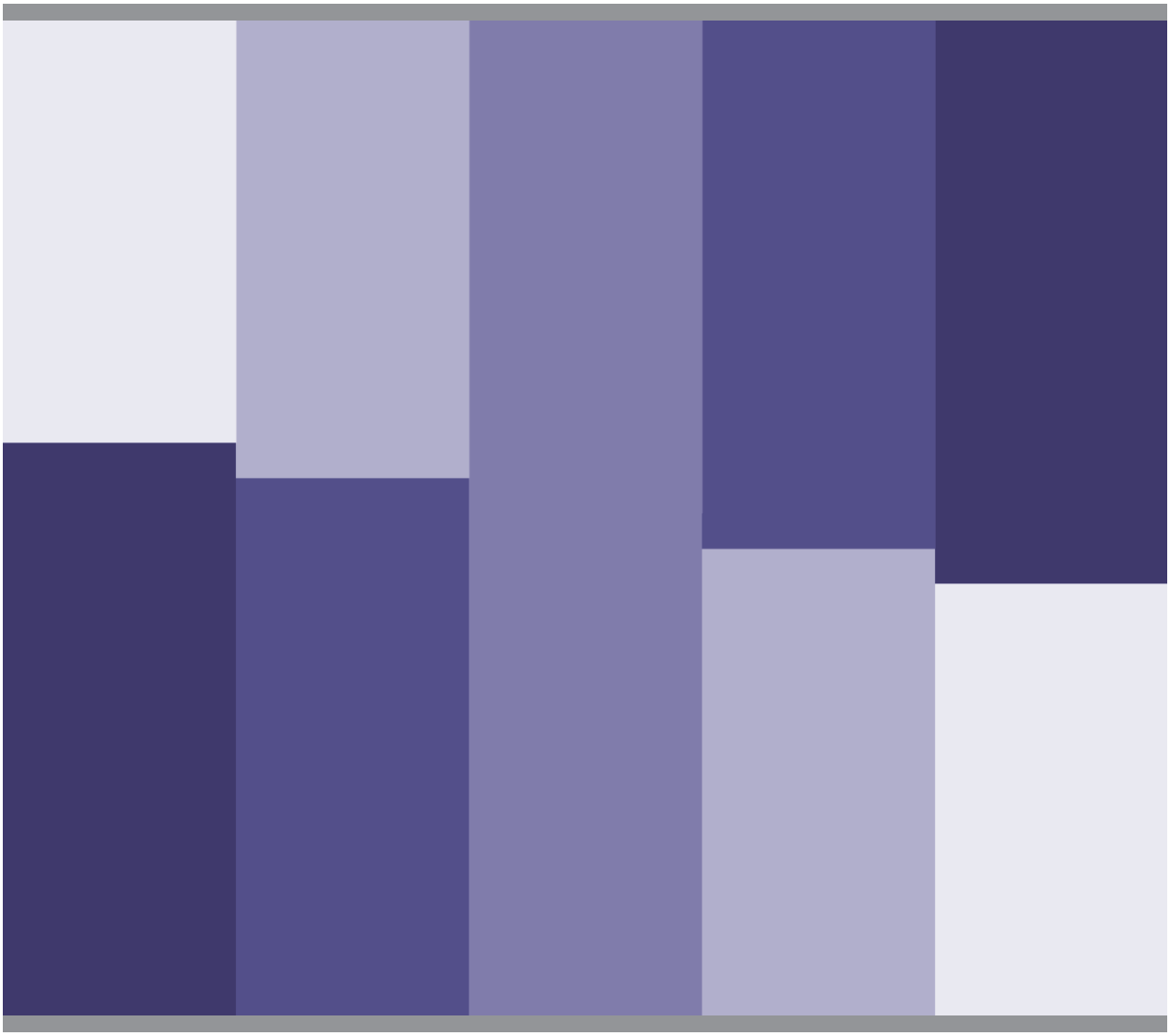

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CONTENTS

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

==== Preface====

《The fundamental defect of the General Theory of Relativity Equation is that any particles in EGTR has no thermodynamic action. It leads finally the gravitational collapse of a definite energy-matter only go to Singularity.》 May/2010

New Edition

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【Abstract】: Right now, the General Theory of Relativity Equation (GTRE) is almost linked together with all new physical concepts, such as the Big Bang, black holes (BH), Singularity, zero point energy, dark energy, N demission spaces, etc. Perhaps say it in another way, all above new physical concepts are squeezed into GTRE by the modern physicians as the reasonable coats in the mainstream of physics. However, the observed facts have demonstrated that, those new physical concepts may be illusory. The obvious examples are singularity and the density of vacuum energy. About 40 years ago, R. Penrose and S. Hawking discovered Singularity losing the time-space significance in EGTR, but there would not be any indications of singularity of infinitely great density observed in nature. They further derived from GTRE that, our universe was originated from singularity, which would certainly exist in any BHs, and even have naked singularity in universe. They also proposed out "the hypothesis of cosmic censorship" for explaining singularity better in nature, In addition, according to J. Wheeler's calculations, the density of vacuum energy would be up to 10^{95}g/cm^3. All above arguments are unimaginable, unrealistic and may have no way to be observed and demonstrated forever. In this article below, author will demonstrate with Hawking's laws of black holes that, there would not be any singularity in BHs, and our universe was not born from singularity or the Big Bang of singularity at all. Singularity can only be a product from GTRE, but impossibly appear and exist in real nature. [Academia Arena, 2010;2(8):1-26] (ISSN 1553-992X).

【Key Words】: General Theory of Relativity Equation (GTRE); singularity; black holes (BH); big bang; Planck era; Planck particle--m_p; minimum gravitational black holes--M_{bm}

【1】。The different results and conclusions of the scientific research can be decided by scientists with their different research method. However, the correct result and conclusion must accord with the observed and practical texts.

Why had the problem of Singularity troubled scientists for over fifty years? Because in GTRE which have only the sole gravitational forces between energy-matter particles and have no heat pressures as resistant forces, the results of the pure gravitational collapses would certainly and finally lead to the appearance of singularity. Therefore, GTRE which violates the causality and the second law of thermodynamics is only a mathematical equation, it cannot reflect the reality in nature.

In this article, some Hawking laws about BHs will be applied, as to study the changes of physical parameters on the event horizon of BH. The superiority of Hawking theory about BH is that, the variations of physical parameters on the event horizon of BH can completely obey quantum mechanics and thermodynamic laws. Thus, BHs can become to have the general law of life and death like everything in nature. Owing to applying Hawking laws accordant with thermodynamic laws on the event horizon of BHs, and regardless of the variations of states and structures inside BHs, as the results, the final collapse of the event horizon of any BH would finally become minimum BH (M_{bm}), i.e. $M_{bm} = (hC/8\pi G)^{1/2} = 10^{-5}$ g = m_p, and minimum BH (M_{bm}) can just be Planck particle (m_p). It shows that the final collapse of any BH would only become m_p and explode in Planck Era, but impossibly continuously collapse to singularity. The above correct conclusions don't need to solve the complicated GTRE.

【2】。The second law of thermodynamics is the causality in nature. It shows the time direction and cannot be violated by any ultimate theories included GTRE. How would physicists violate the thermodynamic laws in the process to solve

GTRE? All the famous physicists included Friedmann, Schwarzschild and Einstein himself proposed two hypotheses to solve GTRE, the first one is the gravitational shrink with equal mass, the second one is the "universal model of zero (constant) pressure". Just those two hypotheses have violated thermodynamic laws and lead to appearance of singularity in solve EGTR.

Suppose a definite (equal) amount of energy-matter particles (M) is in a shrinkable process,

1*. When M change from state 1 to state 2, according to the second law of thermodynamics, $\int TdS = C + (Q_2 - Q_1)$, in above formula, Q—quantity of heat; T—temperature; S—entropy; C—constant. It shows that, M in the heat-insulating and free state can only produce expansion and lower its temperature T due to increase in its S, but impossibly produce contraction.

2*. Let $M = M_1 + M_2$, according to the thermodynamic laws, in case M_1 in the shrinkable process could only decrease in S and increase in T and pressure with emitting energy-matters outside, and M_2 would get the corresponding increments from M_1, then M_1 could gradually reduce its energy-matters and shrink its size. Once M_1 could not remove out any energy-matters from inside, M_1 would stop its contraction at once. If M_1 as a original nebula could shrink its size and increase in $T \approx 2\times10^7$k and reach the temperature of nuclear fusion in its center , thus, a new star would appear in the sky. In the star conditions, once energy produced in a star core (M_1) from nuclear fusion could be equal to the amount of energy discharged out from M_1, star (M_1) would keep its constant temperature and pressure inside, and no more shrink its size in a long-term period. Only in the shrinkable process losing energy-matters, the process can really accord with thermodynamic laws. It clearly shows that, if no energy-matters emit outside, a definite amount of energy-matters (M) cannot shrink its size with the sole gravitational forces by itself.

3*. If M_1 could shrink its size to Schwarz child's limited condition, i.e. $M_1 = C^2 R_1/2G$, due to emitting energy-matters outside and increase in temperature, M_1 would become a complete BH. R_1 is the event horizon of BH M_1. After M_1 become a BH, M_1 would expand its size and decrease in its temperature and density with engulfing the greater energy-matter particles from outside, and shrink its size with emitting the smallest Hawking quantum radiations to outside. Once M_1 could engulf all energy-matters outside, M_1 would non-stop emit Hawking quantum radiations (HQR) to outside, contract its size and increase in its temperature, finally, up to $M_1 = M_{bm} = (hC/8\pi G)^{1/2} = 10^{-5}$ g = m_p, Planck particle ($m_p = M_{bm}$) had to explode in Planck Era at once, but impossibly continuously collapse to singularity. It will be demonstrated below.

It can be seen that, the appearance of singularity in GTRE is due to the wrong hypothesis of contraction of equal energy-matter and the hypothesis of constant temperature and pressure in solving EGTR.

【3】。Since singularity derived from GTRE by physicists is not accordance with reality in nature, it clearly shows that, GTRE has the basic defect hardly to be overcome. GTRE was not built on the reliable experimental foundation, but was a product from Einstein's brain. In GTRE, there are only the gravitational forces, but not heat pressure as exclusive forces between all particles in the whole body. Thus, every particle m_s in the body could only be in the unstable state, so, the exact and real movement of any particles m_s in or outside body could not be got from solve EGTR. For getting a model of stable state of the universe, Einstein added a universal constant Λ as the exclusive forces in GTRE several years later. However, Λ is added outside the body, Λ as a acting force can only push the whole body to do some whole movement, but Λ have no way to resist the gravitational forces of every particle inside body. Therefore, the movements of every particle inside are not certain yet. It is the reason why GTRE is born weak and ill cared for after birth.

However, even though GTRE has some important defects, GTRE as a new universal outlook to integrate time and space together can have very great significances on science and on philosophy.

According to Einstein's explanations to GTRE, as a steel ball presses on a tight circular rubber web, the web should be crooked. Sun can let lights outside crooked like above rubber web. Though the system of GTRE had included some rational contents of Newton's system. However, GTRE had only solved few important problems which were not solved by Newton's system in the past 100 years . It shows that, GTRE is also a uncompleted great system like Newton's system before. In his old age, Einstein said: "Every body think that, I would feel calm and satisfied, while I look backward about the works in my life. On the contrary in fact, I firmly believe that, there would not be any concepts proposed by me in the past which had been stable like a huge rock. I'm not sure that, whether or not I was in the correct orbit in total. " Only an epoch-making scientific giant

created many marvels could modestly state a common truth with his splendid achievements.

【4】。In the real universe, how could the state of temperature and the gravitational forces between all particles of M in a definite ball, affect the movement of a particle m_s inside or outside the ball? Suppose a definite mass (M) in a rubber ball with a radius R, its temperature T, the elastic forces of rubber ball can be neglected.

1*. In case m_s outside the ball, R_s is the distance between m_s and the center of ball, m_s does the curvilinear motion effected by the gravitational forces of M, the radius of curvature at R_s is k_s, temperature T_s. If ball M expands due to increase in temperature from $T_s \rightarrow T_1$, because R and M become bigger, the distance from $R_s \rightarrow R$ becomes shorter, then, the gravitational forces of M to m_s become bigger, so, the radius of curvature k_{s1} become bigger too, and $k_{s1} > K_s$, then, the motion of m_s would shorten R_s.

2*. On the contrary, in case ball M and R becomes smaller due to decrease in temperature from $T_s \rightarrow T_2$, correspondingly, $k_{s2} < K_s$, then, the motion of m_s would lead R_s become longer.

3*. In case m_s inside the ball M, the distance R_s would becomes shorter or longer while temperature of M becomes lower or higher. It is said, the change of temperature in a body M has to affect the motional orbit of any particle m_S inside or outside the body.

Conclusion: It can be seen that, applying the hypothesis of "universal model of zero (constant) pressure " to solve GTRE cannot accord with the reality in nature. Temperature and pressure of every particle cannot be neglected in GTRE at all, Once neglecting the heat pressure of all particles as exclusive forces to gravity, it would certainly lead to the appearance of singularity. That just is the tragedy of EGTR.

4*. A ball of particles in the heat-insulating and free state can only expand but not shrink. It shows that, the heat pressure of particles would be bigger than its gravitational forces, Therefore, the hypothesis that a ball full of energy-matters could shrink its size under the heat-insulating and free state, is a "artificial proposition" . A ball of particles would shrink its size, only its heat could emit outside and decrease in temperature. Specifically, once a star BH formed after the explosion of supernova, owing to BH having no way to emit energy-matters outside except extremely faint Hawking quantum radiations, and owing to BH inside having no way to produce super higher pressure than the explosion of supernova, as the result, energy-matters inside BH could absolutely impossible shrink with the gravitational forces of themselves. It can be seen, singularity is an absurd result of GTRE caused from hypothesis to violate the thermodynamic laws.

【5】。At first, GTRE has only two items, i.e. the first item is Einstein tensor to describe the geometrical characteristics of time-space; the second one is energy-momentum tensor to describe the field of energy-matters. In reality, GTRE should be a unstable dynamical equation, it could hardly describe the motions of every particle in or out a ball which is shrinking. It is the reason why GTRE must set up two false hypotheses to violate the thermodynamic laws for getting a solution of stable state , one is "definite energy-matters", another one is "universal model of zero pressure". Just those two false hypotheses let GTRE to inevitable appearance of singularity. Thus, only the states of a ball of energy-matters are extremely approximate to above two hypotheses, GTRE may be solved and get some better results. For examples:

1*. In case M is the total energy-matter in a ball (region) great enough, owing to stability of density and pressure in the ball, so, the orbit and curvature of motion of particles m_s (included light) outside may be approximately got from solving GTRE. Scientists often applied the principle of GTRE to calculate light deflection near star or star cluster, but the result not precisely.

2*. When mercury passes by sun, owing to that sun is a stable ball, its density distributions can be easily got, so, the calculated value of the motion of mercury at perihelion got from GTRE is more precise than got from Newton dynamics.

3*. Let sun as a ball of stable temperature and constant diameter, the light deflection appeared near sun cannot be explained and calculated by Newton dynamics, but only be solved by GTRE, because according to special theory of relativity (STR), any light must have no mass. Suppose lights would have some corresponding mass, Newton dynamics might also solve the problem of light deflection near sun.

【6】。In our universe, either any stable thing or body, or a stable ball of matters, their stable structures are all the results of balance inside between gravitational forces and heat pressures as exclusive forces under the condition of some definite temperature and pressure. Thus, keeping the limits of permitted temperature and pressure can just be keeping the stable existence of the structures of that thing or body or a ball of matters. It shows that, the stable and solid structures of a matters or a body,

but not broken, can resist the gravitational collapse of great amount of matters. If the sole contraction of gravitational forces of definite energy-matters can't overcome the resistance of solid structure, the contraction can only be stopped.

1*. In our universe, any body of mass $<10^{15}$g always has a little solid core, which can support the gravitational collapse of a great amount of mass outside the core. Any planet has a solid or liquid iron core to resist the gravitational collapse of mass outside the core. Sun and all other stars must have a stable core of very high temperature and pressure producing nuclear fusion, which can maintain the high pressure in core to resist the gravitational collapse of matters outside the core. Every white dwarf has a solid core of high density about 10^6g/cm^3. Any neutron star has a solid core of high density about 10^{16}g/cm^3, which can only produced by the strongest explosion of supernova in our universe. Generally, after a supernova of the original mass > 8 M_0 (sun mass) exploding, its survivals may form a star BH with density of about 10^{16}g/cm^3. In any star BHs, the highest density in core may $\leq 10^{16}$g/cm^3 .

2*. In our present universe, the strongest explosion may only be originated from supernovae, it can only presses matters to density of 10^{16}g/cm^3. neutrons can't be broken in about density of 10^{16}g/cm^3. Thus, inside any star BH, it could impossibly produce the supernova explosion again. Therefore, the gravitational contraction of matters in star BH could absolutely not collapse to singularity. What is more, the bigger BH is, the lower its density will be, so, the bigger BHs inside could more impossibly collapse to singularity.

3*. At the time of building GTRE, Einstein only knew two forces-- gravity and electromagnetic force, but not know other two forces—weak force and strong force. Scientists even didn't know white dwarfs and neutron stars, and their high density in core to 10^6g/cm^3 and 10^{16}g/cm^3 at that time. Perhaps they considered that the gravitational collapse of matters is a simple and natural process. Now, scientists know that the matter density may be high to 10^{93}g/cm^3 under combined interactions of above 4 forces, but the strongest explosion of supernova in our universe can only press matters to the high density of 10^{16}g/cm^3. Thus, the resistance of density from 10^{16}g/cm^3 to 10^{93}g/cm^3 could be too high to be overcome by the gravitational collapse of matters in our universe, the density of singularity $>>10^{93}$g/cm^3 could impossibly be overcome by any present natural forces.

【7】。It can be seen, 1*. if wanting to get the stable orbit of any particles m_s in or out a ball of energy-matters from GTRE, then, the exclusive forces of heat pressure must be added into item of energy-momentum tensor in GTRE, but not Λ added outside the item of energy-momentum tensor. 2*. In case a ball of energy-matters have the gravitational collapse, a solid core and its structure must exist. In reality, above two conditions (heat pressure and structure of high density) should just be the mechanisms or origin in nature to obstruct the occurrence of Singularity. However, the current GTRE has no way to be added in those two or any other supplementary conditions, it would certainly break the perfection of GTRE and impossibly be permitted by Einstain and GTRE. Those are reasons why GTRE just has a showy appearance, but hardly had practical use in the past 100 years. Furthermore, R.Penrose and S.Hawking got a monster of inconceivable singularity from GTRE.

Why would the most scientists believe the inconceivable singularity? Starting off from singularity, scientists might dream of the more inconceivable concepts: such as, white holes. Worm holes, and how to travel to other universe, etc.

【8】。According to his imagination, but not on the basis of observations and experiments, the model created a new scientific theory of GTRE by Einstein is widespread welcome and accepted by scientists in the future, because they can build and develop the new scientific theories and concepts only with their intelligent brain. After that, various new theories and concepts had been born out like the bamboo shoots after a spring rain，such as the Big Bang, Singularity, dark energy, N demission spaces, string theory, film theory, theory of everything, etc. An important defect of GTRE leading the occurrence of singularity is the point structure of particles in GTRE. String and film are not the point structure, so, singularity can impossibly appear in string theory or film theory.

Most importantly, any new theory or concept can impossibly be successful, if it has no thermodynamic actions.

【9】。In Part 1 of this article, it will be proved that, the final collapse of any BHs would be minimum BHs--$M_{bm} = (hC/8\pi G)^{1/2} = m_p$, and disappeared in Planck Era. In Part 2 of this article, it will be proved that, our universe was originated from minimum BHs--$M_{bm} = m_p$ in Planck Era, not originated from singularity, or the Big Bang of singularity. $=1.09 \times 10^{-5}$g

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

New Edition

====Part 1：Black Holes====

May.-2010

《Black Holes: The Final Gravitational Collapse Of The Event Horizon Of Any BHs In Nature Would Only Contract To Planck Particle $m_p = M_{bm} = 10^{-5}$g And Disintegrate in Planck Era, But Impossibly Contract To Singularity Of Infinite Density.》

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【Abstract】: In this article, author doesn't propose any hypothesis and any supplementary condition, may derive out directly "the finally gravitational contraction of any black holes (BH) could impossibly become singularity, but Planck particles $m_p = M_{bm}$ and disappear in Planck Era". That result is got from Hawking laws about BH and other classical formulas together.

The superiority of author's method is to apply a group of formulas only to research the changes of physical parameters on the event horizon (EH) of any BHs, regardless of the complicated state and structure inside BHs. Thus, the final contracted result of EH of BHs could only become Planck particle $m_p = M_{bm}$ (minimum BH), but not singularity. Since the final collapse of EH of BH with its all mass (M_b) had to become m_p, if there were little BHs inside, it could certainly contract to m_p in advance.

The fundamental defect of the General Theory of Relativity Equation (EGTR) is that, any particles in EGTR has no thermodynamic action to resist the gravitational collapse, it would certainly lead to occurrence of singularity. On the contrary, Hawking formulas of BH were built on the foundation of thermodynamics and quantum mechanics, the heat pressure could resist the gravitational collapse forever.

According to above explanations and analyses, an important formula will be got as below:

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

In above formula (1d), m_{ss} is the mass of Hawking quantum radiation (HQR) on the EH, M_b is the mass of whole BH. $m_{ss}M_b$ is a constant. From (1d), in the real universe, $M_b \neq 0$, and, $m_{ss} \neq 0$, the smaller M_b is, the bigger m_{ss} can be. According to axiom of any part ≦the whole, at the limited condition, $m_{ss} = M_b = (1.187\times10^{-10}g^2)^{1/2}$. Thus, M_b is impossible become a singularity.

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

Formula (1f) is the best important. correct and final conclusion in this article got by author. It clearly shows that, the final gravitational collapse of any BH would become Planck particle m_p, and explode in Planck Era, but not continuously go to singularity of infinite density.

Many new concepts and laws in this article are all the further developments to Hawking theory about BHs. In science, the simplest is the best. The demonstrations in this article is the simplest, whether it is good or bad will remain to reader's comments. [Academia Arena, 2010;2(8):1-26] (ISSN 1553-992X).

【Key words】。black holes (BH); singularity; star-formed Schwarzschild (gravitational) black holes: Planck particle--m_p; Planck Era; Hawking quantum radiation (HQR); General Theory of Relativity Equation (GTRE); minimum BH--M_{bm};

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

【I】。Regardless of the states and structures in BHs, the final contraction of the event horizon (EH) and mass M_b of any BHs due to emit Hawking quantum radiations (HQR) could only become minimum BH (M_{bm}) equal to Planck particle (m_p), it could impossibly contract to singularity.

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

Applying Hawking law and other classical formulas to derive out the final gravitational collapse of EH of BH. Hawking temperature formula on EH of BH,

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

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

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

According to Schwarzschild special solution to GTRE,

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

From (1a) and (1b), then,

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

Formulas (1a),(1b),(1c), (1d) are 4 general laws effective on any EH of BHs. In formulas (1a) and (1d), due to that, $T_b M_b$ = constant, $m_{ss} M_b$ = constant. So, m_{ss}, T_b and M_b is impossible ∞ or 0, then, m_{ss}, T_b and M_b all have its limit. Furthermore, according to axiom of any part ≦the whole, m_{ss} is impossible > M_b, at the limited condition, the maximum m_{ss} = the minimum M_b-- M_{bm}, so,

$$m_{ss} = M_{bm} = (hC/8\pi G)^{1/2} = 1.09 \times 10^{-5} g \text{ [3]} \quad (1e)$$

Owing to $(hC/8\pi G)^{1/2} \equiv m_p$ [3] so,

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

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

$$T_{bm} \equiv T_p \text{ [3]} \equiv 0.71\times 10^{32} k \quad (1h)$$

$$R_{bm} m_{ss} = h/(4\pi C) = 1.0557\times10^{-37} cmg \quad (1i)$$

Similarly, $m_{ss} \neq 0$, $R_{bm} \neq 0$, so, R_{bm} and m_{ss} all have its limit.

The best important conclusion: 1. From fotmulas (1b)，(1c)，whether one of M_b，R_b，T_b，m_{ss} is 0 or ∞ can not be judged. That is reason why singularity could present in General Theory of Relativity Equation (GTRE). However, from formula (1a)，(1d) and (1i), any one of M_b，R_b，T_b and m_{ss} can impossibly be "0 " or "∞"，so, each of 4 has to its limit. That are results of Hawking theory about BHs to apply thermodynamics and quantum mechanics. 2。**When a BH could get into the gravitational collapse because of emitting Hawking quantum radiations (HQR) after engulfing all energy-matters outside, it would continuously shrink its size R_b, increase in T_b, lose mass M_b and finally become $M_{bm} = m_{ss} \equiv m_p$. In addition, M_{bm}, R_{bm}, T_{bm}, m_{ss} form a perfect minimum BH, and perfectly and individually equal to m_p, L_p, T_p of Planck Era,**

【2】. In the process of the gravitational contraction of any original nebula (matters), the principle of a particle m_s emitted to outside in nebula is the same mechanism with HQR emitted to outside from EH of a BH. They are all from high energy (temperature) flowing to low energy (temperature). The final result of both continuously contracted process are all the complete same, i.e. $M_{bm} = m_p = (hC/8\pi G)^{1/2} \equiv m_p \equiv 1.09 \times 10^{-5} g$. Thus, Hawking quantum radiations (HQR) are just the energy particles, which have the lower energy (temperature) than the valve temperature on EH and may flee out from the restraint of gravity of BHs to go to outside.

For examining the correctness of (1f); Suppose a particle m_s in nebula and on the boundary of R, if m_s is in the state of thermodynamic balance and locate at the end of R, then,

$$dP/dR = -GM\rho/R^2 \text{ [3]} \quad (2a)$$

$$P = n\kappa T = \rho\kappa T/m_s \quad (2b)$$

$$M = 4\pi\rho R^3/3 \quad (2c)$$

Formula (2b) is the state equation of gas or particles, Formula (2c) is the formula of ball volume, P – pressure of R end, M –total mass in radius R, ρ – average density of R ball, T – temperature of R end,

Applying formulas (2a)，(2b)，(2c)，(1a), (1c) together. Formulas (1a), (1c) are right to physical parameters on EH of any BHs, so, the results of parameter values got from solving following equations are all on EH of BH. Thus, to any BHs, in reality, M, R are all completely equal to M_b, R_b as below.

$$\text{From } P = \rho\kappa T/m_s = \kappa/m_s \times (3M/4\pi R^3) \times (C^3/4GM) \times (h/2\pi\kappa) = 3hC^3/(32\pi^2 GR^3 m_s),$$

$$dP/dR = d[3hC^3/(32\pi GR^3 m_s)]/dR = -(9hC^3)/(32\pi^2 Gm_s R^4), (\therefore dP/dR \propto R^{-4}), \quad (2d)$$

$$-GM\rho/R^2 = -(GM/R^2) \times (3M/4\pi R^3) = -(3G/4\pi R^3) \times (M^2/R^2),$$

from (1c), $M_b/R_b = C^2/2G = M/R$.

$\therefore -GM\rho/R^2 = -3C^4/(16\pi GR^3)$, $(\propto R^{-3})$ (2e)

let (2d), (2e) into (2a),

$-(9hC^3)/(32\pi^2 Gm_s R^4) = -3C^4/(16\pi GR^3)$,

or $3h/(2\pi m_s R^4) = C/R^3$

$\therefore R = 3h/(2\pi Cm_s)$, or

$\therefore Rm_s = 3h/(2\pi C) = 1.0557\times10^{-37}$cmg (2f)

From (2f) and (1c), then,

$m_s M_b = 3hC/(4\pi G)$ (2g)

Comparing formulas (1d) and (2g), (1i) and (2f), only under the condition of $m_s = 6m_{ss}$, as the results, (1d) = (2g), (1i) = (2f). Why must $m_s = 6m_{ss}$? Because in deriving process from (2a) to (2g), density ρ and temperature T in formulas (2a), (2b) and (2c) used as the average values in a ball M of R, but not the real density and temperature on EH of BH, which < their average values, so, their combined effects let $m_s = 6m_{ss}$. Thus, under the condition of $m_s = 6m_{ss}$,

$\therefore m_s = 6m_{ss}$, (1d) ≡ (2g), (1i) ≡ (2f) (2h)

Thus, the gravitational collapse and final destiny of any nebula (particles) is the perfectly same with the EH of a BH. Their final destinies are all $m_{ss} = M_{bm} = (hC/8\pi G)^{1/2} = 1.09\times10^{-5}$g. In nature, any gravitational collapses of anybody are the certain results of discharging energy nonstop to outside.

Analyses and conclusions:

1*. Since formula (2h) accords with the real conditions, it is a circumstantial evidence to formulas (1d), (1f) and (1i). it shows that, the final collapse of EH of any BHs can reach to Planck Era, but not to singularity.

2*. Formula (2a) is really a simplified equation to Tolman-Oppenheimer-Volkoff equation. [7] Formula (2a) cancelled 3 complicated amended items from TOV equation. Thus, on the foundation of (2a), combined (1a), (1c) and (2b) as the boundary conditions, the correctness of (2f) and (2g) should be reliable.

3*. There are no essential distinctions for any BH or a star or a nebula to emit out or to attract in energy-matters. However, any BHs have very strong gravity, even light can't flee out from EH of BH. Owing to the very high density or big mass of current BHs, for example, a BH of $5M_0$, according to formula (1d), it could emit the extremely small energy of HQR equivalent to $m_{ss} = 1.187\times10^{-44}$g and absorb in any energy-matters > $m_{ss} = 1.187\times10^{-44}$g. A BH of mass $=10^{15}$g, its HQR = $m_{ss} = 1.66\times10^{-24}$g = mass of a proton. The current BHs in nature are all star BHs, so in people's mind, all BHs are rapaciously plundering energy-matters outside,

4*. How could HQR flee out from EH of BH? Just like a particle or quantum (energy or light) fleeing out from the boundary of a star or any body, once average energy of HQR < κT on EH, or its instant temperature < κT on EH duo to the heat motion and vibration, they could possibly flee out at a instant under the state of little lower temperature and energy.

【3】。No. 1 essential attribute of any BHs: Once a BH could be formed, it would be a BH forever until it finally become a Planck particle $m_p = M_{bm} = (hC/8\pi G)^{1/2} = 1.09\times10^{-5}$g, no matter whether it's expansion because of engulfing energy-matter from outside or it's contraction because of emitting HQR to outside.

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

$R_b = 2GM_b/C^2$, (3a)

$\therefore C^2 dR_b = 2GdM_b$

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

Suppose another BH M_{ba}, and,

$C^2 R_{ba} = 2GM_{ba}$ (3c)

From (3a) + (3b) + (3c)

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

Formula (3d) clearly shows that, any BH, no matter whether it would emit out or plunder in energy-matters, or collide with another BH, it could only be a BH of different mass forever.

In 1998, two groups of U.S.A. and Australia discovered the accelerating expansion of our universe (AEOU) through observations to the bursts of remote supernovas Ia, they pointed out, that remote galaxies are accelerating away from us. Most current scientists explained AEOU with "dark energy" of exclusive force in the universe. Author considered that, AEOU was due to the collision of our universal BH with other BHs in their early ages. Formula (3d) was proposed as the theoretical foundation for above hypothesis.

【4】。No. 2 essential attribute of any BHs: BHs are all the simplest bodies in nature. All physical parameters on the EH of BHs are only decided by mass of a BH, and have the same, sole, linear and single numerical value corresponding to mass M_b. In other words, any 2 physical parameters on the EH of all BHs have the same relationship of the sole, linear and single numerical value. Furthermore, no matter how structures and states inside different BHs, all EHs of BHs with the same mass M_b can have the completely same essential attributes. Therefore, there are not necessary for us for solving the complicated GTRE to study the structures and states inside BHs. Once knowing the mass of any BHs, then, knowing its all. This is Hawking's great contribution to the theory of BHs. From formulas (1a), (1b), (1c), (1d), it can be seen for any BHs, then,

$$M_b \propto R_b \propto 1/T_b \propto 1/m_{ss} \qquad (4a)$$

【5】。No. 3 essential attribute of any BHs: Non-stop emitting HQRs to outside or engulfing in energy-matters from outside is other essential attribute of any BHs. Just like a star or a body to emit lights or infrared radiations, energy would always flow out naturally from high energy to low energy, no exception for any BHs to emit HQRs.

The EH of any BH is its boundary. The exchange of energy-matters must pass through EH. It can be seen from (2a), owing to that, HQR on EH would always be in the condition of heat motion, it could non-stop vibrate and have no an instant precise temperature, so, any HQR on EH could be in the unstable state and impossible to keep the thermodynamic balance at any instant. Thus, the exchange of energy-matters passed through EH would only lead to Event Horizon oscillated.

From formula (1b) $m_{ss}C^2 = \kappa T_b$, T_b is the valve temperature on EH, Really, EHs have become the switch of BHs to transfer energy-matters.

1*. Only in case κT_b of HQRs on or in BH, which instant temperature T_b is a little higher than outside, could flee out. After they fled out from EH. because of decrease in a little energy of BH, BH would contract a little size and increase in a little temperature, then, the energy distance would become bigger between EH and the fled HQR, which could impossibly return back into BH again. Thus, after losing a HQR, BH would continuously emit HQRs to outside, until finally become a Planck particle $m_p = M_{bm} = (hC/8\pi G)^{1/2} = 1.09 \times 10^{-5}$g, and explode in Planck Era.

2*. Obviously, in case outside particle $m_o > m_{ss}$ or outside temperature $T_o > T_b$, m_o and radiation energy κT_o outside can be attracted into BH. Thus, BH can nonstop attract in all energy-matters outside with increase in mass M_b and decrease in T_b on EH. After that, BH will nonstop emit HQRs to outside, until M_b finally become a Planck particle $m_p = M_{bm} = (hC/8\pi G)^{1/2} = 1.09 \times 10^{-5}$g, and explode in Planck Era.

3*. In case $m_o = m_{ss}$ or $T_o = T_b$, generally, because the number of particles and T_o outside are more then those on EH of BH, so. BH can attract in more energy-matters than those fled out. After that, the process and result will be the same with above 2* section.

The character of any BH is always nonstop taking in all energy-matters from outside at first, then, emitting energy to outside until its final vanish in Planck Era, its Event Horizon would be oscillated nonstop.

According to Hawking's theory, the rate of radiating energy of a BH is:

$$dE/dt \approx 10^{46} M^{-2} \text{ erg/s}, \quad (5a)$$ <2>

Suppose $M = M_0 = 2\times 10^{33}$g $= M_0$, $dE/dt \approx 10^{-20}$ erg/s, based on such extremely tiny rate, a BH of sun mass (M_0) needs about 10^{65}years to radiate out all its energy-matters and explode in Planck Era.

Suppose $M = M_0 = 2\times 10^{33}$g, its HQR $= m_{ss} = 1.187\times 10^{-10}/(2\times 10^{33}) = 6 \times 10^{-44}$g. So, m_{ss} is too small. It shows that, mass of a BH equal to sun can almost absorb any tiny energy in the current space. If no energy outside, that sun BH can radiate HQR of 6×10^{-44}g, It is much smaller than a proton mass of $1{,}66 \times 10^{-24}$g.

It can be seen, Hawking theory and laws of BHs to emit HQRs are all right, but Hawking's explanations to emit HQRs are not correct and convincing. Normally, Hawking and the most modern scientists may explain HQRs with the concepts of vacuum energy. They recognized that a pair of virtual particles would be suddenly born out from vacuum, then annihilate and appear repeatedly. [1]. After negative particle on EH of BH being captured by positive virtual particle of vacuum and annihilating, then, the positive particle of BH would remain and appear outside BH and become a HQR fled out, Such explanations of them is a deliberate myth with the new physical concept. The energy value of HQR on EH of BH is certain, why could a pair of virtual particles appeared have the same energy value with HQR on EH and both could meet at the same time and same place? In addition, the explanation of so-called "virtual energy" has not a reliable and certain numerical value right now in any theory and may have no way to be observed and examined forever.

Right now, whether BHs would emit energy-matters or not with other ways except Hawking's radiations remains a question.

【6】。No. 4 essential attribute of any BHs: After plundering all energy-matters outside, any BH could only contract its size R_b, decrease in M_b, increase in T_b and m_{cc} because of emitting HQGs continuously. The final destiny of every BH could only become minimum BH (M_{bm}) equal to Planck particle (m_P), then, explode and vanish in Planck Era at once. See formula (1f),

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

Why could M_{bm} be impossible to become < $\{(hC/8\pi G)^{1/2} \equiv m_p \equiv 1.09 \times 10^{-5}g\}$ and continuous contraction? Surely impossible.

1*. Once $M_{bm} < 1.09 \times 10^{-5}$g, its HQR ($m_{ss}$) $< 1.09 \times 10^{-5}$g too. Thus, $m_{ss}\ M_{bm} << ((hC/8\pi G)$. It violates formula (1d) of BHs.

2*. Once M_{bm} reach 1.09×10^{-5}g, its gravitational energy = $M_{bm}\ C^2 = 10^{16}$erg, its radiation energy = $\kappa T_b = 1.38\times 10^{-16}\times\ 0.71\times 10^{32} = 10^{16}$erg too. . So,

$$M_{bm}\ C^2 = \kappa T_b = 10^{16}\text{erg} \qquad (6a)$$

It can be seen, the reason why BH can emit HQR is that the bigger BH has surplus gravitational energy to transfer to radiation energy of HQR. However, once M_{bm} reach 1.09×10^{-5}g, the whole M_{bm} is a whole particle and has no surplus energy as HQR, it can only throughout explode, and wholly transfer $M_{bm}\ C^2$ to many and many small γ–rays of the highest energy of 10^{32}k.

3*. Owing to M_{bm} reach 1.09×10^{-5}g, $M_{bm}\ C^2 = m_{ss}C^2$, it is said, the whole M_{bm} is a complete particle, no gravitational forces inside could continuously contract to resist the highest temperature of 10^{32}k inside the whole M_{bm}, thus, the whole M_{bm} must crushingly explode.

4*. According to Uncertainty Principle

$$\Delta E \times \Delta t \approx h/2\pi \qquad (6b)$$

To M_{bm}, $\Delta E = M_{bm}\ C^2 = \kappa T_b = 10^{16}$erg, Δt = Compton time = $R_{bm}/C = 1.61\times 10^{-33}/3\times 10^{10} = 0.537\times 10^{-43}$.

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

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

【7】。Various substantial structures just are the best and last mechanism to resist the gravitational contraction in nature. Bodies of no gravitational collapse in nature have always a solid and stable core.

From the process of formation of star BHs, the reasons why singularity can impossibly appear and exist in star BHs will be clearly known. In GTRE, the appearance of singularity is base on the hypotheses of that, a ball of definite energy-matters could free and infinitely contract its size with no resistance. However, in reality, the contracted process of anybody must at least overcome two resistances: the first is the heat pressure of its energy-matters, and the second is its substantial structure.

1*. Any body of mass $<10^{15}$g, its chemical structure can support its gravity, needs not a solid core. Mass of 10^{15}g has 10^{39} ($=10^{15}/1.67\times 10^{-24}$) protons. 10^{39} is a Dirac's large number.

2*. Planets of mass between 10^{15}g and 0.08 M_0 (1.6×10^{32}g) must need a core of liquid or solid irons to resist its gravitational collapse outside the core.

3*. Stars of mass > 0.08 M_0 (1.6×10^{32}g) : Owing to existence of the very high and stable pressure and temperature supplied by nuclear fusion, all stars cannot collapse in a long-term period, until nuclear fusion stopping in its core.

The pressure P_s in the core of sun is estimative about as below,

$$P_s = \rho_s\ \kappa T_s/m_p = 10^2\times 1.38\times 10^{-16}\times 1.5\times 10^7/1.67\times 10^{-24} \approx 1.5\times 10^{11}\ \text{atm.} \qquad (7a)$$

4*, White dwarfs: It is generally estimated that, after finishing its nuclear fusion and through red giant star, the original star of mass < 3.5 M_0 could compress its remnant to become a white dwarfs of mass ≤1.44 M_0. 1.44 M_0 is called Chandrasekhar's limit. It is said, after a white dwarf plundering energy-matters outside or colliding with another companion star, its mass might go beyond Chandrasekhar's limit >1.44 M_0, and become a neutron star. White dwarf has a solid core of density about 10^6g/cm^3 and has very long lifetime. In the solid core, the distance between atomic nucleus is 10^{-12}cm, Electrons can freely flow and have the strong exclusive forces to resist the gravitational collapse outside the core. Once mass of a white dwarfs could approach 1.44 M_0 due to absorb matters outside, it would become a carbon-oxygen white dwarf and occur the strongest explosion of Ia supernova, and turn into powders scattered in space.

5*. Neutron stars: It is generally estimated that, after the original star of (3.5~8) M_0 finishing its nuclear fusion and after the strongest supernova explosion, its remnants might be contracted into neutron star of mass between(1.5~2) M_0. It is said, mass of neutron stars may be (0.1~1.5~2) M_0. Their density in core about 10^{14} ~5×10^{15}g/cm^3. Diameter of the biggest neutron star is 33km. The structural figure of neutron stars as below:

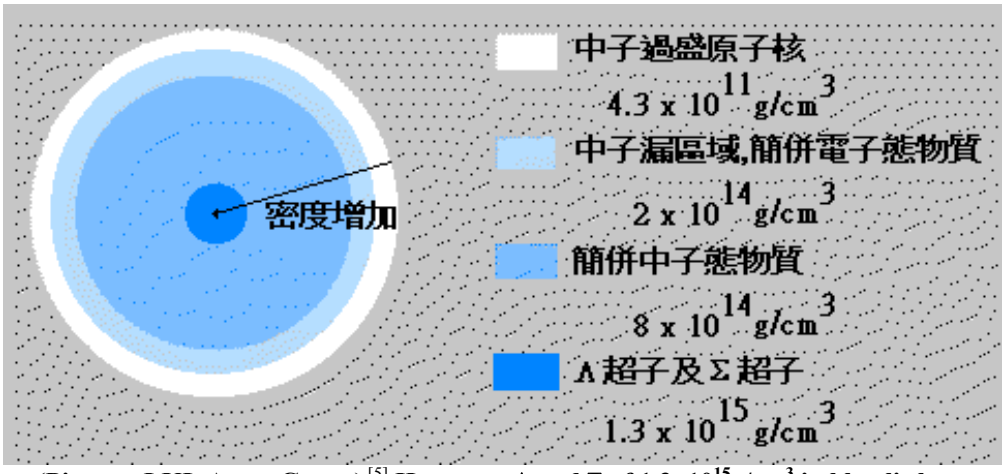
Parameters of neutron stars: mass of most M_n = (1.5~2) M_0; density in core $\rho_n \approx 10^{14}$~ $10^{15.5}$g/cm^3; distance between neutrons, $d_n \approx 1.2\times10^{-13}$ cm; numbers of neutron in cm^3, $n_n = 10^{39}$ /cm^3; Λ and Σ are hyperons or solid neutrons in core.

Conclusions: 1. It shows clearly from above analyses and demonstrations that, before overcoming the very high density and crushing the extremely solid structure of its core formed by supernova explosion, any stars, no matter how great its mass is, can't continue or complete its gravitational collapse to compress matters to >10^{16}g/cm^3 in core.

2. From figure.1 below, the core of the density of neutron stars $\rho_n \approx 10^{14}$~ $10^{15.5}$g/cm^3. The formation of core of neutron star may be solid neutrons, or hyperons Λ and Σ.

3. If a neutron star could become a BH due to absorb energy-matters outside, only matters outside the core can be greatly compressed, the density in core can hardly increase any more, because the density between a little BH of $2M_0$ and a neutron star of $2M_0$ is almost the same, just their sizes have the great difference. Diameter of a neutron star of $2M_0$ is about 33km, but diameter of little BH of $2M_0$ is about 12km.

Figure. 1. Structural figure of neutron stars,



(Picture: LKL Astro-Group)[5] Hyperons Λ and Σ of 1.3×10^{15}g/cm^3 in blue little core.

【8】。Star BHs: Singularity could be impossible to occur in star BHs. The formation of star BHs, Generally, the mass of star BHs may be between (3~10) M_0.

How could star BHs be formed? It is said, after nuclear fusion having finished and through supernova explosion, the remnants of the original stars of mass > $8M_0$ might become a star BH of mass≥3 M_0. Besides, if a neutron star could engulf energy-matters outside or collide with its companion white dwarf (or another neutron star), it might become a star BH of mass ≥ $3M_0$. $3M_0$ is so=called Oppenheimer-Volkoff limit. However, those two conditions are just the theoretical inference, but no real observations can be as evidences.

Parameters of a BH of mass = 3 M_0: $M_{b3} = 3M_0 = 6\times10^{33}$g, its $R_{b3} = 8.89\times10^5$cm≈9km, $T_{b3} = 1.3\times10^{-7}$k, HQR--$m_{ss3} = 2\times10^{-44}$g. $\rho_{b3} = 2\times10^{15}$g/cm^3, [see formulas (1a), (1b), (1c), (1d), (2c)]

In 2006, a smallest star BH called XTE J1650-500 [6] was discovered, its mass = 3.8 M_0. According to imagination and calculations by scientists, limit of mass of the smallest star BHs not still discovered in universal space might be (1.7~2.7) M_0, then its density calculated is about $\rho_{b2} \approx 5\times10^{15}$g/cm^3.

Many important inferences and conclusions can be got from above calculations and analyses:

1*. Comparing the density of core between neutron star $\rho_n \approx 10^{14}$~ $10^{15.5}$g/cm^3 and density of the smallest star BH, their $\rho_{b3} = 2\times10^{15}$g/cm^3 to $\rho_{b2} \approx 5\times10^{15}$g/cm^3, so, the core of small star BHs and neutron stars are the same thing, which may be all hyperons Λ and Σ. or solid neutrons. They have almost the same density, and are all originated from the explosion of supernovae.

The distance d_n between two adjacent neutrons in the core of neutron stars and star BHs,

$N_n = \rho_n / m_n = 5\times10^{15}/1.67\times 10^{-24} = 10^{39}$

$d_n = (1/ N_n)^{1/3} = 10^{-13}$cm (8a)

From (8a), in the core of neutron stars and star BHs, The distance d_n between two adjacent neutrons is equal to diameter of a neutron or a proton. Thus, under the density of about 5×10^{15} g/cm^3, atomic nucleuses of neutrons or protons are just closely contacted together, but far away from break.

2*. Owing to no star BHs < $2M_0$ existed in nature, the forces and pressures produced by the supernova explosions are the strongest forces in current universe and later. Thus, the matters of density $\rho > 5\times10^{15}$g /cm^3 have impossible to appear and exist in nature afterwards, then, matters of density $\rho_n \approx 5\times10^{15}$g/cm^3 are the highest density in nature.

3*. Since star BHs are all originated from the superstar explosion, supernova explosion would impossibly occur inside any star BHs again. Thus, star BHs inside would impossibly continue its gravitational collapse, so, it have impossibility of appearance of singularity.

4*. Owing to that, the bigger a star BH is, the lower its density can be. Thus, all BHs (> star BH of 10 M_0) inside can be more impossible to produce > density of 10^{16}g/cm^3, so, absolutely impossible to produce singularity inside.

5*. Since matters of density $\approx 5\times10^{15}$g/cm^3 in star BHs are hyperons or solid neutrons, it shows that, protons having become hyperons are not broken or disintegrated, and still keep their own quark chains, i.e. keep their proton formation. Maybe it is reason why protons have so long lifetime of about 10^{30} years.

6*。Since protons can keep their particle formation at about density 5×10^{15}g/cm^3, how great density may let protons disintegrated into quarks? Author consider that, protons may be disintegrated in density about 10^{53}g/cm^3.

According to Hawking's theory of BH, in the collapsing process of any star, its entropy always increased and its information capacity always decreased. Suppose Sm--original entropy before the collapse of a star, S_b--the entropy after collapsing, M_0--mass of sun = 2×10^{33}g,

$S_b/S_m = 10^{18}M_b/M_0$ [2] (8b)

Jacob Bekinstein pointed out at the ideal conditions, $S_b = S_m$, or, the entropy did not change before and behind the collapse of a star. From formula (8b), M_b will be 10^{15}g, and M_b = original mini BH = M_{bo} [1] [2]

Density of (M_{bo} =10^{15}g) is ρ_{bo} =0.7×10^{53}g/cm^3; $R_{bo} = 1.5\times10^{-13}$cm; $T_{bo} = 0.77\times10^{12}$k; $m_{sso} = 12\times10^{-24}$g;

7*. The best important conclusions from Bekinstein's explanation to Hawking formula (8b) about entropy of BHs is as below. Bekinstein only did a well mathematical arrangement to formula (8b), but neglected the profound physical implications of (8b). Author think, (8b) should be applied to explain some significant physical process.

Firstly, the gravitational collapse under the condition of density < 10^{53}g/cm^3, the collapsed process should not be equal entropy. It clearly tell us that, protons can keep its particle formation, and not be disintegrated, so, protons as particles must have heat motions and frictions, and can change entropy more or less.. Hyperons Λ and Σ are only protons of high temperature, and still formed from quarks.

Secondly, however, since in the changed process of density from 10^{53}g/cm^3 to 10^{93}g/cm^3, entropy can impossibly change, it shows that, protons must be disintegrated, and become into quarks. It also shows that, quarks might only be changed in the ideal state between density region from 10^{53}g/cm^3 to 10^{93}g/cm^3, no matter whether they were in expansive or contractive process, which were all the ideal process of equal entropy. In other words, quarks might have no heat motion and frictions changed between 10^{53}g/cm^3 and 10^{93}g/cm^3.

The best important conclusion: The strongest pressure in present universe produced from the supernova can only compress matters into density of about 5×10^{15}g/cm^3, what could be the most powerful force in nature to compress matters to density of 10^{53}g/cm^3, even finally to 10^{93}g/cm^3 of Planck particle (m_p)? The most powerful force is only the contracted force of very small BHs (<< star BH) due to radiating HQRs continuously, it can let BHs (mass <10^{15}g) to contract nonstop to Planck particles. It obviously shows that, BHs only radiating nonstop its HQRs outside can nonstop go on its gravitational contraction until becoming to minimum BH-- $M_{bm} = (hC/8\pi G)^{1/2} \equiv m_p$ and disappearing in Planck Era.

【9】。Original mini BH = $M_{bo} \approx 10^{15}$g, Could those M_{bo} be found in the universe at present? In nature, the great significance of M_{bo} is its density of 10^{53}g/cm^3, only substantial density > 10^{53}g/cm^3, protons can be broken and disintegrated. That may be an important reason why protons have so long lifetime of 10^{30}years,

From formula (8b), the mass of original mini BHs = $M_{bo} \approx 10^{15}$g. Its other parameters are:
$R_{bo} = 1.5\times10^{-13}$cm; $\rho_{bo} = 0.7\times10^{53}$g/cm^3; $T_{bo} = 0.77\times10^{12}$k; $m_{sso} = 12\times10^{-24}$g
From formula (6b), lifetime of M_{bo}, $\tau_{bo} \approx 10^{-27} M_b^3$ (s) $= 10^{18}/3.156\times10^7$s $\approx 3\times10^{10}$yrs.
Compton time $t_{bo} = R_{bo}/C = 5\times10^{-24}$s,
Numbers of proton: $n_{bo} = M_{bo}/1.66\times10^{-24} = 10^{39}$, n_{bo} is other Dirac's large number.
According to calculations above, the lifetime τ_{bo} of original mini BH=$M_{bo} \approx 10^{15}$g , $\tau_{bo} \approx 3\times10^{10}$yrs. The age of our universe is 1.37×10^{10}yrs, which is the same scale with τ_{bo}. In 1971, Hawking proposed, M_{bo} might exist in our universal space, if some of them could be survivals from the newborn time of our universe. However, in 1970s, many scientists attempted to observe and find out such original mini BHs in universal space, but their efforts about 10 years were all in vain. It clearly shows that, no such M_{bo} could remain to the present.

In the newborn time of our universe, at least before the end of Hardron Era, i.e. the expansion of our universe from density 10^{93}g/cm^3 to 10^{53}g/cm^3 could have perfect homogeneity, because that expansive process would be completely equal entropy known from above paragraph. The numerical values of 3 main parameters ρ_{bo}, T_{bo} and t_{bo} of M_{bo} are all in Hadron Era of universal evolution. At that time, all M_{bo} in universe were closely and evenly linked together into a whole, and had no way to exist single. With their expansion later, they could only combine each others and become bigger and bigger. In other words, in the universal expansive process, any original BHs of high density could not exist single at all, no matter how great they were, because BHs linked together could only combine and expand, but have no way to exist independently. Only after Radiation Era of universal evolution, because radiations separated from matters and led to lower temperature in matters, then, matters could do a renew contraction. As a result, the nebulas could have a great gravitational contraction to become the compact stars or a BHs through supernova explosion.

【10】。The super great BHs of（10^7 ~10^{12}）M_0 and Quasars.

In the center of every galaxy and star cluster, there is a super great BH, its mass can reach to（10^7 ~10^{12}）M_0. Recently, a super giant BH called Q0906+6930 discovered by an astronomy group of Stanford University in the remote center of our universe. Its mass more than 10^{10} M_0, and it formed 127×10^8 years ago. i.e. after 10^9 years of the birth of our universe. [9]

Let that BH be $M_{bs} = 10^{10}$ $M_0 = 2\times10^{43}$g, so, its $R_{bs} = 2.96\times10^{15}$cm, its $\rho_{bs} = 1.74\times10^{-4}$g/cm^3.

The simple calculations to Quasars in the 8th chapter of Prof, He Xiangtao's book "Observation Cosmology" [3] are as follows:

The mass of a Quasar must be satisfied by the following formula,

$$M_Q > L_Q M_0/1.5\times10^{38} = 3.3\times10^8 M_0 \qquad (10a)$$

In above formula (10a), $L_Q = 5\times10^{46}$erg/s.

If the light period of a Quasar is 1 hour, its scale D should be:

$$D \le C\Delta t = 1.1\times10^{14}\text{cm}, \qquad (10b)$$

For a Schwarzschild's BH of the same size , its mass M_S should be:

$$M_S = RC^2/2G = 1.9\times10^8 M_0 \qquad (10c)$$

It can be seen, $M_Q \approx M_S$，the numerical values of both are very close.

Conclusion: Really, Quasars should be the predecessor and the childhood of super great BHs, which might all come from the evolution of Quasars.

There has been an important problem in astronomers and cosmologists: Was BHs formed before as a core to contract its outside energy-matters to compose galaxy and star cluster, or substantial particles contract to form nebula at first, and then ignite the nuclear fusion in the core to form BH through supernova explosion? Author think, the later can accord with the real circumstance in nature, because forming a galaxy needed time is << forming a BH needed time.

【11】。The simple summations, further analyses and important conclusions as bellow:

A: No matter whether the EH of any BHs or a large ball of matters (mass of a nebula 5 M_0 ~8 M_0) would be, their finally contracted destinies could be the perfectly same, i.e. $m_{ss} = M_b = M_{bm} = (hC/8\pi G)^{1/2} = m_p = 1.09 \times 10^{-5}$g, but impossible to contract to singularity of infinite density. It proved that, Hawking laws about HQR, Schwarzschild solution to GTRE, uncertain principle and other classical dynamic laws are completely

harmonious and identical, No singularity shows that, General Theory of Relativity Equation (GTRE) has had the fatal weakness.

B: The fatal weaknesses of GTRE are to neglect the thermodynamic effects to resist the gravitational contraction of matter particles. For simplifying the difficulties to solve GTRE, the most scholars proposed two bad hypotheses which violate thermodynamics, i.e. the contraction of equal matters and the "universal model of zero (constant) pressure". Just those two bad hypotheses lead gravitational contraction to singularity in GTRE. Of course, GTRE may have other important defects, such as, permitting the infinite contraction of particles of point structure. In addition, GTRE is hardly to be solved. The hypothesis of inertial mass equal to gravitational mass has no reliable evidences, etc.

Particles of point structure, which may be infinite contraction in GTRE, must have a limit. It is just Planck Era, in which time and space are not continuous, [8] and it certainly leads GTRE lose effect.

C: Hawking theory and some important laws about BHs based on quantum mechanics and thermodynamics are very correct and effective, they avoid and overcome the important defects of appearance of singularity in GTRE, just as quantum mechanics could demonstrate that, electrons could not fall into atomic nucleus in the past. Similarly, Hawking theory and laws about BHs demonstrated that, GTRE lost effectiveness in Planck Era, just as GTRE demonstrated that, Newton mechanics had lost effectiveness in the movements of near light speed.

However, the explanations of Hawking and modern physicists to HQRs with the concept of "a pair of virtual particles would be suddenly born out from vacuum" may be a deliberately mystifying with the new physical concept. HQRs flow out from the EH of BH to outside, just as energy or matters naturally flow down from high position to low position, or from high temperature to low temperature.

D: Through studying star BHs, the conclusion is that, singularity could have no possibility to occur in BHs. After the Big Bang, the strongest explosions in nature have been the supernova explosions, which explosive forces can only compress matters to density about 10^{16}g/cm^3, i.e. the density of core of neutron stars, in such level of density, protons cannot be broken yet. Only the substantial density reaches to 10^{53}g/cm^3 of original mini BH (M_{bo}), protons can be destroyed. Protons are the most stable and solid particles, and have the longest lifetime of 10^{30} years. The forces to destroy protons have not appeared in nature as yet. Of course, no more powerful forces can compress matters to the density 10^{93}g/cm^3 of Planck particles ($m_p = M_{bm}$), except the contraction of BHs < 10^{15}g due to emitting HQRs.

On the contrary, if there were singularity or smaller BH in BHs, certainly, singularity could explode at once and change into rays of extremely high energy in BHs. At the same time, the smaller BH could absorb energy-matters of its outside, finally, the event horizon (EH) of smaller BH could enlarge to combine with the EH of BH together.

E。Here author makes a guess: In BHs of >10^3 M_0, (10^3 M_0 is guessed by author, because nuclear fusion had finished before any star BHs of <15 M_0 was formed.) owing to no nuclear fusion occurred before BHs forming, so, nuclear fusion might occur in BHs because of the contraction of matter particles. Thus, energy-matters would discharge outside BHs until nuclear fusion finished.

F: Only the contracted forces of mini BH, which mass (M_{bo} = 10^{15}g) due to radiate HQRs, could compress protons disintegrated into quarks. After that, the contracted forces of mini BHs of mass M_{bmi} < (M_{bo} = 10^{15}g) due to radiate HQRs could raise the density of M_{bmi} and decrease in distance between quarks in M_{bmi}. The finally contracted results of M_{bmi} would just become to ($m_p = M_{bm}$), and explode and disappear in Planck Era.

G: A few words out of this article about the destiny of our universe, if the current mass M_u of our universe is about 10^{56}g, and no energy-matters outside can be absorbed. Thus, our universe can only nonstop emit HQRs to contract its size up to become $m_p = M_{bm}$ =10^{-5}g, and explode and vanish in Planck Era. The lifetime of M_u will be (= $10^{-27}M_u^3$) about 10^{132}years.

The problem is to judge whether energy-matters have or no outside our current universe. Author think, if the real lifetimes of some bodies in nature measured by scientists, such as some celestial bodies or aerolites, are the same with Compton time of our current universe (UBH), and Hubble constant has a certainly reliable value as normal, it may shows that, there might still be energy-matters outside our universe. Correspondingly, our universe will plunder all energy-matters outside, after that, it can nonstop contract its size with emitting HQRs until become $m_p = M_{bm}$ =10^{-5}g, and explode and vanish in Planck Era. Thus, its lifetime will prolong to >>10^{132}years. If the real lifetimes of some bodies in nature > Compton time of our UBH, and Hubble constant = 0, it shows no energy-matters outside our UBH.

However, if a insolated star BH of $3M_0$ had no energy-matters outside to be engulfed, it could only contract its size to $m_p = M_{bm} = 10^{-5}$g, then, explode and vanish in Planck Era too. Its lifetime = $10^{-27}(3M_0)^3 \approx 10^{67}$years is too long. It is much longer than lifetime = 10^{30}years of protons.

H: Author's few words: Author may only forge ahead a little step from Hawking theory about BHs with simple explanations and calculations to BHs in this article, and get many important and basic conclusions. It may help people to understand many fundamental and principal concepts to BHs from profound theories and complicated mathematical equations of modern scientists.

====The End====

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

Nov.-2005

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

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

June/2010

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【Abstract】。 In this article, based on some general laws of astronomy, physics and many classical theories, the calculated results can prove that our present expansive Universe was impossibly born from Singularity or from the Big Bang of Singularity but from the Big Crunch of pre-universe in Plank Era. According to the principle of time symmetry, suppose before the birth of our universe, there could be a final Big Crunch of pre-universe. Once the final Big Crunch of pre-universe reached to Planck Era, i.e. time $t \leq [k_1 (2G\kappa)/C^5]^{2/3}$ (3c), $t = -0.5563\times 10^{-43}$s and temperature $T = 0.734\times10^{32}$k, every Planck particle (m_p) simultaneously reached 3 states: 1. Reached Planck Era; 2. The gravitational linkage between the closest particles broke off and the collapse stopped at the state of no gravity; 3. Every particle (m_p)

at that moment would exactly become a minimum gravitational black hole ($M_{bm} = m_p = 1.09\times10^{-5}$g)。Just those 3 states could effectively stop pre-universe continuously collapse to singularity, and let all M_{bm} explode in Planck Era. The strongest explosions of every M_{bm} in whole pre-universe synchronously formed a so-called the Big Bang. After that, the new and bigger $M_{bmn} = 2M_{bm}$ of longer lifetime could certainly occurrence due to decrease in density and temperature caused by the Big Bang. Newborn $2M_{bm}$ became the embryos of our present universe. It was the process of genesis of our present Universe. The collisions and combinations of all newborn $M_{bmn} = 2M_{bm}$ would create an "Original Inflation", and form the present expansion of our universe. The whole process changed from the disappearance of old pre-universe to the genesis of new universe in Plank's Era was not reversible. Other important conclusions got in this article are those: Our universe has been a real universal black hole (UBH), which accords with all laws of general black holes (BH); Hubble law is just the expansive law of our universe to plunder energy-matters outside; the new and simple explanations and demonstrations to " Original Inflation", etc. [Academia Arena, 2010;2(8):1-26] (ISSN 1553-992X).

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

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

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

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

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

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

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

Formula (1b) below precisely describes our universe's evolution relevant within the Matter-Dominated Era in Figure 1, (from $t = 1/3\times10^6$ years to the present).[3][4][2]

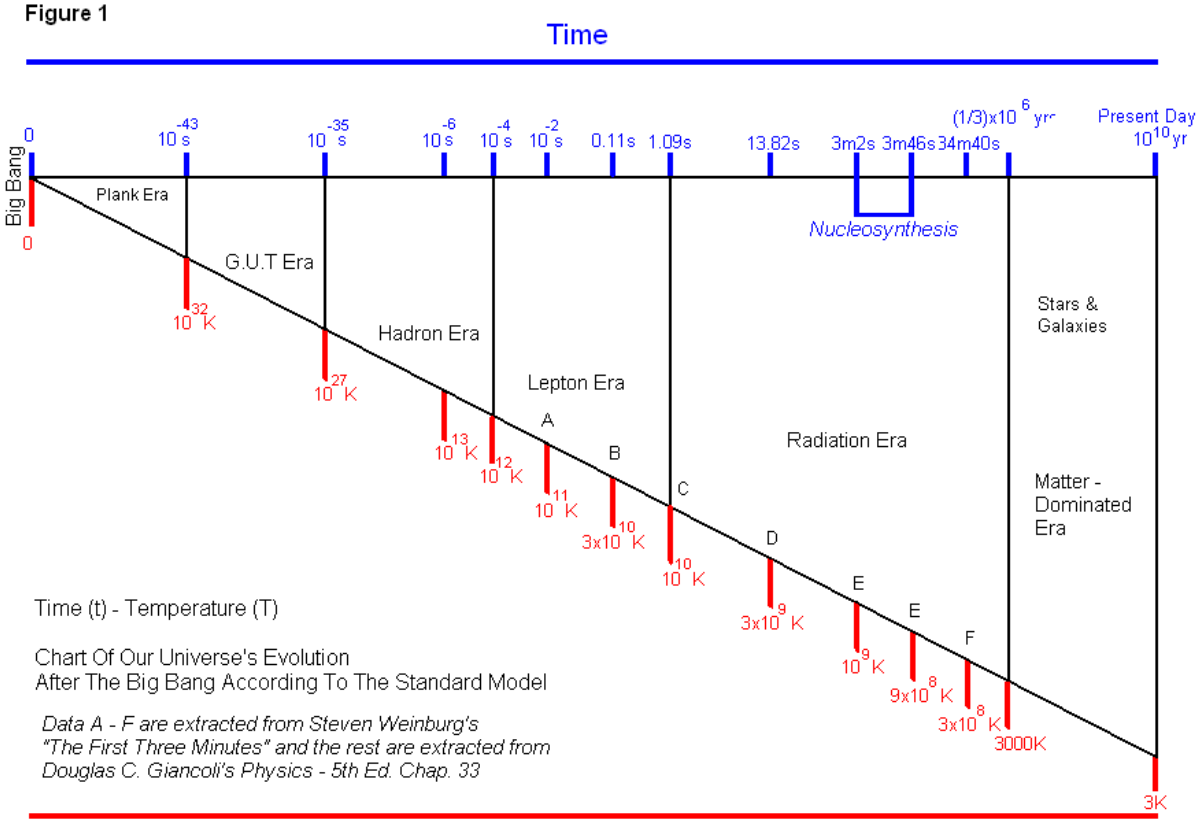
$$Tt^{2/3} = k_6,^{[4][3]}\ R = k_7t^{2/3},\ RT = k_8,\ R = k_9\lambda \qquad (1b)$$

k_6, k_7, k_8, k_9 – Constants

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

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

Figure 1



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

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

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

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

T_1/T_2 = 3K /3,000K ≈ 1/1,000, λ_1/λ_2 = 0.1cm / 10^{-2}cm ≈ 1, 000,

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

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

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

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

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

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

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

According to Schwarzschild special solution to GTRE,

$GM_b/R_b = C^2/2$ [1][2] (2c)

From (2a) and (2b),

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

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

$m_{ss} = M_{bm} = (hC/8\pi G)^{1/2} = 1.09 \times 10^{-5}g$ [1] (2e)

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

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

$R_{bm} \equiv L_p$ [6] $\equiv (Gh/2\pi C^3)^{1/2} \equiv 1.61\times 10^{-33}cm$ (2g)

$T_{bm} \equiv T_p$ [6] $\equiv 0.71\times 10^{32}k$ (2h)

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

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

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

$2G M_b = C^2 R_b$ (2c)

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

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

$2G M_{ba} = C^2 R_{ba}$ (2k)

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

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

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

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

Furthermore, according to Uncertainty Principle,

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

$$t^{3/2} \leq [(2\times6.67\times10^{-8}\times1.38\times10^{-16}) / (3\times10^{10})^5] \times 1.732\times 10^{10})] = 0.075758\times10^{-74}\times 1.732\times10^{10} \approx 0.1312\times10^{-64},$$

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

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

$$\therefore\ t_m \leq 0.5563\times10^{-43}\text{s},\ \text{and}\ t_m \geq 0.5563\times(-10^{-43})\ \text{s}, \qquad (3d)$$

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

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

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

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

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

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

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

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

$$\therefore (d_m \geq 2r_m) \quad (3j)$$

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

m_m of no gravity	M_{bm}–minimum BH	m_p–Planck particles[3]
$m_m = 1.125\times 10^{-5}g$	$M_{bm} = 1.09\times 10^{-5}g$	$m_p = 1.09\times 10^{-5}g$,
$t_m = \pm 0.5563\times 10^{-43}s$	$t_{bm} = 0.539\times 10^{-43}s$	$t_p = 0.539\times 10^{-43}s$,
$T_m = 0.734\times 10^{32}k$	$T_{bm} = 0.71\times 10^{32}k$	$T_p = 0.71\times 10^{32}k$,
$r_m = d_m/2 = 1.67\times 10^{-33}cm$	$R_{bm} = 1.61\times 10^{-33}cm$	$L_p = 1.61\times 10^{-33}cm$,

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

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

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

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

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

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

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

Acceding to Hawking law (5a) of the lifetime τ_b of BHs due to emitting Hawking quantum radiations (HQR), M_b–mass of a BH, R_b–the event horizon of a BH, t_{bc}–Compton time, which indicates the necessary time to form a stable BH. The necessary condition to form a new stable minimum BH—M_{bmn} was as below.

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

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

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

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

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

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

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

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

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

1*. The real observational numerical values had demonstrated that, our universe is a ball to have various precise and reliable values. A, The real and precise age A_u of our universe is: $A_u = 13.7\times10^9$yrs.[8], then, the event horizon $R_u = C\times A_u = 1.3\times10^{28}$ cm, density $\rho_u = 3/(8\pi GA_u^2) = 0.958\times10^{-29}$ g/cm^3. so, the total mass of our universe is $M_u = 8.8\times10^{55}$g. B. Hubble constant is another reliable observational value, $H_o = (0.73\pm0.05)\times100$kms^{-1}Mpc^{-1} [9], as a result, the density of our universe ρ_r : $\rho_r = 3H_o^2/(8\pi G) \approx 10^{-29}$g/cm^3. The age of our universe is: $A_r^2 = 3/(8\pi G\ \rho_r)$, $A_r = 0.423\times10^{18}s = (13.4\pm0.67)\times10^8$yrs. The total mass $M_r = 8.6\times10^{55}$g。

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

2*. From (7-2a) and (7-2b), the newborn M_{bm} might have 2 ways to link all M_{bm} in M_u together and created 2 kinds of great expansions to become to little BH--M_{bb2} or M_{bb1}, A 。"Original Inflation"：from (7-2a), "Original Inflation" can be considered, the event horizons R_{bb1} of newborn little BHs-- M_{bb1} made the total "Inflation" of n_{o2}/n_{o1} included its conventional expansion，after "Inflation of $t_{o1} = 2\times10^{-37}$s, $R_{bb1}\times n_{o2}/n_{o1}$ turned equal to $R_{bb2} = 6\times10^{-14}$cm, so, 2×10^{-37}s was the end of "Original Inflation". B。" conventional expansion": Through." conventional expansion" created by the combinations of all M_{bm} to form little BHs-- M_{bb2}, after $t_{o2} = 2\times10^{-24}$s, R_{bb2} of M_{bb2} reached to 6×10^{-14}cm.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

The numbers of proton mass of the Universe are; $N_{op}=M_u/m_{proton}=10^{56}/1.67\times10^{-24}\approx10^{80}$.

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

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

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

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

2*. In reality, John & Gribbin pointed out in his book—<Companion To The Cosmos>: "Our universe might originate from such particles-- $M_{bm} \approx 10^{-5}$g." [7] " （Planck Era ） was really the state at genesis of our universe."[7] In this article, author may just better demonstrated John & Gribbin's above suppositions with correct Hawking laws about BHs through the more precise calculations.

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

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

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

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

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

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

====The End====

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马博士：请您在 Nature and Science , 2005=debate 001 上 删去原来的第 1，第 2，第 3 篇旧文，贴上此 3 篇新文。content 页上内容不变。新旧文的篇幅基本一致。Header and Footer 已经改正，只是 page number 我无能力改正。现在的文章删减了许多论述内容，增加了不少新的论证内容，修正了 2 个错误。将《黑洞》作为 Part 1, 将《宇宙起源》作为 Part 2. 自认为比旧文好多了。

谢谢。 **张洞生 拜托**

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Radius Of Photon Orbit Of Charged Rotating Blackhole

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Abstract: This article describes the Einstein's mass energy equivalence relationship

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Keywords: Einstein; mass energy; equivalence; blackhole

Introduction

According to Einstein's mass energy equivalence relationship: Mass of charged rotating blackhole is the measure of it's energy. Total energy assosiated with the charged rotating Blackhole is given by E=Mc^2

where M=Mass of charged rotating blackhole ,c=speed of light in vaccum(3*10^8m/s). As charged rotating blackhole also possess spin parameter given by the relation a=J/Mc where M=Mass of charged rotating blackhole,J=Angular momentum of this blackhole. By rearranging of equation a=J/Mc we get Mc=J/a.

Then the equation E=Mc^2 i.e E=(Mc)c i.e E= Jc/a,

where a= spin parameter of charged rotating blackhole.Photon sphere is a spherical region of space where gravity is strong enough that photons are forced to travel in orbits.Consider photon of relativistic mass"m"is moving in the photon orbit around this black hole.Then the gravitational force of rotating Black hole experienced by the photon is given byF=GMm/r^2 where G=Universal gravitational constant, M=Mass of of rotating blackhole,m= relativistic mass of photon,r = distance between charged rotating Black hole and photon(radius of photon orbit). Total energy assosiated with the charged rotating Blackhole is given by E=Mc^2 then the equation F=GMm/r^2 becomes F=GEm/r^2 c^2 .

As the total energy of rotating black hole is also given by E= Jc/a then the equation F=GEm/r^2 c^2 becomes F=GJcm/a r^2 c^2.Thus F=GJm/a r^2 c is obtained. gravitational field also surrounds this black hole ,then gravitational force of charged

rotating Black hole experienced by the photon moving in photon orbit can also be given by F=mI where I=gravitational field intensity of this black hole ,F= gravitational force of rotating Black hole experienced by the photon of mass 'm'moving in photon orbit. By equating F=mI and F=GJm/a r^2 c, we get the equation r^2=GJ/aIc,

where r=radius of photon orbit opf rotating black hole G= Universal gravitational constant, J=Angular momentum of rotating blackhole, a= spin parameter of rotating blackhole, I=gravitational field intensity,c=speed of light in vaccum. Electric potential of rotating charged blackhole is given by $\varphi_{E=QR/(R^2+(J/Mc)^2)}$,

where a=J/Mc,R=horizon radius,Q=charge on this blackhole,a=spin parameter of this black hole then $\varphi_{E=QR/(R^2+a^2)}$ is obtained. $a^2= (QR/\varphi_E - R^2)$ then $a= (QR/\varphi_E - R^2)^{1/2}$,

then the equation $r^2=GJ/aIc$ becomes $r^2=GJ/(QR/\varphi_E - R^2)^{1/2}Ic$.

5/1/2010

Determinants of Non Farm Income among Farm Households in South East Nigeria

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ABSTRACT: Agriculture led growth played an important role in reducing poverty and transforming the economies of many Latin American Countries, but the same has not yet occurred in sub –Saharan Africa. Most Countries in Sub-Saharan Africa have not yet met the criteria for a successful agricultural revolution. Factor productivity still lags far behind the rest of the world. This has led to growing doubt about the relevance of agriculture to growth and poverty reduction in the region, especially in Nigeria. As a result the promotion of off farm activities as part way out of poverty has gained widespread support among development agencies. However little policy efforts have been made to promote the off farm sector to reduce poverty and overcome potential constraints in counties of sub-Saharan Africa like Nigeria. Results indicate that self employed activities dominate source of farm income. The share of non farm income is positively correlated with overall income. The econometric analysis show that households with low education and infrastructure are constrained in their ability to participate in non farm activities. Policy implication is that barriers for disadvantaged households to participate in better paying non farm income activities need to be overcome to promote crop and livestock activities which will benefit the poor more than the rich. [Academia Arena, 2010;2(8):29-33] (ISSN 1553-992X).

Key words: Farm, off farm, income, diversification, self employment, Push factors.

INTRODUCTION

Non-farm activities have become an important component of livelihood strategies among rural households. Different studies have reported an increasing share of non-farm income in total household income, Haggblade et al: 2007 de Janvry and sadoulet, 2001, Ruben and van de Bercy, 2001). The reasons for this observed income diversification include declining farm incomes and desire to insure against agricultural production risk (Lanjouw, 1999). Household are pulled into the off farm activities when returns to non farm employment are higher and less risky than in agriculture. Also when farming is less profitable and move risky due to population growth and market failures, many households are pushed into non-farm activities (Reardon, 1997). Many studies assume that the distress effects dominate. Although the findings presented in this paper are specific to the study area, they may contribute to a better general understanding of the issues and linkages.

MATERIALS AND METHODS

An interview–based survey of households was carried out in the study area. The information collected was representative of Owerri Agricultural zone in South East of Nigeria. Farm enterprises are small in size, that most production is net buyers of food.

The sample consists of 200 farm households which were chosen by a multi-stage random sampling technique. Eight out of the 16 Local Government Areas (LGA's) were randomly selected in the first stage. Then five villages were randomly selected from each of the eight Local Government Areas, and finally five households were sampled in each of the 40 villages using a complete village lists compiled for this study. The survey questionnaire are designed to gather information on household composition and other socio economic data, including details on the participation of individual household members in different income generating activities.

RESULT AND DISCUSSIONS

1.0 The descriptive statistics of the household characteristics is presented in table 1.

Table 1: Descriptive statistics of the Farm Households

Variable	Description	Mean	Std. Deviation
Household size	Number of household members	7	2.14
Age	Age of household Head (yrs)	48	3.12
Education	Numbers of yrs in school of the household Head (yrs)	8	1.4
Farm Size	Area cultivated by household (ha)	0.87	6.44
Income	Total household income per year (Naira/ month)	187,157,11	4.4
Electricity	Dummy for access to electricity (yrs = 1, No=0	0.58	022
Pipe–borne water	Dummy for access to pipe borne water (yes = 1, No = 0)	0.641	0.32
Tarred road	Dummy for tarred road in the village (yes = 1, No =0)	0.550	6.42
Distance to market	Distance from the village to the nearest market place (KM)	10.2	4.24

The average household size is seven (7) persons per household. About 32 percent of the households are headed by women. The average educational status is fair showing that the households heads have an average of eight (8) years of formal education, which can be explained by the density of secondary education schools in the study area. The average farm size is 0.87 hectares which can be attributed to the high population pressure in the area. The infrastructure variables indicate that many of the farm households do not have access to electricity and pipe born water. Total household income is approximately N40 thousand per month.

2.0 STRUCTURE OF HOUSEHOLD INCOME.

The structure of farm household income is presented in table 2.

Table 2: Average composition of farm household income

Income Source	Mean annual income (N)	Std. Deviation
Total farm income	1,272,846.00	
Crop income	127,284.60	20.4
Livestock income	190,926.90	14.5
Export	38,185,92	30.2
Total non-farm income	59,872.59	
Agric wage income	18,328.99	23.4
Non agric wage income	22,911,23	38.2
Self employment	88,372.76	22.4
Remittance	10,259,53	10.8

To determine the extent of relationship between socio-economic factors and the level of non-arm income, four functional regression forms were tried, and a lead equation was chosen on the basis of R^2, F-ratio, number of significant variables and a –priori expectations. Based on these attributes, the double log was chosen as the lead equation. The implicit regression function is of the form .

$Y = f(X_1, X_2, X_3, X_4, X_5, X_6, X_7, e)$

Where

Y = Non-far, income (Naira)
X_1 = Age of household head (Numbers)
X_2 = Education of Household head (years)
X_3 = Farm Size (Hectares)
X_4 = Occupation (Dummy)
X_5 = Household size (Numbers)
X_6 = Farm Investment (Naira)
X_7 = Value of farm output (Naira)
e = Stochastic error term.

The estimated non – farm income parameters is presented in table 3.

Table 3: Parameter Estimates of the double Log function for Non farm Income among farm households

Variables	Co-efficient	Standard Error	T-value	Unit of Measurement
Age of House hold head (X_1)	-0.0519	0.0493	0.527	Years
Education of House hold head (X_2)	0.0718	0.0207	3..4686*	Years
Farm Size (X_3)	-0.1092	0.0418	-2.6124*	Hectare
Occupation (X_4)	-0.0529	0.0497	-1.0644	Dummy
Household Size (X_5)	-0.0849	0.0217	-3.9124*	Number
Farm Investment (X_6)	-0.0667	0.0599	-3.1135*	Naira
Value of farm output (X_7)	-0.0188	0.0075	-2.5067*	Naira
Intercept	-15821.2			

Source: Field data: 2006

R^2 = 0.6183
F Value = 9.7171
t (0.05) = 1.98
F (0.05) 7,42 = 2.24

* = Significant at five percent level.

The co-efficient of land holding size, occupation, household size, farm investment and hours spent on farm work have the expected signs. The most important result of this model from the point of view of Non farm income is found to be the coefficient for education. It should be noted that the coefficient is positive and significant at the chosen level of significance (0.05), indicating a rather strong relationship with Non Farm income. Its marginal effect is positive suggesting that households with higher education are more likely to seek non farm employment in rural areas. The marginal effect is 0.0718 showing that one additional year of education increases the probability of non farm employment by 7.18 percentage points. This is similar to the findings of parasada (2002) in India and Ibekwe (2001). It is understandable that where the education of household workers is higher, they are reluctant to work in the farm sector as they have better prospects elsewhere. The coefficient for age of household heads was not significant and negatively correlated with Non farm income. This may be due to the fact that the optimism mental and physical energy required for increased farm productivity declines with age. This is most common in the rural communities where young people have migrated outside the communities (FAO, 1998). The coefficient for farm size was significant and negatively correlated with non farm income. This conforms to a prior expectation that increase in farm size will encourage farmers to increase their farm output and farm income. But due to the fact that Imo State is one of land deficient states in Nigeria (Ibekwe 2001) farmers are forced to diversify their activities which decreases income from farming due competitive nature of the non farm activities the farmers pursue. The coefficient of occupation of household heads was not significant and negatively correlated with non farm income this may be due to increased opportunity cost of the farm activities pursued by the farm households. The coefficient of household size is significant and negatively correlated with non farm income. This may be due to the fact that most of the dependants in farm household at the community level are too young to migrate or work in the household farms. The coefficient farm investment was significant and negatively correlated with non farm income. This was in accordance with expectation as poor farm income can lead to low saving and consequently to low investment in farming. This will make the farmers to invest outside their farms.

The coefficient value of farm output per hectare was found to be significant and negatively correlated with non farm income. A household per hectare agricultural output may effect its member's decision to be engaged in non farm activities. Therefore a negative relationship is expected between per hectare value of agricultural output and non farm income. Households that fail in agriculture may be pushed into Non farm activities due to distress diversification. This therefore supports the hypothesis of negative link from agricultural income to traditional non farm income as against a positive link from agriculture to modern Non farm income due to agricultural growth (World Bank, 1996).

CONCLUSION:

A distress diversification hypothesis in this study is supported by negative relationship between non farm income and the farm output per hectare of land. We sought to account for a household involvement in non farm activities by reference to its demographic features and to other household specific characteristics such as occupation, education level, family size and land holding as well as farm output therefore, it can be inferred from the result that land holding size, years of workers education, per hectare value of agricultural output, occupation and age of household head are important factors for non farm income at the household level. This suggests that economic and social factors would matter in Non farm sector policy Southeast Nigeria if the distress diversification is to be ameliorated.

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6/1/2010

Effect of instruction in Metacognitive self-assessment strategy on Chemistry Students self-efficacy and achievement

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Abstract: This study examined the effect of instruction in metacognitive self assessment strategy on senior secondary school students' Chemistry self-efficacy and achievement. The study also explored the interaction effect of instruction in metacognitive self assessment strategy and gender in their Chemistry self-efficacy and achievement. The study was guided by five research questions and four hypotheses. A non-equivalent control group pretest and posttest design involving one treatment and one control group was adopted. A total of 192 SS 2 students from Port Harcourt Education zone were used for the study. The Self Assessment Instructional Programme (SAIP) was developed, validated and used for the study. Three instruments: Chemistry Achievement Test (CAT), Self Assessment Scale (SAS) and Chemistry Self-efficacy scale (CSS) were adopted, validated and used for data collection. The results suggested that instruction in the metacognitive self assessment strategy improve the students' chemistry achievement and self-efficacy. [Academia Arena, 2010;2(8):34-43] (ISSN 1553-992X).

Keywords: metacognitive; strategy; senior secondary school; students; Self Assessment Instructional Programme (SAIP); Chemistry Achievement Test (CAT); Self Assessment Scale (SAS); Chemistry Self-efficacy scale (CSS)

1. Introduction

Chemistry is one of the major branches of science. There are various applications of Chemistry in home or industry. There is an increasing impact of growing knowledge in the subject of chemistry on our social and economic life. A poor chemistry foundation at the secondary school will jeopardize any future effort to enhance achievement in the subject. The study of chemistry at the secondary school level helps students in developing basic skills, knowledge and competence required for problem solving in their environment. According to Ohodo (2005) chemistry contributes generating to the attainment of the aims of education and specifically helps individuals to develop effective process skills, critical thinking and competences required for dealing with observation, classification, measurement, counting numbers, recording, communication, prediction, hypothesis, inference, experimentation, interpretation of data, research, controlling variable and generalization etc. At the secondary level, the foundation of chemistry education is laid as they are taught the underlying principles.

The poor achievement of learners in chemistry has been variously explained. According to Usman and Memeh (2007), the factors that negatively affect chemistry achievement include students' background problems; students lack of interest and/or negative attitude towards chemistry; teacher related factors like poor teacher preparation; inadequate qualified chemistry teachers, inadequate instructional materials and application of poor teaching methods. In Nigeria efforts are being made by researchers, government and nongovernmental organization to improve both cognitive, affective and psychomotor outcomes in chemistry. For instance, a good number of research efforts have been made to diagnose the problems associated with the teaching and learning of chemistry in order to proffer solution that lead to better achievement. Recommendations have been made regarding the teaching methods, instructional materials, home and school related environmental factors that could enhance achievement in chemistry. However, as evidence available indicates, achievement in chemistry at the secondary school remains low and unimpressive. The federal government of Nigeria is not left out in this effort to revamp interest in the study of science, especially chemistry and improve achievement in the subject.

Chemistry teachers mainly adopt instructional strategies that arc mainly teacher directed and do not encourage deeper students involvement and self-regulation (Zimmerman, 1990). Self-regulated learners are self-propelled and independent learners, who possess relevant skills which enhance their ability to construct knowledge, assume responsibility for their own

learning and realises that learning is a personal experience that requires active and dedicated participation (Peters, 2000, and Kuiper, 2002).This perception of the role of the learners in the learning process is changing the views of educational researchers on the role of the teacher in the learning process. Instead of viewing teaching as teacher exposition followed by students practice, effective teaching may be achieved by integrating a self-regulating strategy such as metacognitive self-assessment in the process. The constructivists approach to learning locates understanding within the learners, not with the teachers. It is the learners who must learn and therefore must take the responsibility for learning. According to Kuiper, (2002), learning is based on an appropriate self-reflection which leads to meaningful knowledge construction.

Trends in research in some western Countries tend to suggest that metacognitive self-assessment strategy enhances learners' self-regulated behaviour and academic achievement. Metacognitive self-assessment is a self- monitoring approach in which learners get involved in the assessment of their own progress and deficiencies in the process of learning (Rivers, 2001). As learners monitor their own learning, they learn to check their own responses and become conscious of errors or answer that do not make sense. Schunk (1996a)) opined that metacognitive self-assessment is simply judging the quality of one's work. It is a process of assessing the quality of work done based on evidence and explicit criteria. This suggests that self-assessment is goal oriented. To achieve the desired goal will require the active involvement of the learners in the process and the development of skills.

Research findings have suggested that learners who possess relevant skills in metacognitive self-assessment and are aware of these skills arc more strategic in pursuing learning and achieve better in their academic endeavour (Kuiper, 2002: Rivers 2001). When learners are exposed to the skills of self-assessment of their progress, they achieve more. As Bandura (1997) and Schunk (1996a) observed positive self-assessment encourages students to set higher goals and commit more personal resources to learning the task. However, negative self-assessment arises when learners embrace goals that conflicts with learning or select goals that are unrealistic or adopt strategies that are ineffective or exert low effort. Rivers (2001) observed that when skills in metacognitive strategies are acquired, they become potentially powerful stimulants to higher achievement. Literatures reviewed indicate that most of the studies that investigated the efficacy of self assessment are foreign to Nigerian culture and most of them were in English comprehension, prose and reading. This created the need to design a study to determine the extent instruction in metacognitive self assessment strategy would enhance the Chemistry achievement of senior secondary school students.

Self-assessment has been associated with individual learners' perceived self-efficacy. Learners who arc exposed to metacognitive self-assessment skills have been suggested to persist more on difficult tasks, be more confident about their ability and take greater responsibility for their learning tasks (Daley, 2002; Kuiper. 2002). Self-efficacy has been described as a set of belief an individual has about his/her abilities or capabilities in specific performance domain (Bandura, 1994). Individuals' self-efficacy belief influences choice of task, the amount of effort expended and level of persistence in the selected task. Thus learners who possess a repertoire of earning skills are more likely to be efficient learners with high self-efficacy. Successful learners seem to control and direct their thinking process, ask themselves questions and try to organize their thought. They have learnt how to go about their learning and possess relevant cognitive strategies they can apply as necessary. On the contrary, low self- efficacy belief is associated with conditions of learned helplessness, a severely debilitating belief that one has no control over ones learning (Pajares and Miller, 1994).

In spite of efforts by educational researchers to improve school achievement especially Chemistry, less attention has been paid to the affective component of the learner such as their perceived self- efficacy. This study therefore sought to determine the extent the acquisition of metacognitive self assessment skills could affect the Chemistry self-efficacy of senior secondary school students in Delta North education zone of Delta state.

Studies on gender differences in Chemistry achievement have continued to yield inconsistent results (Usman and Memeh. 2007). The results of some studies indicate that male students achieve significantly better than girls (Kador, 2001; Usman and Ubah, 2O07 whereas some other studies reveal no significant difference in the achievement of the two genders (Loofa, 2001). Where these differences exist between boys and girls, it has usually been attributed to unequal exposure of males and females to experiences relevant to Chemistry learning. This is occasioned by the traditional cultural attitude towards the

female gender which restricts them from activities considered masculine (Okeke, 1990). This difference in cultural attitude towards males and females in access to environmental stimulations has been reported to influence their self- efficacy in favour of the boys (Eze and Agboma, 2008). This study therefore sought to examine the extent exposure to metacognitive self assessment strategy interact with gender to affect senior secondary students' Chemistry self-efficacy and achievement. The findings of this study will be beneficial to educators in designing instructional strategies that will help lay a solid foundation for Chemistry at the secondary level of education.

This study was guided by the following research questions and hypotheses:

1.1 Research Questions

1. To what extent does the acquisition of skills in metacognitive self assessment strategy depend on instruction in the strategy?
2. What is the difference in the Chemistry achievement of those exposed to metacognitive self assessment strategy and those not exposed as measured by their mean scores on Chemistry achievement test (CAT)?
3. To what extent do the Chemistry achievement of males and females differ as a result of instruction in metacognitive self assessment strategy?
4. What is the difference in the Chemistry self-efficacy of students exposed to instruction in metacognitive self assessment strategy and those not exposed as measured by their mean scores on the Chemistry self-efficacy scale?
5. To what extent do the Chemistry self-efficacy of males and females differ as a result of instruction in metacognitive self-assessment strategy?

1.2 Hypotheses:

The following hypotheses that guided the study were tested at 0.05 levels of significance.

1. There is no significant difference in the mean Chemistry achievement scores of students exposed to metacognitive self assessment strategy and those not exposed as measured by their mean scores on CAT
2. There is no significant interaction effect of instruction in metacognitive self assessment strategy and gender on students' achievement in Chemistry
3. There is no significant difference in the mean self-efficacy scores of students exposed to metacognitive self assessment strategy and those not exposed as measured by their mean scores on Self-efficacy scale (SES)
4. There is no significant interaction effect of instruction in metacognitive self assessment strategy and gender on students' Chemistry self-efficacy.

2. Methods

The design adopted for this study was quasi-experimental. Specifically, the study was a pre-test and posttest non-equivalent control group design involving one treatment and one control group. In fact classes were used for the study in order not to disrupt administrative arrangement of the school. This became necessary as the study lasted for eight weeks.

The population of the study comprised of all the senior secondary school (SS II) students in Port Harcourt education zone. The participants in this study comprised of 192 SS II students drawn from the area of study. This is made up of 91 boys and 101 girls. Their average age is [0.4 years. To compose the sample for the study, the researcher adopted a multi-stage sampling technique. First, two local government areas were randomly sampled through a toss of the coin. In each local government area, two secondary schools with at least two streams of SS II students were randomly selected. The secondary schools in each of the local government areas were then randomly assigned as treatment and control schools. In each school, one intact class was randomly sampled to participate in the study. Treatment was implemented only in the treatment schools where the students were instructed in the skills for using metacognitive self assessment strategy in solving mathematical problems.

This was independent of the normal Chemistry classes by the regular classroom teachers. The students in the control group had their normal Chemistry classes with their regular class teachers who were only requested to encourage the students to be serious in studying Chemistry for better achievement.

2.1 Instrument for the study

Three researchers' developed instruments were used for the study. They are Chemistry Achievement Test (CAT), Self-Assessment Scale (SAS), Chemistry Self-efficacy Scale (CSS)

2.1.1. Chemistry Achievement Test:

This is a teacher made achievement test constructed by a panel of qualified and experienced teachers and under the supervision of two specialists each in Chemistry education and measurement and evaluation. Ten questions were generated based on the selected Chemistry contents the students were taught in the second term of 2008/09 session. The test was not a multiple choice type since the emphasis was on the process of working out the answer and not just the test is 50. The test items were generated based on the test blue print developed and face validated by 'the two specialists in Chemistry education and two others in measurement and valuation. This was done to ensure the content validity of the achievement test. The test items generated were again given to the same specialists to ensure their suitability in terms of appropriateness of language and clarity, and the level of the students. Each test item has a maximum score of 5 marks. The highest score obtainable from the test is 50.

The CAT 'as trial tested on 18 SS 2 students in Obio/Akpor Local Government Area. The score obtained from the test was used to determine the reliability of the test. Since the test was nor dichotomously scored, the internal consistency reliability estimate was determined using cronbach Alpha method. The obtained reliability estimate is 0.92. An inter-rater reliability was determined using Kendall's co-efficient of concordance procedure. This was done using the scores of three different scorers who used a validated marking scheme as a guide. The obtained Kendall's co-efficient of concordance estimate is 0.94. This shows a high positive relationship among the scores given by the different scorers. Since the same MAT was used as pretest and posttest, the test was re-administered after two weeks and a test retest analysis conducted to determine the stability of CAT over time. Pearson correlation method was adopted and a test retest reliability estimate of .93 was obtained.

2.1.2 The Self-Assessment Scale (SAS).

This instrument was designed to assess the extent students possess the self-assessment skills relevant for Chemistry problem solving. It is a five point likert rating scale which ranges from very high extent (VHE= 5), High extent (HE =4), Moderate extent (ME = 3), low extent (LE= 2) to Not at all (NAA = 1). The items of the scale were generated based on review of literature and the researchers' personal experiences. The scale has two parts. Part A relates to the personal data of the subjects whereas part B sought for information on the self-assessment skills the students possess and apply in learning Chemistry. The instrument required the subjects to self-report on the extent they use the skills in the process of solving Chemistry task. The SAS was face validated by subjecting it to peers review. Two educational psychologists and one measurement expert reviewed the items to ensure appropriateness and clarity. It was thereafter trial tested to further determine its appropriateness and suitability and to test the reliability. The Cronbach alpha method was adopted to determine the internal consistency of the items. The internal consistency reliability estimate of 0.86 was obtained. In order to determine the stability of SAS over time the instrument was re-administered after two weeks and the data obtained were correlated with the earlier data using Pearson product moment correlation method. The test retest reliability estimate of 0.79 was obtained.

2.1.3. Chemistry Self-Efficacy Scale (CSS).

This instrument was developed by the researchers and used in measuring the perceived Chemistry self-efficacy of the students. It is a four point rating scale with the responses option ranging from strongly Agree (SA= 4), Agree (A 3), Disagree (D= 2) to strongly disagree (SD[). Negative items statements were reverse scored. The instrument has two parts. Part A sought for personal information of the respondents whereas part B sought for information relating to the self-efficacy belief of the respondents on Chemistry teaming and problem solving. This instrument was peer reviewed by presenting it to two educational psychologists and one in measurement and evaluation. It was trial tested and the data obtained used in testing the internal consistency reliability estimate. This was done using Cronbach alpha procedure and the reliability estimate obtained is 0.84. The instrument was also tested for stability as it was used for pretest and posttest. The data obtained through a re administration of the instrument after two week were correlated with the data obtained earlier using Pearson product moment correlation method and the stability estimate of 0.82 obtained.

2.2 Treatment Procedure

Before the commencement of treatment, the SAS, CSS and CAT were administered in this order after a lesson period interval. These were administered by the regular classroom teachers in both the treatment and control schools. In the treatment schools, one of the researchers who had good background in secondary Chemistry posed as a guidance counselor and implemented the treatment using a validated self-assessment

instructional programme (SAIP). The treatment was independent of the normal Chemistry classes though illustrations were drawn from Chemistry content that were not part of the scheme of work for the second term of 2008/2009 session. The researchers made use of available free periods on the time table for instruction in the self-assessment strategy. The treatment was designed to last for eight weeks with one session per week. Each session lasted for 35 minutes. Those in the control group had their normal Chemistry classes, however, their teachers were requested to encourage them to be working hard in Chemistry.

The SAIP emphasized skills that will enable the students to set learning goals and to assess every step they take as they work towards the goal. Using SAIP, the instructor guided that students to use the metacognitive self-assessment strategy as they work through a Chemistry problem. The instructor models the process and engages the students in the practice of the skills. Elaborative feedbacks were given and the instructor evaluated every stage in the process.

At the end of treatment the class teachers administered the SAS, the CSS and the CAT to the students in both treatment and control group to obtain the post treatment data. This was done two weeks after treatment.

2.3 Method of Data Analysis

The data generated were collated, organized and analyzed using mean and standard deviation in order to answer the research questions and a two way analysis of covariance for testing the hypotheses. The homogeneity of regression assumption that underlies the use of ANCOVA was tested for in this study. It was assumed in this study that the difference between the population regression coefficient of the treatment and control group is not significant (P<.05). This was confirmed as the observed f value for the population regression coefficient for the treatment and control groups are 1.94 an4 1.65 for MAT and SAS respectively. These were significant at 0.18 and 0.27 respectively and therefore not significant at 0.05 levels, In order to determine the extent of students' metacognitive self assessment acquisition and self-efficacy before and after treatment, the following decision rules were applied. Mean rating between the ranges of 0.50-1.49, 1.50-2.49, 2.50-3.49, 3.5-4.49 and 4.50-5.00 were interpreted as not at all, low extent, moderate extent, high extent and very high extent respectively. Also, Mean rating within the ranges of 20- 29.9, 30-49.9, 50-69.9 70-80 were interpreted as strongly disagree, disagree, agree and strongly agree respectively.

3. Results

The results of the study are presented in the Tables as shown below:

Research Question One:

To what extent is the secondary students' meracognitive self assessment skills acquisition dependent on instruction in metacognitive self assessment?

Table 1: Mean Pretest and Posttest scores of treatment and control groups on SAS

Groups		Pretest	Posttest	Mean gain score
Treatment	Mean	1.46	4.42	2.96
	N	97		
	Std. Deviation	0.48	0.85	
Control	Mean	1.07	1.38	0.31
	N	97		
	Std. Deviation	0.68	0.78	

Results in Table I show the pretest posttest mean ratings on the extent of metacognitive self assessment skills acquisition of the secondary students in the treatment and control groups. The students in the treatment group had pretest mean rating of 1.46 with a standard deviation of .48 and a posttest mean rating of 4.42 with a standard deviation of .85. The posttest mean rating indicate that the extent of acquisition of the skills was high. This is also shown by the pretest posttest mean gain of 2.96. Students in the control group had a pretest mean rating of 1.07 with a standard deviation of.68 and a posttest mean rating of 1.38 with a standard deviation of 0.78. The pretest posttest mean gain was 0.31. These data show that the extent of acquisition of metacognitive self assessment skills was low for the control group. The low standard deviations for the treatment group and control group show that their ratings clustered closely around the mean.

Research question two:

What is the difference in the Chemistry achievement of those exposed to self assessment strategy and those not exposed as measured by

their mean scores on the Chemistry achievement scores?

Table 1.2: Pretest, Posttest means Chemistry scores of treatment and control groups

Groups		Pretest	Posttest	Mean gain score
Treatment	Mean	14.96	43.43	28.57
	N	97	97	
	Std. Deviation	2.80	3.48	
Control	Mean	15.60	24.22	8.62
	N	95	95	
	Std. Deviation	3.58	3.10	
Total	Mean	15.14	33.93	17.79
	N	192	192	
	Std. Deviation	3.18	8.46	

Data on Table 2 indicate that the students in the treatment groups had a pretest mean score of 14.96 with a standard deviation of 2.80 and posttest mean score of 43.43 with a standard deviation of 3.48. Their pretest posttest mean gain score is 28.57. The students in the control group had a pretest mean score of 15.60 with a standard deviation of 3.58 and a posttest mean score of 24.22with standard deviation of 3.10. Their pretest posttest mean gain score is 8.62. These results indicate that the students in the treatment group benefited from the self assessment skills instruction as can be observed from their higher posttest achievement scores in the Chemistry achievement test.

Research Question Three:

To what extent do the Chemistry achievement of males and females differ as a result of instruction in metacognitive self assessment strategy?

Table 1.3: Posttest means and standard deviations of students on MAT (Treatment x Gender Levels)

Groups	Gender	Pretest	Posttest	Mean gain score
Treatment	Male	43	43.44	3.94
	Female	54	43.42	3.10
Control	Male	48	24.98	3.52
	Female	47	23.45	2.38

Results on Table 4 indicate the posttest Chemistry mean scores of male and female students. Males in the treatment group had a posttest mean score of 43.44 wish a standard deviation of 3.94, whereas the females in the group had a mean score 43.42 with a standard deviation of 3.10. The males in the control group had a posttest mean score of 24.98 with a standard deviation of 3.52 whereas the females in the group had a mean of 23.45 with a standard deviation of 2.38. The results show that both males and females in the treatment group outperformed the males and females in the control group in the Chemistry achievement test.

Research Question Four:

What is the difference in the self-efficacy of students exposed to metacognitive self assessment strategy and those not exposed as measured by their mean scores on the Chemistry self-efficacy scale?

Table 5: Pretest Posttest means scores and standard deviations of students on CSS

Groups		Pretest	Posttest	Mean gain score
Treatment	Mean	52.01	76.89	24.88
	N	97	97	
	Std. Deviation	11.05	12.96	
Control	Mean	48.38	47.81	-.57
	N	95	95	
	Std. Deviation	3.78	4.02	
Total	Mean	50.22	62.51	12.29
	N	192	192	
	Std. Deviation	8.47	17.46	

Result on Table 4 show that the students in the treatment group had pretest mean self-efficacy score of 52.01 with a standard deviation of 11.05 and posttest mean self- efficacy score of 76.89 with a standard deviation of 12.96. For those in the control group, they had a pretest mean self-efficacy score of 48.38 with standard deviation of 3.78 and a posttest mean score of 47.81 with standard deviation of 4.02. The students in the treatment group had a pretest and posttest mean gain score of 24.88 indicating enhanced self-efficacy probably due to the treatment received whereas those in the control group had pretest-posttest mean loss of -0.57 suggesting a slight deterioration in their self-efficacy.

Research Question five:

To what extent does the Chemistry self-efficacy of male and female students differ as a result of instruction in metacognitive self assessment strategy?

Table 5: Posttest mean scores of male and female students in MSS (Treatment x Gender)

Groups	Gender	Pretest	Posttest	Mean gain score
Treatment	Male	43	77.33	13.17
	Female	54	76.56	12.91
Control	Male	48	47.06	3.50
	Female	47	48.58	4.40

Results on Table 5 show the posttest self-efficacy mean ratings of males and females in the treatment and control groups. Males in the treatment group had the mean ratings of 77.33 with standard deviation of 13.17 whereas males in the control group had a mean of 47.06 with standard deviation of 3.50. Females in the treatment group had a mean of 76.56 with standard deviation of 12.91 whereas the females in the control group had a mean of 48.58 with standard deviation of 4.40.These results imply that both males and females in the treatment group experienced high self- efficacy at posttest stage whereas both males and females in the control group experienced lower self-efficacy at the posttest stage.

Hypothesis One:

There is no significant difference in the mean Chemistry achievement scores of students exposed to metacognitive self assessment strategy and those not exposed.

Table 6: Analysis of Covariance (ANCOVA) on students posttest achievement scores on CAT (treatment and gender)

Source	Type III sum of squares	Df	Mean square	F	Sig
Correct Model	17779.578a	4	4444.894	415.722	0.000
Intercept	8109.797	1	8109.797	756.493	0.000
Pretest	9.003	1	9.003	0.842	0.360
Experimental	17340.873	1	17340.873	1621.857	0.000*
Gender	24.797	1	24.797	2.319	0.129**
Experimental x Gender	20.7313.043	1	20.731	1.939	0.165**
Error	1999.401	187	10.692		
Total	240780.000	192			
Corrected Total	19778.979	191			

*Significant at 0.05 levels ** Not Significant at 0.005 level of significant.

Data on Table 6 indicate that treatment as main factor has a significant effect on the students' Chemistry achievement. This is shown by the obtained f-value of 1621.857 which is significant at .000 and also significant at 0.05 levels. The null hypothesis of no significant difference in the mean achievement scores of the students in the treatment and control group is therefore rejected. In other words, there is significant difference in the mean scores the students in the two experimental groups as a result of instruction in self assessment skills.

Hypothesis Two:

There is no significant effect of instruction in metacognitive self assessment strategy and gender on students' achievement in Chemistry.

Results on Table 6 also indicate that the interaction effect of instruction in metacognitive self assessment skills and no significant. This is shown by calculated f-value of 1 .939 which is significant at .165 levels and therefore not significant at 0.05 levels. The null hypothesis of no significant interaction effect of instruction in self assessment skills and gender on students' Chemistry achievement is upheld. This suggests that the effect of treatment on the students' achievement did not depend significantly on the gender of the students.

Hypothesis three:

There is no significant difference in the mean self-efficacy scores of students exposed to instruction in metacognitive self assessment skills and those who were not exposed.

Table 7: Analysis Covariance (ANCOVA) on students posttest Chemistry self-efficacy (Treatment x Gender)

Source	Type III sum of squares	Df	Mean square	F	Sig
Correct Model	48605.196a	4	12151.299	235.299	.000
Intercept	51705.328	1	51705.328	1002.328	.000
Pretest	7932.279	1	7932.279	153.733	.000
Experimental	46553.556	1	46553.556	902.238	.000*
Gender	27.208	1	27.208	.527	.469**
Experimental x Gender	73.201	1	73.201	1.419	.235**
Error	9648.799	187	51.598		
Total	710250.000	192			
Corrected Total	58253.995	191			

Results on Table 7 reveal that treatment as main factor produced a significant effect on the students' Chemistry self-efficacy. This is indicated by the calculated f-value of 902.238 which is significant at .000 and also significant at 0.05 levels. This implies that instruction in self assessment skills significantly enhanced the Chemistry self-efficacy of the students. Consequently, the null hypothesis of no significant difference in the Chemistry self-efficacy of those in the treatment and control group is rejected. An alternate hypothesis of a significant difference in the Chemistry self-efficacy of the two groups is therefore, accepted.

Hypothesis Four:

There is no significant interaction effect of instruction in metacognitive self assessment strategy and gender on students' Chemistry self-efficacy.

Results presented on Table 7 further show that there is no significant interaction effect of treatment and gender on the students' Chemistry self-efficacy. This is because the calculated f-value of 1.419 which is significant at .235 levels is not significant at 0.05 levels. The null hypothesis of no significant interaction effect of treatment and gender on the students' Chemistry self-efficacy is therefore accepted. This suggests that the effect of the treatment did not significantly depend on the gender of the students.

4. Discussion

The results of this study have shown that instruction in metacognitive self assessment strategy enhanced the achievements of the students in Chemistry. Data on Table 6 indicate that the students exposed to instruction in self assessment skills performed significantly better in the Chemistry achievement test than those in the control group. The non significant effect of the interaction of the instruction in self assessment strategy and gender further shows that acquisition of the skills in self assessment skills accounted for the better achievement of those in the treatment group. The findings of this study support the findings of related earlier studies by Kuiper (2002), Rolheiser and Ross (2002) and Rivers (2001). Their findings suggest that good learners engage in the process of assessing the quality of their work based on evidence and set criteria. They get involved in active self- appraisals and management of their thoughts. As they monitor their own learning, they learn to check their own responses and become aware of errors or answers that do not fit. Acquisition of the self assessment skills could have permitted the students to gain control of their learning activities and were therefore able to learn the processes in Chemistry problem solving.

Result in Table 6 also shows that gender is not a significant factor in the students' Chemistry achievement. This finding contradicts some earlier

studies. For instance, Jahun and Momoh, (2001), and Usman and Uba,(2007) observed a significant difference in Chemistry achievement based on gender. However, the findings of the study by Olagunju (2001) support the non significant difference in Chemistry achievement reported in this study. The acquisition of self assessment strategy by both males and females in the treatment group could have removed gender related disadvantage in Chemistry learning. These skills in self assessment encourage sell-regulated learning and could have motivated both genders to actively participate in the Chemistry learning process.

The findings of the study showed that the interaction effect of instruction in self assessment skills and gender on students' mean achievement scores in Chemistry was not significant. The findings supported the results of a similar study by Eze (2003). In the study, Eze found no significant interaction effect between instruction in elaborative interrogation strategy and gender. In this study, the findings indicate that both gender benefited almost equally from the self assessment instruction. This implies that the contribution of gender to the effect of treatment on the dependent measures was not significant.

Results on Table 7 show that instruction in metacognitive self assessment strategy has a significant effect on the Chemistry self-efficacy of the secondary school students involved in the study. The students in the treatment group who received instruction in self assessment strategy had a significantly higher Chemistry self-efficacy than those in the control group. The findings of this study may be explained in line with the study of Zimmernam (1990, 2000), and Pajeres and Miller, (1994) which observed that learning skills acquisition enhances self-regulated learning behaviour which in turn ensures motivation and confidence as a learner engages in learning tasks. The confidence to approach learning in an independent manner which promotes the belief in one's ability to execute a given task may invariably lead to enhanced self-efficacy. It has been noted that learners who posses a repertoire of effective learning skills are more likely to be efficient learners who develop high self-efficacy. The instruction in self assessment could have been the reason for the higher self-efficacy demonstrated by those in the treatment condition.

Data on Table 7 also show that gender had no significant influence on the Chemistry self-efficacy of the secondary school students. The non significant different on the Chemistry self-efficacy of the males and females especially in the treatment group would be attributed to the effectiveness of instruction in self assessment strategy which possibly equipped them with relevant learning skills that makes learning Chemistry appealing. When the relevant skills were mastered, it is possible that the male and female students saw Chemistry as a subject that can be learnt through systematic and sustained effort. The interaction effect of instruction in self assessment and gender on the Chemistry self-efficacy of the students was not significant. This supported the results of a similar study by Eze (2003) which found no significant interaction effect between learning strategy instruction and gender on perceived self-efficacy. The findings of this study showed that both males and females benefited from the strategy instruction. In this study, evidence on Table 7 show that the contribution of the two genders on the effect of the self assessment instruction on the students Chemistry self efficacy was not significant.

5. Conclusions

The results of this study show that instruction in metacognitive self assessment strategy significantly improved the Chemistry achievement of secondary school students and also significantly enhanced their self-efficacy. This suggests the need for teachers to equip senior secondary school students with relevant self assessment skills effective for Chemistry learning. Such skills which have been observed to enhance confidence in task execution also improve their self-efficacy and keep them focused and concentrated on a given mathematical task. The result of the study further indicated that the difference in the mean Chemistry achievement scores and the mean Chemistry self-efficacy scores of male and female students exposed to the self assessment skills instruction were not significant. These indicate that both male and female students benefited from the self assessment instruction and as such both genders can explore the skills in .self assessment to enhance their Chemistry achievement and self-efficacy.

6. Recommendations

Classroom teachers should therefore be equipped with self assessment strategy so that in the teaching learning process, they would be able to transfer these skills to the students who need them to pursue their own learning purposefully and independently. This will help the students who are deficient in some areas of Chemistry to acquire the necessary skills needed for efficient and effective learning of the subject.

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Some Aspects Of Neurometrics In Sahel Goats In Maiduguri, Nigeria

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Abstract: The study was done on the nerometrics of the sahel goats using a total of 14 goats between the ages of <1½-3 years. The mean brain weight obtained was 96.14g, weight of the head, length of cerebrum, depth of cerebrum, length of cerebellum and depth of cerebellum were 1.19kg, 7.18cm, 3.81cm, 3.42cm and 2.77cm respectively. Animals >2-3years have slightly higher brain values than those <1½-2 years. The females have lower brain weight than males. Location has no effect on the neurometrical data of the sahel goats. The results obtained in this study can be used as a research data for neuroanatomy, neurophysiology and pharmacology, in animal psychiatry and in comparative studies between breed and species. [Academia Arena, 2010;2(8):44-47] (ISSN 1553-992X).

Key words: Brain, Sahel goat, Cerebrum, Cerebellum

INTRODUCTION

The head is the most superior part of the body. It is the most important region by virtue of the location of some vital organs of the body. These organs include the brain, eyes, nose, tongue, ears and mouth (Sisson and Grossman, 1975; Chibuzo and Sivachelvan, 1994; Olopade and Onwuka, 2003). Other organs such as the mandibular lymph nodes, salivary glands, parotid lymph nodes and the tonsils are in close association with the head.

Indeed the head is vital since the clinical status of the organs located on it and the body could be used to deduce the health status of an individual animal. For example, the paleness of the mucous membrane of the mouth and the eye is clinically assessed to determine anaemic condition of an animal. The degree of wetness of the muzzle, the brightness and shiny state of the eye, the alertness of the ears and excesses of saliva are other parameters used to assess the health status of an animal (Peacock, 1996; Olopade and Onwuka, 2003).

The head can also be used in describing animal species within and between breeds (Devendra and Mcleroy, 1982; Dyce et al., 1987; Gall, 1996).

The brain which makes the head the most vital region of the body is highly protected from the outside environment. Nevertheless, the cavitations such as the paranasal sinuses in the cranium could serve as a route of infection into the head. The brain is the master coordinator of the body. Any change in the structural or functional anatomy of the brain could result in abnormality and inefficiency. This would probably explain why the brain is highly secured. The central nervous system consists of the cerebrum, cerebellum and the spinal cord. It has almost no connective tissue and is therefore a relatively soft, gel-like organ (Junqeira and Carneiro, 2005).

Brain weights and other linear measurement in the brain remain important indices in neuroanatomy and other related studies of the brain (Chrisman, 1991; Benclouif and Rosenzweig, 1995). While some studies were carried out by Olopade and Onwuka (2002), Onwuka et al., (2002) on the breeds in Nigeria, alot needs to be done on the sahel goat ecotypes which necessitate this study.

MATERIALS AND METHODS

SAMPLE COLLECTION.

A total of fourteen heads of sahel goats (seven males and seven females) of different age groups of between ≤1½ year to about 3years where used for this study. The heads were obtained from the Maiduguri township abattoir and the source is from within and outside Maiduguri metropolis. The age and sex of the goats where determined using the external features and dentition as described by Sisson and Grossman (1975) and Dyce *et al*., (1987). The goats where slaughtered and then decapitated after restraint at the occipito-atlantal junction. The head was weighed using a sensitive balance in kilogram (kg).The heads were kept at -20^{o}c and brain were later removed without chemical fixation according to the method of Olopade *et al*., (2005).

WEIGHT OF THE BRAIN

The brain after being removed from the cranial cavity and cutting off the attachment of the cranial nerves that hold the brain in place was weighed using a sensitive balance (digital). The weight was recorded in grams (g).

MEASUREMENT OF THE BRAIN

A measuring tape was used to measure the brain. Measurements taken include the length of the cerebrum, (LOC), depth of the cerebrum (DOC), length of the cerebellum, (LOCB) and the depth of the cerebellum (DOCB). Measurements were recorded in centimetres (cm).

DATA ANALYSIS

The values obtained in this study were analysed using the Pearson correlation students t-test at 5% level of significance and presented as mean standard deviation ±S.D.

RESULTS

Table 1. Neurometrical data of the sahel goats, N=14

WOH(kg)	WOB(g)	LOC(cm)	DOC(cm)	LODB(cm)	DOCB(cm)
1.19±0.17	96.14±2.07	7.18±0.33	3.81±0.57	3.42±0.39	2.77±0.31

WOH-Weight of head
WOB-Weight of brain
LOC-Length of cerebrum
LOCB-Length of cerebellum
DOCB-Depth of cerebellum.
DOC-Depth of cerebrum

Table 2 Age-based data of the sahel goat.

Age(yrs)	WOH(kg)	WOB(g)	LOC(cm)	DOC(cm)	LOCB(cm)	DOCB(cm)
<1½-2	1.09±0.78	96.0±2.70	7.21±0..25	4.04±0.54	3.42±0.54	2.93±0.26
>2-3	1.40±0.07	96.4±1.52	7.12±0.48	3.40±0.37	3.42±0.36	2.50±0.12

Table 3 Sex-based neurometrical data of sahel goat.

Sex	WOH(kg)	WOB(g)	LOC(cm)	DOC(cm)	LOCB(cm)	DOCB(cm)
M	1.07±0.08	96.14±1.34	7.27±0.26	3.60±0.49	3.37±0.34	2.63±0.26
F	1.31±0.16	83.29±1.06	7.09±0.39	4.03±0.59	3.47±0.46	2.93±0.29

Table 4 Location based neurometrical data of sahel goat

Location	WOH(kg)	WOB(g)	LOC(cm)	DOC(cm)	LOCB(cm)	DOCB(cm)
Urban	1.19±0.16	96.12±2.30	7.23±0.36	3.63±0.57	3.41±0.45	2.75±0.29
Periurban	1.20±0.20	96.33±1.63	7.20±0.31	4.20±0.51	3.38±0.35	2.87±0.38

This study revealed that the mean brain weight of fourteen sahel goat in the study is 94.14g. The mean length and depth of cerebrum and that of the cerebellum were 7.18cm, 3.81cm, 3.42cm and 2.77cm respectively.

Animals that are <1½-2 years show no significant difference (p>0.05) with animals >2-3years

From this result, it can be seen that there was no significant difference (p>0.05) between the males and female Sahel goats.

Goats from the urban Sahel goats show no significant difference (p>0.05) with those of periurban sahel goat when.

DISCUSSION AND CONCLUSION

The weight of the brain obtained in this study is 94.14g as seen in table 1,which is slightly higher than that obtained for the Red Sokoto goat which was 85.85g (Olopade and Onwuka, 2002) and much higher than that obtained for the West African Dwarf goats which weigh about 56.89g. Linear measurement of the LOC, DOC, LOCB and DOCB are 7.18 cm, 3.81 cm, 3.42 cm and 2.77 cm respectively as seen in table 1.

Animals <1½-2 years had lower values of LOC, DOC and DOCB than those of >2½-3 years though there was no significant difference (p>0.05) between them. This suggests that as the animals begin to grow in age, a rostrocaudal compression occurs in the brain development in this breed. Since the LOC is higher than the DOCB, the result obtained in this study thus suggests that the much greater differences between DOCB in favour of the former could have occurred in the early months of the life of the Sahel goat as shown in table 2. This is a similar finding to the work of Olopade *et al*., 2007.

The weight of the brain of the male sahel goat is higher than that of the female as seen in table 3 though there was no significant difference (p>0.05), which is inconsistent with the results of

West African Dwarf and for Red Sokoto goats (Onwuka et al., 2002, Oopade *et al*. 2005, Olopade and Onwuka, 2002) and this may partially be the outcome of a lower cerebellar length in the females though not significantly different ($p>0.05$). This study is in agreement with human studies where females had smaller brains (Skulleruel, 1985), and males were also found to have a larger cerebral volume (Giedd *et al*., 1987) and also in agreement with Frederic *et al*., 2001 where brain size varies considerably among individual. The brain of males' average about 10 percent larger than those of females, owing to differences in average body size. No correlation exists between brain size and intelligence. Individuals with smallest brains and largest brains are functionally normal.

Goats from the urban and periurban pastoral settings showed no significant ($P>0.05$) variation in the WOH, WOB, LOC, DOC, LOCB and DOCB. This suggests that location has no effect on the neurometrical data of sahel goats.

The cerebellum is involved in motor learning and cognitive functions in humans and animal experiments have found structural changes in the cerebellum in response to long-term motor skill activity (Hutchinson *et al*., 2003). The relatively longer cerebellum in this study may indicate a response to a specialized motor activity in the Sahel goat in comparison to other breeds.

The results obtained in this study can be used as a research data for neurophysiology and pharmacology, and in animal psychiatry (Bencloucif and Rosenzeig, 1995) in controls when comparing with pathological cases like scrapie encephalomyelitis and other brain abnormally like cerebellar hyperplasia and neoplastic conditions of the brain (CNN, 2000, Chrisman, 1991) and in comparative studies between breed and species (Kawakami, 1994)

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摘要：1、江晓原引用钱钟书先生的话说：学问本属“荒江野老屋中二三素心之人相与培养讲求之事”，原本是要清静的。他最后还说了一句大白话：对学术成果来说，并非数量越多越好。2、江晓原的另一个身份是科普作家，打比喻是他的强项：现在我们的某些管理者将办大学看成造房子，通常是事先计划好一切，工艺是现成的，材料是准备好的，按照规范和图纸操作，按照计划施工。“这是典型的工科思维方式。”江晓原特别介绍了西方对待学术的态度：在一块地里播一些种子，浇水施肥，里面会有一颗或若干颗结出果实。但事先人们并不知道哪颗种子能成长，哪颗种子会发育不良；如果其中一颗死掉了，并不意味着播种的失败，这只是一个概率的问题。所以，要资助足够数量的一批人，营造一个比较好的学术氛围，这样成果早晚会出来。[Academia Arena, 2010;2(8):48-60] (ISSN 1553-992X).

关键词：中国；科学；农村；城市；学术氛围

低碳量子色动化学

发现认识元素周期表新视角

将金属铅转变成黄金或许永远是个神话，不过与其相类似的“炼丹术”不仅可能，而且还相当廉价。美国宾州大学 3 名研究人员日前发表文章说，他们发现某些元素原子的组合所显示的电子特征同其他元素的电子特征相仿。研究小组带头人艾伯特·卡斯尔曼教授表示，此发现有望帮助人们获得更廉价的广泛应用于新能源、环境治理和催化剂的材料。

研究人员同时还向人们展示，在完成的原子合成研究中，他们所验证的那些原子通过简单地查看元素周期表就能预测到。研究小组利用先进的实验和理论对这些崭新和意外的发现进行了量化分析。卡斯尔曼教授认为，他们开创了认识元素周期表的新视角。相关研究成果发表在近期的美国《国家科学院院刊》（*PNAS*）网站上。

卡斯尔曼领导的研究小组另外两名成员分别是塞缪尔·培泊尼克和达斯萨·古纳偌特恩。培泊尼克曾是宾州大学的研究生，现为太平洋西北国家实验室的博士后研究员；古纳偌特恩仍是宾州大学的研究生。在研究中，他们利用光电子成像光谱技术，分析研究了一氧化钛和金属镍、一氧化锆和金属钯，以及碳化钨和白金两两之间的相同点。

卡斯尔曼介绍说：“光电光谱仪可测量将原子或分子中电子从各种能态移出（或去除）所需的能量，与此同时用电子相机将去除电子过程的分步图拍摄下来。如此方法允许我们了解电子的结合能，并观测电子

在被从原子中去掉前所处在的电子轨道的自然状况。我们发现，从一氧化钛分子中去除电子所需的能量同从镍原子中去除电子所需的能量相同。同样，一氧化锆和金属钯以及碳化钨和白金的情况也是这样。这 3 对物质的关键点是它们两两之间具有等电子体结构，也就是说它们两两之间具有相同的（外层）电子排布。”他强调，等电子体在这里主要是指原子或分子的外层电子数目。

在光电光谱仪拍摄的成像中，研究小组研究的 3 对物质两两之间代表着电子从原子外层被去除时所发出的释放能量的亮点看起来相似，图表也显示两两物质之间能量峰值相近，同样理论计算的结果表明它们的能级也相匹配。

卡斯尔曼解释说，一氧化钛、一氧化锆和碳化钨分别是金属镍、金属钯和白金的“超级原子”。所谓“超级原子”是一簇带有元素原子某些特征的原子。卡斯尔曼过去的实验室涉及到超级原子概念的研究，其中一项实验显示，由 13 个金属铝原子组成的原子簇其表现如同一个碘原子，而在铝原子构成的系统中增加一个电子，其表现则如同一种罕见的气体原子。进一步研究发现，14 个铝原子组成的原子簇的活动性与一种碱金属原子的相当。

卡斯尔曼新的研究目标是将超级原子想法提高到一个新的高度，并为超级原子概念提供合理的量化基础。他表示：“这看上去就像我们能预测哪些元素原子的组合可模仿其他的元素原子。比方说，通过查看元素周期表，你便能推测一氧化钛是镍的一个超级原子。简单方法是钛原子的外层有 4 个电子，而原子氧的外层有 6 个电子，在元素周期表中，钛元素向右移动 6 个元素便是镍。镍原子的外层有 10 个电子，正好与钛和氧组合的分子的外层电子数相同。我们曾考虑这个发现肯定是一种不可思议的巧合，于是我们试着用其去了解其他的原子，却发现存在着同样的规律。”

卡斯尔曼表示，他不知这样的规律是否适合于整个元素周期表中的所有元素，或者该规律是否只适合表中部分元素。目前，他和研究小组的成员正忙于对过渡金属元素的分析工作。未来，他们计划研究了解超级原子是否与其对应的元素原子具有类似的化学性质。

对于新研究的应用，卡斯尔曼说：“白金广泛用于汽车的催化转化器中，但是它十分昂贵。相反，与白金对应的碳化钨却价格低廉。如果汽车催化转化器制造商能够利用碳化钨来取代白金，那么便可以节省大笔的资金。同样，用于某些内燃过程中的金属钯期望能被廉价的一氧化锆所代替。我们的研究从科学进步和实际应用两个角度看，都是十分令人振奋的。”（来源：科技日报 毛藜）

盐亭嫘祖文化研究批判（三）

---从《扶桑花姑娘》到《嫘祖故里姑娘》

甘栋国

2010 年 2 月 14 日

扶桑花女孩-剧情概况

昭和 40 年(1965 年)，石油逐渐取代煤矿成为主要燃料能源，昔日的煤矿相继关闭，无数的人失去了工作。以采矿为生的日本福岛县某煤矿小镇也面临产业没落、矿坑关门的危机，煤矿工人面临集体失业和裁员。当地煤矿承包人忽发奇想，以兴建一个四季如夏的“夏威夷度假中心”来转型，这个以发展观光事业为目的度假村开始大兴土木，招募日后将在度假村登台表演的草裙舞少女，并从东京请来了一位有名的女舞蹈老师来教女孩子们学习跳舞。纪美子是个普通高中生，母亲千代和哥哥洋二朗都在煤矿工作，而父亲则死于矿坑事故。娱乐中心募集草裙舞女郎，朋友早苗拉着纪美子一同前往应招。在草裙舞说明会上，女孩们第一次看到了这种露脐摆臀的舞蹈，吓得纷纷逃走，只有纪美子、早苗、初子和小百合四个人不理家人留了下来。舞蹈老师平山真都香是娱乐中心吉本部长从东京请来的，起初平山老师并不喜欢这个乡下地方，要在几个月内教会一群没有半点基础的学生跳舞，更是让她恼火。然而，纪美子等人的热诚感染了平山，她开始全力以赴地授课，同时也渐渐走出了自己的人生低谷。保守的村民们指责她们学习舞蹈，其实是放弃了传统和荣耀，只会穿著暴露草裙摇屁股。在度假中心开业之前，在跟保守派的争执与对立之中，平山老师率领度假中心的姑娘们，不畏接踵而来的阻挠，终究在民风顽固保守的穷乡僻壤，舞出了未来的出路。

扶桑花女孩-影片背景

影片改编自真人真事，富有戏剧性地再现了磐城市的复兴故事，甚至可以看成是日本的一个缩影。片中舞蹈老师平山真都香的原型正是当年领导常磐音乐舞蹈学院的早川老师，目前她依然在常磐音乐舞蹈学院担任首席顾问，片中的夏威夷舞蹈表演至今仍在该处演出。

扶桑花女孩-奖项一览

包括奥斯卡最佳外语片提名在内的 13 个大小电影颁奖，依次的具体奖项有：

第 31 届报知电影奖最佳电影、最佳女配角(苍井优)；

第 49 届朝日电影祭日本放映第四位；

第 28 届横滨电影节日本放映第四位、最佳女主角(苍井优)；

第 19 届日刊体育电影大奖最佳电影、最佳女主角(松雪泰子)、最佳女配角(富司纯子)、最佳新人(苍井优)；

第 49 届蓝丝带奖最佳电影、最佳女主角(苍井优)、最佳女配角(富司纯子)；

第 61 届每日电影大奖最佳电影、最佳女配角(苍井优)、最佳美术设计(种田阳平)、最佳录音(白取贡)；

第 21 届高崎电影节最佳导演(李相日)、最佳女主角(苍井优)；

2007 日本奥斯卡最佳电影、最佳新人(苍井优)、最佳企画制作(石原仁美)，第 16 届东京电影奖最佳女主角(苍井优)、最佳女配角(富司纯子)；
第 80 届日本《电影旬报》2006 年十大最佳电影第一位、最佳女配角(苍井优)；
第 80 届日本奥斯卡最佳影片、最佳剧本(李相日、羽原大介)、优秀电影、优秀剧本(李相日、羽原大介)、优秀女配角(苍井优、富司纯子)、优秀照明(小野晃)、优秀录音(白取贡)、新人优秀(苍井优、山崎静代)、话题奖、最佳导演(李相日)、最佳女配角(苍井优)、优秀导演(李相日)、优秀女主角(松雪泰子)、优秀摄影(山本英夫)、优秀美术(种田阳平)、优秀编集(今井刚)；
第 79 届奥斯卡最佳外语片提名。
扶桑花女孩-影片简评

《扶桑花女孩》是一部温馨小品，适合大人小孩。此片描写一个以煤矿为经济来源的乡下小镇，由于产业没落，面对新时代来临，必须寻求另一生存之道的故事。在里面看到了类似漫画《父之历》中葬于火海的早期日本街道，导演将寒冷的煤矿小镇与夏威夷度假中心这两个相差甚远的地方融入影片，刚开始觉得有些荒诞感，却没想到这是真实故事改编，世界上真的有这样的地方，发生那些事吗？抛开明显抄袭《红粉联盟》(A League of Their Own)的桥段不论，这真是一部温馨动人、笑中带泪的通俗剧佳作，光看苍井优在片终前的独舞，就值回票价。不过，引起观众最多惊喜的，却是日本知名搞笑团体“南海甜心”里的小静出场时，所引起的阵阵惊呼，看来很多人都看过《男女纠察队》的女丑特集。
扶桑花女孩-关于影片

矿城镇经济变迁这一沉重话题以轻松的喜剧形式展现。一个北方煤矿小镇为拯救当地经济，打算将自己打造成日本第一个夏威夷式度假村，但苦于没有会跳夏威夷热舞的女孩。故事围绕一名来自东京的老师指导当地女孩学习舞蹈而展开，是一部感人的轻喜剧。

《扶桑花女孩》全片青春洋溢，色彩浓郁。在片中，甜美女星苍井优饰演离家出走，一心只想学舞独立的豆蔻少女。喜欢她的观众可以一次欣赏到她至少五种以上活泼俏丽的夏威夷舞造型与曼妙舞姿！而她在电影里与舞蹈老师松雪泰子的真挚互动，将亦师亦友的情谊演绎得励志感人。

松雪泰子饰演在都市受挫后逃到乡下的草裙舞老师，片中她对学生从原本的冷漠、冲突到热泪相拥珍惜的演技转变，获得评审青睐，获得第 19 届日刊体育电影大奖的最佳女主角奖。她开心地笑说：“这是我到目前为止收过最好的礼物。”

松雪泰子为演好老师的角色，三个月来每日苦练六小时舞蹈，今次她获‘最佳女主角’，可说是认同了她的演技和努力。松雪泰子，她笑言这部影片令她尝尽苦头，除了要苦练舞蹈之外，其中一幕她与苍井优吵架的

场面，足足NG了六十多次，由早拍到晚，令她非常憔悴。

参考附录

：孙军等 来源：《自然》 发布时间：2010-3-5 13:56:43
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材料力学行为尺度效应研究进展

近日，西安交通大学金属材料强度国家重点实验室微纳尺度材料行为研究中心研究生余倩，在导师孙军教授、肖林教授，和该研究中心教授马恩、单智伟的悉心指导下，与美国宾夕法尼亚大学教授李巨、丹麦瑞瑟国家实验室黄晓旭博士合作，对微小尺度金属单晶材料中的孪晶变形行为及其对材料力学性能的影响进行了深入研究，发现了单晶体外观尺寸对其孪晶变形行为的强烈影响，以及相应材料力学性能的显著变化。此项成果已发表在 1 月 21 日出版的《自然》（*Nature*）杂志上。评审人对此项研究中所完成的大量首创性工作印象非常深刻，认为作者在材料力学尺度效应的研究方面取得了重大进展。

伴随着微电子元器件与微机电系统（MEMS）等技术的进步，所用材料外形特征尺寸的下限也逐渐减小至亚微米甚至纳米量级，而该尺度正是材料塑性变形基本物理机制作用的空间范畴。也就是说，微纳尺度材料中，材料变形载体的特征尺度，如位错线与孪晶缺陷的特征尺度与作用空间，开始和材料的外部几何尺寸处于相似量级。比如块体钛合金中变形孪晶的尺度一般在 0.1～10 微米之间。当具有不同尺寸的微元器件中零部件所用材料外形几何尺寸与其相近时，孪晶是否仍然会发生、其临界条件和性能是否会随尺寸而改变等等，都是当前材料科学领域中的前沿课题和令设计工程师们异常感兴趣的问题。

因此，作为材料开发和应用的重要步骤，如何准确测量和表征这些微小器件在制备和服役过程中的力学性能，成为事关其高性能设计制备与安全使用的关键性课题，也是材料科学发展所必须面对的挑战。以前，对这一方向的研究主要集中在位错的滑移行为，而对于材料的另一种重要塑性变形方式——孪晶在微小尺度材料中的成核与演化过程却鲜有报道。此外，以位错变形为主导的多晶金属材料存在一定的临界尺度。当材料的晶粒尺寸小于该特征尺度时，描述材料力学行为的经典“Hall-Petch”幂律关系，即“尺寸愈小、强度愈高”，亦将不再适用。描述孪晶变形的“Hall-Petch”幂律关系的斜率通常要比位错滑移变形的大很多，也就是说，孪晶变形应表现出更强的尺度依赖性。

文章作者通过巧妙的实验设计，基于六方晶体结构金属孪晶、位错滑移变形的特异性，选取钛-5%铝合金单晶中以孪晶变形为主导塑性变形方式的晶体取向，利用纳米压入仪下微柱体压缩与相应的透射电镜原位定量变形表征技术，有针对性地研究了孪晶变形在微小尺度材料中的行为规律和机理。结果发现，当外观几何尺度减小到微米量级

时，与相应宏观块体材料相同，材料的塑性变形仍以孪晶切变为主，但材料的屈服强度及其塑性变形中能够承受的最大流变应力均有显著提高，分别达到其宏观值的近 5 倍和近 8 倍，表现出很强的尺度依赖性。其实验测定的“Hall-Petch”幂律关系指数接近于 1，即远高于多晶的 0.5。

令人惊奇的是，当晶体的外部几何尺度进一步减小到亚微米量级时，材料的塑性变形方式发生了根本性的转变。由于材料尺寸的限制，孪晶变形被完全抑制，并由位错滑移变形取而代之。而发生这一转变的临界特征晶体尺寸为一微米左右（远大于多晶纳米材料强度极值对应的 20 纳米）。小于该临界尺寸后，“Hall-Petch”幂律关系将不再适用，而材料所能承受的最大流变应力亦呈现出一种接近于所用材料理想强度水平的“应力饱和”平台现象。这就意味着，原本块体材料由于存在晶体缺陷而无法达到的强度“天花板”——理想强度已经被触及。更为重要的是，这种转变的特征尺度是在微米向亚微米过渡的范围，即小尺度材料在微器件和微机电系统等实际应用中所用材料的重要尺度范围。由此，文中提出了与光学物理“受激辐射”效应类似的，以螺位错为媒介的孪晶变形“受激滑移”模型，得到“Hall-Petch”幂律指数的理论值为 1，与实验值吻合良好。并且由于仅有 1%左右的位错可以作为极轴，而晶体尺寸愈小，就愈难于利用螺位错的极轴作用将两个相邻的滑移面有效地耦合在一起而形成孪晶，完美地解释了孪晶变形具有强烈的晶体尺寸效应和“尺寸愈小、强度愈高”的内在原因。

此项研究结果对于系统认识微小尺度材料的力学行为有着十分重要的作用。对于微电子元器件与微机电系统所用材料的性能表征评价与设计，特别是利用其强度的强烈晶体尺度效应进行微纳加工等具有重要的指导意义。

据悉，该项研究得到了国家自然科学基金与“973”计划项目以及国家外专局/教育部首批学科创新引智（“111 计划”）项目的共同资助。（来源：科学时报 张行勇）

黏菌具有建立高效运输网络能力

日本研究人员最近发现，一种单细胞生物——黏菌具有建立高效运输网络的能力。他们希望在将来的城际铁路网络、通信网络等基础设施的规划设计中发挥黏菌的这种能力。

黏菌是介于动、植物之间的一种微生物，形态各异，具有向食物聚集的特性，如果食物处于分散状态，黏菌就会在食物之间形成管道，通过管道输送养分。

来自北海道大学和广岛大学等机构的研究人员在一个 A4 纸大小、与日本关东地区形状相同的容器内培养黏菌。黏菌和最大块的食物被放在容器内模拟东京中心的位置，而其他小块食物则被分散放置在容器内模拟关东地区 36 个主要车站的位置上。

研究人员发现，黏菌首先在周围迅速形成细密网络，随着网络向四周扩散，网络从出发中心向外逐渐由细密变清晰，一至两天后，在容器内整个“关东地区”便呈现出清晰的“铁路网”。

虽然黏菌每次形成的网络并不相同，但研究人员发现这些网络有着共同的特点：经常用的管道会越来越发达，而不用的管道会逐渐消失；最终网络的总长度达到尽可能短；确保在某处中断时有其他路径可以绕行。

研究人员还利用黏菌不喜光的特性，用光照射模拟一些在实际铁道施工困难的地方，结果黏菌都形成了最为经济的网络。实验中还出现过与现实的关东地区铁路网基本相同的网络。

研究人员分析认为，黏菌网络在总长度、运输效率、应对事故能力等方面，都可与实际的铁路网相匹敌甚至做得更优秀。研究人员希望，在需要考虑成本和风险等复杂因素的城际铁路网络、通信网络等基础设施的规划设计中，黏菌的这种网络建设能力能发挥作用。

上述研究成果已发表在 1 月 22 日出版的美国《科学》杂志上。（来源：新华网 刘赞）

海洋细菌具有“阿凡达”般的生物感应能力

据英国《新科学家》杂志报道，在科幻电影《阿凡达》中，生活在潘朵拉星球上的纳威人能够将自己的神经束与该星球上生物圈所有生命元素进行连通，其中包括磷光植物和像翼龙一样的鸟类。目前，科学家最新研究显示，地球上也具有像《阿凡达》电影中类似的互连感应生态系统，一种生活在海底泥泞沉积物中吞食硫磺的细菌就具备特殊的生物感应能力。

一些研究人员认为海底沉积层中的细菌通过微生物纳米线形成的网络进行连接，这些精细的蛋白质细丝携带电子来回摆动，使得细菌群落成为一个超有机体（一群相互依赖、共同行为成为一个单位的有机体，如群居昆虫）。目前，丹麦奥尔胡斯大学的彼得·尼尔森和他的研究小组发现支持这一颇具争议理论的有力证据。

尼尔森说：“这项发现非常吸引人！它违背了我们迄今所掌握的知识。这些微生物可以远距离彼此生活在电子共生系统中。之前我们所理解的生命应当长得什么样，它们能够做什么，什么无法做，以上一切的状况目前都必须换个思维进行考虑。”

许多海洋细菌通过氧化硫化氢气体可以产生能量，这种现象在海洋沉积层较普遍。为了实现这一点，生活在海底的微生物需要使用海水中的氧气，在硫化物被分解时便于携带电子。

尼尔森和研究小组成员在奥尔胡斯地区附近的海底采集了具富细菌的沉积层样本，在实验室他们首次在海水中移除并置换了沉积层样本上的氧气。令研究人员惊奇的是，在再次引入氧气扩散至沉积层样本之前，他们测量发现样本表面几厘米深度的细菌释放的硫化氢气体已开始分解。相关论文发表于《自然》杂志。

尼尔森相信细菌之间的传导蛋白质细丝网络起到了重要作用，这种传导网络可以实现远程氧化反应，在沉积层样本中缺氧深层的细菌通过蛋白质细丝传导电子，将信息通讯传递至样本表面富含氧气的沉积层样本中，这样沉积层样本表面富含氧气区域的细菌可释放氧气。尼尔森称这一过程是“电子共生现象”。

其他证据也支持这一理论，多年来，地质化学专家就知悉海床中的细菌可产生微弱的电流，这一过程可用于建造微生物燃料电池。尼尔森说：“然而研究人员都聚焦于细菌如何产生电流，他们却忽略了细菌如何产生微弱的电流。”

美国加利福尼亚州圣地亚哥克雷格·文特尔协会生物地质化学家尤瑞·戈比说：“这是一项非常让人兴奋的研究结果！”他指出尼尔森的研究很大程度地暗示电子共生系统存在的可能性。

与电影《阿凡达》中的科幻情节相比，尼尔森称，我们并未发现该细菌通讯网络中有更高级的信息沟通交流。

在智利发生地震约 8 小时后，美国卫星照片显示智利首都上空出现的黑烟。

北京时间 3 月 2 日消息，据美国宇航局官网报道，2010 年 2 月 27 日智利发生了 8.8 级强震。强震发生后，智利首都圣地亚哥城区上空迷漫着一层薄雾和黑烟。美国宇航局“Terra”卫星上的中分辨率成像光谱仪于国际标准时间 2 月 27 日 14 时 25 分(北京时间 2 月 27 日 22 时 25 分)捕捉到这一画面。

在图片中，城市的北部地区上空漂浮着一层黑烟，而南部地区上空则迷漫着一层浅色的薄雾，也有可能是污染或是尘埃，薄雾充满了峡谷。第二幅图拍摄于 2 月 23 日，显示的是万里无云的圣地亚哥和周边地区。

随手拿起一张白纸，我们会发现，它的表面很光滑，光线照射在上面，甚至会反射出光泽。好，现在，让我们拿起放大镜，再次观察这张白纸，我们会发现，这张白纸的表面其实并不那样光滑，它是凹凸不平的。

如果我们的放大镜质量上乘，放大倍数很高，我们甚至可以看到，纸其实是有许多木质纤维组成，这并不奇怪，纸就是木材被加工后得到的。

再放大一些怎么样？从这张白纸上撕下很小很小一片，放到显微镜下观察，我们会发现这张纸竟然漏洞百出。请不要责怪造纸厂，所有的纸通过显微镜观察，都是这副模样。如果我们的放大镜倍数够高，我们甚至能看见在纸上散步的细菌。

假如仪器允许我们看得更细，我们还能看到什么？纸也好，纸上的细菌也罢，都是由原子构成的。原子依然可以划分为更小的物质，只要我们的仪器能让我们看清楚。

可是，如果我们把仪器对准原子和原子间的空隙，也就是我们通常所说的空间，我们能看到什么呢？如果可能，把我们的仪器对准时间，我们又可以看见什么？

时空破碎

如果我们把无比精密的显微镜对准原子和原子之间的空隙，我们将看到，空间是由一块一块的小空间组成的，同样我们把仪器对准时间去观察，将发现时间也不是连贯的，它也是一段一段拼合成的。

不必惊讶，这就是关于是空的新理论-----圈量子引力理论告诉我们的。这个理论预言，我们周围空间并不是无限可分的，它是离散的，有最小的组成体积，空间不会比这个体积更小了。

打个比方，用杯子盛满水，倾斜杯子，使水缓慢流出，肉眼告诉我们，水连续的流淌着。这好比我们从前理解的连续的空间。把杯子里的水用绿豆代替，是豆子洒出来，我们看到一粒粒豆子从杯中滚出来，这好比新理论告诉我们的空间，空间不是连续的，而是一粒粒的。

这些小“绿豆”即空间的最小单元，它的体积和表面可以用一个非常小的量来度量，即普朗克长度。普朗克长度非常小：10^{-33} 厘米；因此，空间的可能的最小面积，大约是普朗克长度的平方 10^{-66} 平方厘米。桶里，空间可能的最小体积大约是普朗克长度的立方，也就是 10^{-99} 立方厘米。

这一粒组成空间的“绿豆”是如此的渺小，在 1 立方厘米的空间中，含有 1099 个小“绿豆”要知道，我们宇宙的体积是 1 立方厘米的 10 85 倍

在圈量子引力理论中，时间同样不是一条连续的长河，而是如时钟般，每“滴嗒”一次，就大约是一个普朗克时间：10^{-43} 秒。说得更准确一些，在我们的宇宙中，时间就是以数不清的滴嗒声来流动的；时间滴嗒滴嗒地跳过普朗克时间（1043 个最小时间）我们的手表刚好走过一秒。

这个稀奇古怪的理论是如何建立的呢？

理论溯源

整个 20 世纪，物理学中最恢弘的战斗发生在广义相对论和量子力学之间。广义相对论在大的空间尺度、大的质量环境下体现出了它的正确性；而在微观世界中，量子效应却非常明显，量子力学更为适用。让物理学这两个王国统一在一起是物理学家的梦想。目前物理学界比较流行的弦论就是一个试图圆梦的理论，认为世间万物都是由微小的弦构成的，弦的震动产生了自然界中不同的粒子。弦其实存在于 10 维空间里，但是有 6 个维度是紧紧蜷缩起来的，所以我们平时只能感受到 3 维的空间和 1 维的时间，其它的维度无法感知。

弦论的解释让一些科学家心存疑惑，迄今为止，科学家从实验室中无法观测那些所谓蜷缩的维度，而根据弦论预言的大量新的基本粒子以及各种力也并没有被观测到。于是，一些新锐科学家“揭竿而起”，向弦论发起了挑战，圈量子理论诞生了。

1980 年代中期，加拿大的 李·斯莫林、美国的 奥博亥·阿虚卡和泰德·杰克布森、法国的 卡罗·罗维林 等一干科学家发现，此前的理论中，都假设空间几何是连续的和光滑的。回顾一下科学史，我们知道，在发现原子之前，人们认为物质都是连续和光滑的，而事实上，原子与原子剑存在空隙。那么，空间是不是连续的呢？而假如空间不连续，那么过去的一些物理学理论的根基都动摇了。

沿着这个思路，几位科学家开始了全新的理论探索。他们没有固守空间是光滑连续的观念，面对广义相对论和量子力学中的一些理论假设，凡是没有被实验检验的，他们都认为是不可靠的，把这些假设抛弃掉，只保留了那些经过证实的结论。在此基础上，利用自创的数学语言，几位科学家通过计算发现，时空自身是量子化的，或者说，是离散而非连续。他们于是建立了圈量子理论，“圈”这个名词表示划分时空时要引入微小的圈的概念。

圈量子理论认为，时空时有极小的圈组成的，圈与圈之间的相互作用，形成了所谓的自旋网络，形状好似洗衣服时产生的大堆肥皂泡。在这些网络“泡沫”的交汇的接点和彼此的边界上，携带者具有面积和体积的独立单元。这些独立的单元其实就是我们所说的粒子和场。自旋网络的泡沫堆可以非常大，没有上限，内部的结构也可以十分复杂。因此，整个宇宙就可以看成一个包括了无数结点、边界的自旋网络，无比巨大、无比复杂。

古怪世界

庄子是我国古代一位伟大的思想家，在他的著作《庄子》有这样一句话：“一尺之棰，日取其半，万世不竭。”一尺长的木棍，每天取木棍剩余的长度的一半，永远也不会用完。千百年来，人们认为这是真理。

可是，当人们跨入了圈量子的世界后，对不起了，庄子，不会有“万世不竭”其实用不了多少时间那根棍子就被取光了。

让我们简单计算一下假设一根木棍 1 米长，每天用一半则得方程

（1/2）x 米=（1/10）36 米，∴x=116。只要 116 天，木棍就会取尽。根本不到四个月

量子效应使空间和时间丧失了连续性，“无限分割”也就只是理想的蓝图。

因果乱麻

不论是牛顿还是爱因斯坦的物理世界，都存在着清晰的因果结构。他们的理论告诉我们，时空的本质是因果结构，物质具有严重的因果关系，比如物体加速是因为受到了非平衡的外力。

古希腊的哲学家芝诺曾经提出一个“飞矢不动”的饽论：离弦的箭在空中飞行，他在任何瞬间都是非静止有非运动的。这个“矛盾”的观点如何得出的？如果瞬间是不可分的，箭就是静止的，因为箭是运动的话那么瞬间就必然可分。但是时间是由瞬间组成的，如果建在任何瞬间都是静止的，则箭永远保持静止，应该停在空中。

既然如此，正如圈量子论的最小的时间所说的那样，最小的时间是不可分的。

希望能在 100 年后，科学家能让我们“看到”破碎的时空，就像 100 年前的人们梦想看到原子一样！

李白“故里”在甘肃秦安(转帖)

雷 达

提起李白故里，没有人不认为它在四川江油。每年那里都举行李白国际文化节，大打旅游文化牌，那座城市无处不流荡着李白气息。现在，李白故里在江油的观点似已为海内外广泛接受，新版《简明大不列颠全书》《中国大百科全书》有关李白条目，都明确表述李白是“四川江油人”。新版教科书《中国历史》也说：“李白，字太白，彰明人”(彰明即四川江油)。

据赵亚辉博客提供，《人民日报》2002 年 8 月 10 日曾有一文披露一重要细节，说 1982 年，江油很意外地收到了邓小平托女儿送来的亲笔题词，只四个字：“李白故里”。还说，邓小平写这几个字之前，和郭沫若有过一次谈话。这个故事的前半段绝对真实，因为这四个字刻成的碑就矗立在江油；后半部所谓与郭长谈后才写的这几个字，谈过没有，何时谈的，却无法证实，因为郭在几年前就去世了。我认为，领导人题词是对历史人文古迹的倡扬和尊重，也是对主流看法的一种首肯，但是并不一定具有学术上的终极裁定权，尤其是面对复杂的历史疑案。例如现在就有这种情况，一位领导人在此地题了“羲皇故里”，另一领导人却在彼地题了“羲皇故都”，各题各的，并不奇怪。但不管怎样，小平题词是真真切切的存在，它还是大大增加了李白故里属于江油的权威性。一切都表明，李白故里在四川江油是铁板钉钉，任何人似乎都不应该有怀疑。

然而，意外的情况还是发生了。去年 8 月，湖北安陆在中央电视台国际频道播出了以“李白故里、银杏之乡、湖北安陆欢迎您”为题的宣传片，立即有《江油遭受“李白故里”危机，央视四套是帮凶》之类帖子出来，江油网友开始在网上严重声讨湖北安陆的“侵权”行为，旋即江油市委和安陆市政府也卷入此事，各自在力争“李白故里”的归属权，不可开交。当时大家都觉得湖北安陆怕要倒霉了，要被推上被告席了，结果却出乎意料。9 月 15 日，国家工商行政管理总局给湖北省工商局发文的批复却是：“安陆市作为李白曾长期居住地，被称作‘李白故里’具有合理之处。这是对客观事实的正常叙述和说明，属于《商标法实施条例》第四十九条规定的正当使用行为。”是啊，“酒隐安陆，蹉跎十年”，李白在安陆娶妻生子，一度还是他周游天下的根据地，留守处，安陆要宣传，似也未可厚非。但这一下矛盾更激化了，后来还是江油占了上风。

对于这场官司我无话可说。我倒是觉得，由这一事件暴露出现今对“故里”一语的使用充满了歧义和含混，同时还暴露了长期以来掩盖的另一重大隐情，那就是真正的李白故里到底在哪里？除了江油和安陆二地之外，还有没有更有理由称为李白故里的地方？在这个问题上，有没有用现代人的强势话语不顾古人的陈述，不顾基本的历史资料的情况？江、安之争很像是大家在争抢一件宝贝，两个最有可能争到宝贝的人争得尤其厉害，其实，他们都忽视了宝贝真正的主人的意见及其感受。这里，问题的关键是，到底什么叫故里？它是指一个人的出生地，抑或生活过较长时间的地方，还是原籍，祖籍，家乡？到底该选择其中的哪一样？

前不久，一向较真的上海《咬文嚼字》杂志经考证后有文章指出，目前地方宣传中经常误用的词是“故里”，一些地方常常以号称某名人“故里”来吸引游客，理由是这名人曾在当地居住过。其实，“故里”专指其人的故乡，家乡，原籍，祖祖辈辈生活过的地方。他的祖辈如果没有在此地生活过，他本人生活的时间再久也是不能叫“故里”的。文章还举例说，蒋介石曾长期居住在台湾，但有谁会称台湾为“蒋介石故里”呢？蒋故里还是浙江奉化溪口。“长期居住的地方”未必是“故里”，而“出生地”也未必是“故里”。比如一位外国孕妇，在上海旅游时生了孩子，难道上海就是这个孩子的“故里”？还说，他长期住过的地方应该叫“故地”，所谓故地重游；他长时住过的房子应该叫“故居”，所谓某某故居；但“故地”、“故居”和“故里”完全不是一个概念。如此等等。

我对《咬文嚼字》文章的煞费苦心表示理解，但它仍然无法解决李白的故里归属问题。如果“出生地”，“生活过较长时间的地方”，“先辈生活过的地方”，全在同一个地点，那当然不成问题；要是不一致该怎么办？比如，李白出生地一般认为是中亚碎叶，和祖籍陇西成纪不一致，那哪个是故里？祖籍陇西成纪和生活过较长时间的四川江油又不一致，那哪个是故里？

江淹的《别赋》云：“视乔木兮故里，决北梁兮永辞。”这可能是故里一词的最早出现。事实上，现在要给“故里”下一个无懈可击的定语不大可能，故里是一种约定俗成的观念，如果不钻牛角尖，并不难取得共识，它是对“根”的追寻和肯定。一个人，尤其一个古人，对自己故里的认定——尽管他不一定用这个词，最有发言权的只能是他自己。李白真正的、惟一的、被史书早就无数遍肯定下来的“故里”，只能是陇西成纪（现今甘肃天水秦安县，秦属陇西郡，汉属天水郡）。

必须看到，我们在寻找李白的故里，事实上李白也在寻求着他的故里；这两个寻求如果重合，自然无话可讲；如果出现了两个故里，那应该肯定哪一个呢？这就好像一个人说他的父母是谁，我们不信，偏要另外指认他的父母一样。在我们，也许认为李白故里是四川江油；但对李白而言，他的故里毫无疑问是陇西成纪。这是他一再强调的，而且口气坚定，毫不含糊。我们在确定李白故里时，究竟是认同历史上李白本人的认定，还是撇开李白，不听他的，坚持我们认为的四川江油呢？在确定李白故里的问题上，要不要尊重李白个人的意见？如果李白再明白不过地表示了对自己祖籍的确认，我们由于理解的原因，由于利益的原因，由于现代人的自以为是，硬是不承认，视而不见，充耳不闻，这样做对吗？

还是让我们看看李白自己怎么说的。李白诗文中有三篇非常明确地陈述了他的家世。《与韩荆州书》说：“白陇西布衣，流落楚汉。”《赠张相镐二首》其二云：“家本陇西人，先为汉边将。功略盖天地，名飞青云上。苦战竟不侯，当年颇惆怅。”《上安州裴长史书》说：“白本家金陵，世为右姓，遭沮渠蒙逊之难，奔流咸秦。因官寓家，少长江汉。”这后一条里，“本家金陵”与“本家陇西” 似乎矛盾，其实此处“金陵”所指乃是西凉“建康郡”，即指今甘肃兰州一带。考之史料，《晋书·武昭王李玄盛传》有如是记载：“武昭王讳日高,字玄盛。隆安四年(400 年),为群雄所奉,遂起霸图,号凉公,于敦煌、酒泉坐定千里。其子李歆继立,攻沮渠蒙逊,败死。弟恂继立,沮渠破敦煌,恂死,国亡。”这就是发生在宋少帝景平元年(423 年)的“沮渠蒙逊之难”事件。“本家金陵”已为研究界澄清了。总之，李白自认陇西成纪人，再清楚不过。李白还喜欢自称“羲皇人”，所谓“学道三十年，自言羲皇人。轩盖宛若梦，云松长相亲。”“清风北窗小，自谓羲皇人。”“羲皇”就是被史家尊为“三皇”之首的伏羲，传说生于陇西成纪。我们再来看看公认的权威性的文献怎么说。李阳冰《草堂集序》，魏颢《李翰林集序》和范传正《唐左拾遗翰林学士李公新墓碑》都是李白在世时或去世不久时的人留下的文字，史料价值极为珍贵，它们无不证明李白生前所述“家本陇西人”,即陇西成纪人是真实可靠的。李阳冰《草堂集序》云：“李白，字太白，陇西成纪人，凉武昭王九世孙。蝉联圭组,世为显著。中叶非罪,谪居条支,易姓与名”。魏颢《李翰林集序》云：“白本陇西，乃放形，因家于绵。身既生蜀，则江山英秀。”李白死后五十年，范伦之子范传正《唐左拾遗翰林学士李公新墓碑》云：“公名白，字太白，其先陇西成纪人。绝嗣之家,难求谱牒。公之孙女搜于箱箧中,得公之亡子伯禽手疏十数行,纸坏字缺,不能详备。约而计之,凉武昭王九代孙也。隋末多难,一房被窜于碎叶,流离散落,隐姓易名。故自国朝已来,编于属籍。神龙初,潜还广汉,因侨为郡人”云云。

说来可叹，唐代宗宝应元年（762）十一月，李白一病不起，他在病榻上将自己的诗文草稿交给其从叔，刚刚任满的当涂县令李阳冰编辑，后李阳冰将其诗文辑成《草堂集》十卷，并为之作《序》，这就是著名的《草堂集序》。阳冰在《序》中说他“临当挂冠，公又疾亟，草稿万卷，手集未修，枕上授简，俾予为序”。其中，“枕上授简”一语何其悲凉！试问，枕上确定的“李白，字太白，陇西成纪人”一语是什么意思，难道还不足以说明李白的故里何在吗？

是否尊重李白个人意见，是李白研究中的一个突出问题。郭沫若写于文革时期的《李白与杜甫》，受当时目空一切的时风影响，不断指斥李白“不外是以势利眼光在看人说话”，“看来是李白本人或其先人所捏造，目的就是抬高自己的门第”等等，现在已被诸多研究家的考据证明，李白并没有说假话。李白家世研究中目前还

有许多悬而未决的问题，如李白到底出生在哪里，是否出生在江油青莲？如李白究竟是李广的、还是一向讳言的李陵的多少代孙？如李白五岁到四川，到底是从哪里到的四川?从碎叶到江油天水秦安作为丝绸之路是必经之地，当时陇西成纪的地理条件不比江油差，逃难而归的李客何以不在必经之地的故里停留呢？谁能肯定李客李白就没在秦安停留过生活过？天水南郭寺卧佛殿院中舍利塔顶原嵌一小石碣，上镌李白五言律诗一首："自此风尘远，山高月夜寒。东泉澄澈底，西塔顶连天。佛座灯常灿，禅房香半燃。老僧三五众，古柏几千年。"此诗不为任何诗集所载，李白是否到过天水？还有，李白醉草赫蛮书被考证确有其事，那他是在哪里学的蕃文？不管怎样，李白作为陇西成纪人，却始终如一。

事实上，结论已很清楚，李白故里在甘肃秦安。至于四川江油，正如许多学者已经指出的，它只能是李白的第二故里。

Rural Besiege the City for China Science

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Keywords: China; science; rural; city

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弦膜圈说回采反冲力辐射原理

---读蒋秀夫专著《粒子波动论》

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摘要：即使有人批评“讲的完全不得要领”、“干点靠谱的事情”， 笔者也要把受到的思维训练讲出来：如果蒋秀夫先生粒子波动论的微观反冲力作用原理能够成立，且与霍金的宇宙辐射原理、郭光灿的超光速辐射原理是等价的，那么这三者结合，把蒋秀夫的反冲力作用原理称为蒋秀夫反冲力辐射原理（简称反冲力辐射），那么也许就能够用反冲力辐射弦膜圈说，回采超对称理论超伴粒子之谜、全息对称解信息丢失之谜、宇宙是自旋的极问之谜等开拓。[Academia Arena, 2010;2(8):61-78] (ISSN 1553-992X).

关键词：反冲力辐射 弦膜圈说 全息对称

一、从霍金辐射到蒋秀夫反冲力辐射说

众所周知，反冲力运动属于一种宏观现象。例如春节孩子们放爆竹,，有一种叫“地老鼠”或“起花”的爆竹，当火药急剧燃烧，生成的气体以很大速度从爆竹筒下端喷出时，爆竹筒本身就向上升起。根据中学物理学的知识，我们知道，反冲力作用原理与动量守恒定律相关。当一个物体把它的一部分物体推离自己，则它本身也会受到被推离物体反方向的推力作用，这通常叫做反冲力；与被推离开运动相反的方向运动的现象，就叫做反冲运动。比如，火箭，喷气式飞机，都以反冲力作为动力，气体从火箭里高速喷出，火箭被反冲运动。反冲运动和碰撞、爆炸有相似之处，相互作用力常为变力，且一般都都满足内力大于外力，所以反冲运动可用动量守恒定律来处理。其次，在反冲运动的问题中，有时遇到的速度，是相作用的两物体间的相对速度，这时应将相对速度转化成对地的速度后，再列动量守恒的方程。在反冲运动中还常遇到变质量物体的运动，如火箭在运动过程中，随着燃料的消耗，火箭本身的质量不断在减小，此时必须取火箭本身和在相互作用时的整个过程来进行研究。

蒋秀夫的专著《粒子波动论》称，旋涡体是组成粒子的基本形状。蒋秀夫先生论述的是，把反冲力作用原理运用到量子场论等微观现象。蒋秀夫先生说：“如何看待相对论和量子力学？怎样以人们能够理解的方式论证洛仑兹变换方程和薛定谔方程？本书提出反冲力作用原理，对统一场论问题进行了描述；对粒子波动现象的研究结果，导致了一个全新的量子理论。新理论用分析力学和研究方法。导出了与牛顿力学、相对论和量子力学全部调和的理论公式”。蒋秀夫先生工作的单位在西安，是西北水电设计院的高级工程师，现已退休。笔者至今不认识他，只知在上世纪 80 年代初，他在《潜科学杂志》发表过“涡旋论”的简述文章，所以笔者多年前曾在评论陈叔瑄先生《物性论》书里的涡旋解释时，提到过蒋先生也有涡旋论；并说，从涡旋起源，探讨圈态三旋----面旋、线旋、体旋，是值得欢迎的。

2010 年 1 月中旬，蒋秀夫先生突然打电话给笔者，说他要把专著《粒子波动论》寄来，当时笔者正在研读郭光灿院士和高山著述的《爱因斯坦的幽灵----量子纠缠之谜》一书。笔者立马在电话中回话说，他的反冲力作用原理也许是和霍金的宇宙辐射原理、郭光灿的超光速辐射原理是等价的。当月底，笔者收到蒋秀夫先生寄来的《粒子波动论》专著。当认真读完全书，现在笔者的这种认识，不但没有改动，而且更加强烈。笔者的意思是，即使有人批评“讲的完全不得要领”、“干点靠谱的事情”， 笔者也要把受到的思维训练讲出来：如果蒋秀夫先生粒子波动论的微观反冲力作用原理能够成立，且与霍金的宇宙辐射原理、郭光灿的超光速辐射原理是等价的，那么这三者结合，把蒋秀夫的反冲力作

用原理称为蒋秀夫反冲力辐射原理（简称反冲力辐射），那么也许就能够用反冲力辐射弦膜圈说，回采超对称理论超伴粒子之谜、全息对称解信息丢失之谜、宇宙是自旋的极问之谜等开拓。下面是笔者基于在《粒子波动论》一书的解答。

蒋秀夫对反冲力辐射的一些经典的想法是，例如：

1、106 页上说：在牛顿力学和相对论力学所构成的理论框架中，通常是把物体的运动绝对地划分为均匀运动和非均匀运动来研究的。一般认为在真空中物体的均匀惯性运动是一种理想的毫无阻力的运动。然而，这种僵死质点在形式上的运动，是不能揭示运动在时间与空间中绝对不均匀的矛盾性质的。均匀运动是在对立面的斗争中达到相对均匀的。反冲力作用的波动力学原理指出：一切粒子的运动都是在特定的、真实环境的参考系中进行的。可见蒋秀夫说的反冲力辐射，是从一种普遍原理讲的，是弥补牛顿力学和相对论力学需要匀速运动参考系的不足引进的。

2、130 页上说：运动的带电球体是在反冲抛射物质中获得加速度的。带电球体外抛物质相对惯性系瞬时合成速度的最大值是 C+V，最小是 C-V，它们共同制约着球体的运动状态，按几何平均值原则，应该以（C+V）（C-V）的均方根的几何平均值描述球体受洛仑兹力的尺度。这是蒋秀夫巧妙地把洛仑兹变换和狭义相对论的数学，变换结合进牛顿力学的高招。

3、156 页上说：在磁场中垂直于磁力线放置的载流导线，由于电力线沿正电流或自由电子运动方向平移，致使侵入导线两侧物质的数量不同。依据反冲力作用原理，按左手定则来判定载流导线受安培力的方向。在通电导线周围，电力线沿正电流或自由电子运动方向平移，使只有按一定自旋取向的“磁微子”才能停留在导线周围形成涡旋磁场。而具有不同的自旋取向的“磁微子”不是沿电力线“爬动”侵入导线，就是离开导线，形成电磁场的自感和互感。这是蒋秀夫对反冲力辐射的一处经典运用。

4、155 页上说：如果我们把两个自旋相反电子所组成的光量子用电磁场描述，那么电磁场图象就可以用交替变化的电力线和磁力线所组成的横波振动电磁场描述出来。就是说，粒子与空间同是电磁场的负载者。这是蒋秀夫对反冲力辐射圈套圈奇妙的耦合、交变的运用；因为两个自旋相反的电子对的运动，在数学图像上等价于一个圈图。这种圈图电力线的反冲力辐射，变换为磁力线圈图；反之，圈图磁力线的反冲力辐射，又变换为电力线圈图。这种结耦与解耦同时共存共消的圈图，即使各自有三种自旋---面旋、体旋、线旋，也不会受影响。

5、17 页上说：反冲力作用原理是把物体看作是一个具有活力、新陈代谢的存在物，它初步揭示了时间与空间与运动物体场源发生相互作用，由排斥运动转化为吸引运动的真实性质。这可以看作是蒋秀夫对他的反冲力作用原理的总结。那么蒋秀夫、霍金、郭光灿之间，到底有什么不呢？

6、霍金说的黑洞辐射，是说黑洞外部附近的量子真空起伏，造成的一个粒子及其反粒子构成的成对粒子，在彼此湮灭并最终双双消失前，如果可以在非常短暂时间内在真空区自然出现，这是在连续性“点外空间”的一种负实数或者虚数的相对论一次量子化。如果这种成对粒子在黑洞边缘附近形成，其中的粒子在被摧毁前可能掉入黑洞，那么这个粒子的反粒子则被搁浅在事件视界之外而从黑洞临近向无穷逃逸。这也被称为“霍金辐射”。这里可见霍金辐射有两个特点：A、必须是临近黑洞或“点内空间”的有“界限”环境。B、必须是负实数或者虚数的物质量子起伏，即虚粒子变化。所以霍金辐射是相对于有界，以及虚数说的。而反观蒋秀夫说的反冲力辐射，就是相对于点外空间和实粒子说的；这里也许是无“界限”和实数物质空间环境。

7、郭光灿说的超光速辐射，是说以单光子的双缝实验为例，当光子波函数到达感光屏后，测量将导致光子波函数不再遍及整个感光屏，而是随机坍缩到感光屏上一个极小的空间区域中。实际上，光子被感光屏上处于此区域的原子吸收了，并进一步导致大量临近原子的一种不可逆过程，这最终产生感光屏上的一个永久记录。这种非连续运动联系量子隐形传输的超光速量子纠缠，郭光灿还说与“双贝尔实验”使爱因斯坦相

对性原理的失效相连。即超光速辐射类似相对论的二次量子化。因为光子被感光屏上处于此区域的原子吸收了，如果被看成类似量子落入“霍金黑洞”，那么它是分成两个过程演化的。一是，如果我们把从量子叠加到检测屏上退相干的决定性结果的湮灭粒子，进一步导致大量临近原子的一种不可逆过程，看成类似黑洞边缘附近形成的量子真空起伏，造成由一个粒子及其反粒子构成的成对粒子，在最终产生感光屏上的一个永久记录前其中的粒子可能掉入“点内空间”，它的反粒子则被搁浅在“点外空间”，由于它也是虚数粒子，所以这个“点外空间”相对它来说，也是“点内空间”。这里由于留下的正虚数粒子受到真正“点内空间”另一侧正虚数粒子的排斥，而发生类似退相干“霍金辐射”的郭光灿超光速辐射。如果这是 EPR 量子幽灵发生的量子移物隐形传输的图像，那么另一方面退相干湮灭的是实际的粒子，对整个实际的实验粒子和“点外空间”来说，这也类似“点外空间”狄拉克量子海洋，落入检测屏中的湮灭粒子走了，自然在狄拉克“点外空间”量子海洋一侧膜面搁浅留下一个“空洞”。如果设落入检测屏中的湮灭粒子为负虚数粒子，那么在狄拉克“点外空间”量子海洋一侧膜面留下的那一个“空洞”也类似一个实数，被分为正、负两个实数粒子。“空洞”这个负实数粒子的突然收缩消失，会进一步导致大量临近量子的一种不可逆的动力过程，造成相对论时空允许的超光速辐射，这是又一种补充的相对论一次量子化图像。这里可见郭光灿辐射也有两个特点：A、必须是间断或非连续运动的空间环境。B、既有实数物质空间被分为正、负两个实数粒子量子起伏的相对论一次量子化图像，也有虚数物质空间被分为正、负两个虚数粒子量子起伏的相对论二次量子化图像。而反观蒋秀夫说的反冲力辐射，也许是连续运动的空间环境，以及也许只有一种类似实数物质空间被分为正、负两个实数粒子量子起伏的相对论一次量子化图像。

其实，如果把蒋秀夫的反冲力作用原理与霍金的宇宙辐射、郭光灿的超光速辐射接上轨，一齐看作是与量子起伏、不确定性原理、零点能涨落等性质相同的一种辐射，也许还可以把我国很多类似“以太论”、“质变论”、“速变论”等挥之不去的物理创新，作统一变换的数学处理。这也用不着去妖魔化当代前沿弦膜圈说。

二、反冲力辐射与超对称理论超伴粒子之谜

例如我国有人说，所谓“宇宙大爆炸”和“对称性破缺”的谬论甚嚣尘上，这实际上是当今科学向欧洲中世纪“愚昧时代”倒退；当今的科学理论已经发展到头，它再也不能像 20 世纪那样为科技和生产力的蓬勃发展提供宽广的理论平台。其实，这话不是全部事实。实际情况是，以实力强国重视工程实践，走成功科技道路的捷径，国家经济繁荣，科技成果不少；走原创科学道路的探索，基础理论冒尖，高新产品会众多。可见这两者都相得益彰，其秘密在于它们都重视操作的回采。其分歧在于，21 世纪的前沿科学正在迈入宇宙极问时代，比如最近 20 多年来，中外科学家一直在合作建造模拟宇宙初期状态的以寻找宇宙最基本粒子的加速器。如此而已的例子要理解的是，人工第一次达到如此巨大的能量，这是一个艰深的专业问题，也许只能留待专业人士加以解决；其次这类项目耗资巨大，一个国家无法独立完成，往往采取多国合作的方式。即各国做加速器实验虽然众多，但像做世界大型强子对撞机实验的只有一个，也只能建一个。这让无数的科学爱好者、创新者，陷入交换信息、读书的境地。反之，他们没有实验、结构信息的枷锁，说话放炮自然不非气力。

如果说霍金辐射、郭光灿辐射，说了也等于白说----因为霍金追随的弦膜圈说看似也不着边际，但以色列科学家用霍金辐射对物理学回采，制造出了第一例真正意义上的“声学黑洞”，即已经探测到具有“霍金辐射”性质的“声子”；郭光灿了解一些弦膜圈说，虽然他追随的超光速辐射重在对工程实践的回采，但已能应用到国家的量子通信上。要知，虚超光速辐射早是印度物理学家森，最先开拓弦膜圈说的一个成果。蒋秀

夫也了解一些弦膜圈说，反冲力辐射说就比弦膜圈说更具有说服力吗？其实在实验检验的平台上说，蒋秀夫辐射比霍金辐射、郭光灿辐射具有更多的缺环。霍金辐射和郭光灿辐射，只是存在界面和间断的特殊情况，这种例子相对发生的少，且辐射的物质多为虚数物质，所以即使说了等于白说，也有回旋的功能。但蒋秀夫辐射不同，它辐射的物质多为连续实数物质，其类似说的“磁微子”能测知吗？且蒋秀夫把反冲力辐射从微观物体扩大到宏观物体，这些物体反冲力辐射的粒子能测知吗？所以真正意义上，反冲力辐射更多的是一种量子信息描述，霍金辐射、郭光灿辐射也如此，弦膜圈说更是如此。我国一些不喜欢弦膜圈说的人，喜欢把弦膜圈说推给西方，说只是西方科学家的创造，这是一场最大的误解。

易经是我国古代的弦膜圈说，它的阴阳符号图象的表达，都是一些短的弦线的编码，这难道不是广义物质辐射的一种量子信息的描述？又如国学自然发轫的“一尺之捶，日取其半，万是没竭”，其“捶”类似一根弦杆。弦杆可以产生振动波，但更重要的是两端受力，既可以使出推力，即斥力，也可以使出拉力，即引力。但如果把弦杆变换为弦线，虽然也可以产生振动波，然而斥力和引力的对称破缺了，即弦线只可以使出拉力或引力，不能使出推力或斥力。这驳斥了有人滥用相反相成，认为有引力必然有斥力，这不唯物辩证法。因为有引力没斥力的对称破缺，和有引力和斥力相互对称，两者都存在，才是唯物辩证法；这些也才是国学自然弦膜圈说发轫比类取象的精髓。

易经思维不仅起源于中国农耕文明，而且涉及更早的远古盆塞海山寨城邦文明和海洋文明。那时中国古人尚处于原始阶段，仰观俯察，近取诸身，远取诸物，居住无定，流动觅食，以及遇到的如水旋涡、火旋涡、风旋涡等自然灾害、天文、气象、疾病问题，这些给中国古人思维留下的印记，便是从运动观察运动，以动把握动，以动把握静。如《周易》爻辞：“无平不陂，无往不复”；说辞“日往则月来，月往则日来”；“寒往则暑来，暑往则寒来”等“循环迭至”、“循环无端”，循环不是简单一往一复的理解，这终将会悟一个“旋”的理论。这种“旋”， 这类环转、出入、上下循环，正是国学自然弦膜圈说三旋运动的综合形式。马克思说：“我们不是到犹太人的宗教里去寻找犹太人的秘密，而是到现实的犹太人里去寻找犹太教的秘密。”这话启迪我们，仅仅依靠反复琢磨咀嚼前人对易学思维那些玄虚的注解，是难以找到国学自然弦膜圈说发轫的真谛的。例如“民以食为先”，吃饭、消化、排泄，生产，再进食，是一种循环，包含新陈代谢，那么口与肛门相通，人的活体也是一个圈态。弦膜圈说回采国学自然，人这种圈态的反冲力辐射----吃饭、消化、排泄，生产，再进食的人类宏观新陈代谢循环，难道没有类似微观粒子生命自旋辐射的缩影？

中国本土人民在旧社会经历的压迫、剥削等苦难，发轫到 20 世纪初迎来了“民以革命为先”， 造就了新社会。但“民以革命为先”发展到 20 世纪中叶大跃进，遇到的特大自然灾害，再次唤起与回归“民以食为先”的以人为本的交融，使国学自然的现代弦膜圈说，有了唯物辩证法的新图像：“一尺之捶，日取其半，万是没竭” 发轫比类取象的国学自然弦膜圈说，是既有物质无限可分的层子弦膜圈说，也有了环圈三旋的量子信息编码的描述方法。可以说，这后者的物理学的数学公式，也有类似量子信息编码的描述方法。例如，设旋转围绕的轴线或圆心，分别称转轴或转点，现给予定义：

（1）自旋：在转轴或转点两边存在同时对称的动点，且轨迹是重叠的圆圈并能同时组织起旋转面的旋转。如地球的自转和地球的磁场北极出南极进的磁力线转动。

（2）自转：在转轴或转点的两边可以有或没有同时对称的动点，但其轨迹都不是同时重叠的圆圈也不能同时组织起旋转面的旋转。如转轴偏离沿垂线的地陀螺或廻转仪，一端或中点不动，另一端或两端作圆圈运动的进动，以及吊着的物体一端不动，另一端连同整体作圆锥面转动。

（3）转动：可以有或没有转轴或转点，没有同时存在对称的动点，也不能同时组织起旋转面，但动点轨迹是封闭的曲线的旋转。如地球绕太阳作公转运动。

根据上述自旋的定义，类似圈态的客体我们定义为类圈体，那么类圈体应存在三种自旋，现给予定义：

（1）面旋：指类圈体绕垂直于圈面中心的轴线作旋转。如车轮绕轴的旋转。

（2）体旋：指类圈体绕圈面内的轴线作旋转。如拨浪鼓绕手柄的旋转。

（3）线旋：指类圈体绕圈体内中心圈线作旋转。如地球磁场北极出南极进的磁力线转动。线旋一般不常见，如固体的表面肉眼不能看见分子、原子、电子等微轻粒子的运动。其次，线旋还要分平凡线旋和不平凡线旋。不平凡线旋是指绕线旋轴圈至少存在一个环绕数的涡线旋转，如墨比乌斯体或墨比乌斯带形状。同时不平凡线旋还要分左斜、右斜。因此不平凡线旋和平凡线旋又统称不分明自旋。反之，面旋和体旋称为分明自旋。这样看来，涡旋仅是自旋中的线旋或线旋与面旋的组合；而一般说的旋转运动，如果是自旋，主要也指的是面旋或体旋。分明自旋和不分明自旋统称三旋，即面旋、体旋、线旋合称三旋。普朗克的量子论，爱因斯坦的相对论，使得物体的刚性概念在微观和高速的情况下，变得不够明确，已为三旋进入这些领域提供了立足之地。

由于我国弦膜圈说正是有坚实的历史基础，所以回采蒋秀夫的反冲力辐射，能测知、解答反冲力辐射粒子的疑难。这正如有古人云：“众里寻他千百度，蓦然回首，那人却在灯火阑珊处”；“踏破铁鞋无觅处，得来全不费功夫”。

1、安德鲁·华生《量子夸克》一书，提供如费米实验室等的碰撞实验，产生的粒子衰变或喷注现象的大量实验事实和理论，就联系对蒋秀夫反冲力辐射抛离物质和侵入物质的说明。可以说，被抛离的物质和侵入的物质就类似书中说的“海夸克”，而能发生反冲力辐射的涡旋体物质，就类似“价夸克”，或称“组分夸克”。其实，弦膜圈说的弦、膜、圈，就类似价夸克或组分夸克，因为它们已经预设多出 0 维或 1 维的“价量”或“组分”。相反，能量、声子、玻色子等理论的点粒子描述，就类似“海夸克”，它们本质是 0 维的，配上时间维度 1 才有了长度、速度的形象。再其次，也类似物质的质量与能量的匹配，质量类似“价夸克”或“组分夸克”，而能量类似“海夸克”。

2、蒋秀夫的反冲力辐射说，把物质的面旋、体旋运动和平移或偏离运动统一起来，要借助涡旋体从中心到边缘，或从内到外的线旋运动，这必然需要能量守恒的说明。这就需要超导或超流类似的微观超导或超流机制，这正是弦膜圈说的对偶性、超对称理论的优势。因为弦膜圈说的非弹性实验证明，价夸克或组分夸克是属于费米子，海夸克的“海模型”是属于玻色子。如果理论上，把海夸克认定为是价夸克的超对称粒子“超夸克”，把实验证明的正、负电子湮灭衰变生成的光量子或海夸克，认定为是电子的超对称粒子“超电子”，在数学方程上，也是和超对称理论设想等价的。如罗向前教授及三旋理论的基本粒子质量谱和胶球质量计算，其类似格点哈密顿形式解析方法也有结果；类似模拟海夸克对强子质量谱和矩阵元的

影响研究如被应用，那么当今的科学理论发展，会比 20 世纪为科技和生产力的蓬勃发展提供更宽广的实验平台。

3、什么是超对称理论呢？超对称是时空对称性如平移和洛仑兹转动的扩展。西方超对称的研究起源于 20 世纪 70 年代初期；引入弦模型，后来演化成超弦理论，开弦才提出闭圈，这是两类分开的带有超对称色彩的简单数学模型。在超对称理论中，每一种基本粒子都有一种被称为超对称伙伴的粒子与之匹配。；。如每种费米子都应有一种玻色子搭档，反之亦然。超对称自提出到现在已经 30 多年了，在实验上却始终未能观测到任何一种已知粒子的超对称伙伴，甚至于连确凿的间接证据也没能找到，为什么？这不是自然界的错或实验的错，而是物质、能量的点粒子理论描述的错。当然我们知道点粒子模型，费米子无论怎样转，也转不出玻色子；玻色子也转不出费米子等超对称伙伴。但是如果明白点粒子和弦膜圈有一种图像对偶性，那么，三旋圈态图像的超对称自旋的量子信息编码，可将这两类粒子联系起来。

4、超对称的魅力源泉之一，在于玻色子与费米子在物理性质上的互补，这种互补性可以被巧妙地用来解决高能物理中如标准模型的著名等级能标之间存在高达十几个数量级的差别；另一个美妙的性质是普通量子场论中大量的发散结果，在超对称理论中可以被超对称伙伴的贡献所消去，因而具有十分优越的重整化性质。其次，也给宇宙学常数问题及微观超导或超流机制的解决----超对称在什么能量上破缺带来希望。如玻色子的零点能是正的，而费米子的零点能却是负的；玻色子与费米子的参数及自由度数都是严格对称的，因此两者的零点能将严格互消。再其次，没有实验依据的超伙伴粒子，有许多对称性破缺的机制可以协调，这类似弦杆在低能，引力和斥力也对称存在；但弦线在高能，也对称破缺不存在斥力。质量与能量的这类精彩匹配，既有对称线性释放的质量大，配置的能量也大；也有非线性对偶质量分割小了，配置能量反而用得大。这后者也为类似的“海夸克”反冲力辐射说，提供了数量上的保证。

5、在弦论的最基本层次上，基本粒子被视为振动的弦而非点粒子。一段弦可以有许多谐振模式，不同的基本粒子就被诠释为这些不同的谐振模式。但长期以来，物理学运用的是点状或球状模型，这也没有错，因为那时的实验测量取得的数据，转换为数学量子信息编码描述就如此。而现在联系高能加速器、对撞机之类的实验监测记录，获得的是基本粒子的能谱峰值图曲线，转换为数学量子信息编码描述，也许就是弦状、膜状、圈状的波线起伏图像，而不全是点状或球状模型。

那么解读最基本粒子的形态图像，到底是像什么呢？我们说，描述最基本粒子的弦膜圈说形态，就类似我国古代智力玩具九连环套图像。因为在加速器实验中，我们看到的基本粒子，既然只能是用能谱峰值图曲线来表达和分辨的，而这正与国学自然的弦膜圈说九连环套（N≥3）模型的计算图象相合。简单地说，九连环套是个有“圈”环、有“膜”板、有“弦”杆结合的，能表达和分辨圈态结耦、解耦的典型模型，并且这种圈群的组装也具有分形的自相似性质。这里如果把九连环套用的 N 数（N≥3）来表达各种基本粒子，看成类似它们的圈态群落。它们的圈子组装就象九连环套一样，可以不被破坏地结耦和解耦，这样可以类比九连环套中的密码数学：用 1 表示环在圈上，用 0 表示环从圈上脱下来，一个 N 数（N≥3）连环套，可以用 N 位二进制数码的序列来表示它的解耦和结耦的每步信息，而一个 N 连环套结耦或解码密码无错的最少步数表达的基本粒子，这实际构成一组密码研究的各式各样的数列。把 Un 步圈群结耦或解耦构成的 N 位二进制数列，换成十进制数列，再去作图：用横坐标表示结耦或解耦先后序数步数（类似时间轴），纵坐标表示结耦或解耦二进制密码变换成十进制的数码作图（类似能量轴），连此数码的点，将会出现一条象起伏不平的山脉一样的曲线。这里的横坐标代表时间序列，而纵坐标呈现的能谱起伏曲线，正好反映的是各种基本粒子里面圈群结耦或解耦运动编码的实际情况，即能量、物质、信息迁移的情况。

所以利用这种能谱峰值曲线图，可以近似地掌握各种基本粒子里圈态结耦、解耦特征的反应情况，从而

能从特殊的峰值上了解到是否出现了新的粒子，或何种已知的粒子？反之，九连环套弦膜圈说回采反冲力辐射的超导或超流式流程循环的守恒，以及组分或价位的是与非，也容易理解。其次，九连环套虽是个有圈有膜有弦的结合，但整体也可以简并看成是一个点粒子或球粒子。即复杂可以因角度需要变简单；简单可以因角度需要变复杂。而且九连环套的弦膜圈结构和分形意义，还可以把电磁场与电磁相互作用看成类似九连环套模型，其电力线、磁力线就类似九连环套的弦线、圈线。甚至还可以把弱相互作用加进来，九连环套运行中的弦圈自然脱耦，类似弱相互作用的自然衰变放射性。进一步还可以把强相互作用、引力相互作用加进来，即四种相互作用力都可以统一在类似九连环套模型的分形演变与操作上。

6、如此看来，反冲力辐射说还提出了一个如何看待物质的结构信息的量子信息编码，物质的交换信息的量子信息编码，到物理的数学描述的量子信息编码的实在论问题。也许 L·斯莫林的《物理学的困惑》书中 252 页，提供了一种启示，和形象的解读。斯莫林说，17 世纪初，笛卡尔和伽利略做出了最奇异的发现：你可以画一张图，用一个轴做空间，另一个轴做时间。于是，穿过空间的运动成为图上的一条曲线。即在时间中展开的过程，被表现为以另一维代表时间的图中的一条曲线。也许这时的数学信息编码还说明不了什么，我们换成牛顿时的数学信息编码：如结构信息是一列火车，在水平面一条笔直的铁轨上行驶，一次是做匀速运动，另一次是做匀加速运动。交换信息是，要口头描述火车在铁轨上行驶的运动图像和速度过程图像。物理的数学描述是，要能保证又能区别它们的实在。现在牛顿也画一张图，用横轴做时间，竖轴做速度。于是，匀速运动火车在图上是一条水平直线，而匀加速运动火车在图上是开口向上的半边抛物线，这显然和铁轨上行驶的运动图像不一致。难道这错了吗？不是，正确的物理数学量子信息编码，可以和结构信息的量子信息编码图像一致，也可以不一致，但本质都是实在的。同理，弦膜圈说是属于物理数学的一种量子信息编码，它和真实的结构信息图像可以一致，也可以不一致，但本质都是实在一致的描述。例如，麦克斯韦弦膜圈说回采安培的电子如微小电流环，法拉第的磁场如磁力线圈线等形象思维，麦克斯韦把它们升级变换为著名的电磁场数学方程，从数学方程推论，麦克斯韦预言存在电磁波，这是麦克斯韦认识到数学描述和真实结构的一致，但当时并没有发现电磁波，所以数学的推论暂时成为隐秩序。但后来事实证明电磁波确实存在，这就是物理数学描述的生产力意义。

7、同理，量子弦膜圈说的物理数学描述也类似一种隐秩序，也许连同反冲力辐射、暗物质、暗能量思维一起，可成为现代版的隐秩序景观。甚至隐秩序难题，也许还能说明暗物质。据斯莫林的《物理学的困惑》书中论述，隐秩序是一种老思想，起源于 20 世纪 20 年代德布罗意提出的隐变量理论。因冯诺伊曼认为隐变量理论不可能存在，1932 年这个错误证明的发表，压制了隐变量的发展。到 20 世纪 50 年代，玻姆发现冯诺伊曼的错误，才复活了德布罗意的理论。但隐秩序真正关键定理的进步，是 20 世纪 60 年代贝尔的一个不等式方程对实验的推进。今天瓦伦提尼对隐变量理论已研究数十年，已成量子理论基础领域头面人物的科学家，斯莫林说他还在写隐变量的书，而且硕果累累。斯莫林评论瓦伦提尼对隐变量理论做的新的重要修正，“是那个理论在几十年来的第一次进步”。

然而对暗物质、暗能量类似隐秩序研究的忽略，是费曼和少数科学家很早就意识到，也许能以隐秩序量子现象为基础，制造量子计算机。而量子计算机的进步是可以破解现有的任何密码，那么量子现象的物理数学描述，是否可以不用类似微积分的数学分析方程，而用密码学类似的物理数学描述呢？1959 年大跃进遇到的特大自然灾害，“民以食为先” 吃饭、消化、排泄、生产、再进食循环比类取象发轫的国学自然弦膜圈说，引导了把隐变量理论修正为环圈自旋的量子信息编码的三旋数学描述。圈态图像超对称自旋的量子信息编码方法，在完成了“三旋规范夸克立方周期全表”和“三旋规范物质族基本粒子质量谱规律计算表”后，推论存在类似暗物质、暗能量隐秩序的预言。

论证的简化是：既然是用编码的数学方法，编码有避错码就有冗余码。三旋理论对量子色动力学粒子的编码，根据类似哈热瑞模型和帕堤模型的删除方法，得出的夸克立方周期表中的对照结果，可称为“合格码”，它们仅占 62 种自旋态编码中极少一部分。即从环量子三旋规范夸克立方周期全表计算合格码和冗余码共约 162 个量子编码，合格码约占 24 个，剩下的百分之 85 是冗余码。这种按广义泡利不相容原理及夸克的味与声的避错选择原则，如果定义物质为宇宙量子避错码，即把合格码对应四维时空中的物质，那么冗余码存放在哪里的呢？也许暗物质就为宇宙量子冗余码，是类似“冷”放一边的“物质”，仅向外释放很少的能量，而且它仅对于引力做出响应。

如果环量子自旋编码能说明暗物质，那么把三旋图像引入数轴，也许还能解答宇宙快速膨胀源于点内空间，即含有暗能量。论证的简化是：在任何一处数轴的点，用弦膜圈说的线旋图像，可揭示存在点内空间类似的隐秩序，再结合国学自然“点内无内，点外无外”的宇宙描述，负引力类似来源于点内空间。

三、反冲力辐射与全息对称解信息丢失之谜

斯莫林在《物理学的困惑》书中说，暗物质、暗能量是 20 世纪末物理学上最重要的发现。而暗物质、暗能量联系蒋秀夫的反冲力辐射说，也是解决反冲辐射需要更多物质和能量缺环的路子。况且，蒋秀夫的《粒子波动论》一书虽然只有 186 页，却涉及到经典力学、热力学和统计力学、电动力学、量子力学等四大力学很多重要的公式、常数和计算，不管它是精致还是简略，它是把反冲力辐射作为一种大统一科学理论来做的。当代各种大统一科学理论，总的可以分为两种类型：形状入手和性质入手。弦论、膜论、圈论等，属于形状类型；而且庞加莱猜想定理证明，不可能有比弦、膜、圈更简易的几何图像。非对易几何、扭量理论、标度相对论、关系量子论、随机动力学、全息原理等，属于性质类型。三旋理论虽然说的是性质，但它是以圈论作时空背景，所以属于前者。蒋秀夫的反冲力辐射说虽然以球状、点状作基础，但它主要是取抛离和侵入的性质说事，所以属于后者。

这里我们不想评论《粒子波动论》书中大量公式及其推导的正误，只想说，为什么反冲力辐射说具有那么多的统一性？对比例子是黑洞研究。据斯莫林说，黑洞的火红其一是，原先科学家们是想认识量子理论对引力波的影响，后来问题变成，反过来看引力对量子现象有什么影响？即研究量子粒子在引力作用下的时空运动，这就第一个成功地预言了黑洞和膨胀的宇宙。这类计算引入黑洞视界、黑洞熵、黑洞温度、黑洞辐射、黑洞收缩、黑洞信息丢失、极端黑洞、黑洞与膜、黑洞与额外维等问题，使黑洞研究非常精彩。这是将量子论放入类似“点内空间”的方法。其二是反过来，克兰、特胡夫特等科学家认为，量子理论不是一个系统的静态描述，发生在我们常想象为空间的某个区域里的每个事件，都可以表示为发生在包围那个空间的曲面上。这就是特胡夫特提出的所谓“全息原理”。正是从这里，我们看到蒋秀夫的反冲力辐射说，提供了解决黑洞信息丢失等重大疑难问题的很多遐想。

1、不管惠勒、彭罗斯、霍金、贝肯斯坦、马尔德西纳、克兰、特胡夫特等研究黑洞多么成功，他们研究的范围，都没有超过黑洞内和黑洞边界。相对蒋秀夫来说，他们研究的类似“点内空间的反冲力辐射版”。反过来，蒋秀夫研究的类似“点外空间的全息原理版”。而且蒋秀夫的反冲力辐射，是真正含有合适“全息照相”，类似的空间相干性和时间相干性的连续“光源”---这就是“辐射”，如果和激光性质

类似，那么物质的信息，就会大量保存在“点外空间”的各种面上或膜上。正如克兰所说，将宇宙一分为二的每一种方式，都联系着一个量子力学描述。这些量子态不是存在于这个或那个区域，而是存在于它们之间的边界。克兰所指的是信息或量子信息。这也许就是霍金辐射和蒋秀夫辐射的结合地带，他们把宇宙一分为二成点内空间和点外空间两个区域。

2、把信息或量子信息描述，引进点外空间，也许更能自圆其说蒋秀夫的反冲力辐射说。众所周知，宏观世界里的人和动物的运动，并没有看到有什么反冲力辐射的东西。但如果把人和动物的运动，看成是受信息或量子信息“反冲力辐射”的驱使，信息是有形又是无形的，自然也还是说得过去。

3、不说信息“辐射”，就说物体的先验图像与经验图像，也是分成质和能两部分的。物体的质能匹配类似分为五个层次：A、原子；B、原子核；C、质子和中子；E、夸克；F、弦。能量和质量的匹配在这五个层次变得很复杂和多样；在原子层次以下的粒子，它的质量和能量的匹配情况大致是：原子系统的总质量是 10 乘 11 次方 eV，组元的动能是 10 乘 3.5 次方 eV；原子核系统的总质量是 10 乘 11 次方 eV，组元的动能是 10 乘 7 次方 eV；质子系统的总质量是 10 乘 10 次方 eV，组元的动能是 10 乘 10 次方 eV；夸克或轻子系统的总质量是 10 乘 10 次方 eV，组元的动能是 10 乘 15 次方 eV。所以在微观不说辐射“质量”粒子，就是辐射“能量”粒子，反冲力辐射也是很可观的。那么“能量”算不算粒子？斯莫林说，能量的图像是类似金属的振动和声波。声波在金属内传播的速度也是。量子力学中波粒对偶，意思是每个波都伴随着一个粒子。反过来也是对的：每个粒子都伴随着一个波，包括在金属内传播的声波的粒子，它叫声子。声子不是基本粒子，当然也不是构成金属的粒子，但声子仍然还是粒子。它具有粒子的一切性质，它的行为和量子力学规定的任何粒子应有的行为是一样的。即声子或能量粒子既像海夸克的多，又像激光的波。

4、所谓全息原理或全息照相，这是伽伯早在 1948 年的发现，由于没有合适的光源难以实现。到上世纪 60 年代出现的激光，具有很好的空间相干性和时间相干性，提供了一个理想的光源。因为全息照相和普通照相原理完全不同。全息照相在记录物光的相位和强度分布时，利用了光的干涉：引进一束与物光相干的参考光，使这两束光在感光底片处发生干涉叠加，感光底片将与物光有关的振幅和位相分别以干涉条纹的反差和条纹的间隔形式记录下来，经过适当的处理，便得到一张全息照片。所以全息图不是别的，正是参考光波和物光波干涉图样的记录。反过来全息照片的物光波前的再现，是利用光波的衍射，用一束参考光照射在全息图上，就好像在一块复杂光栅上发生衍射，在衍射光波中将包含有原来的物光波，因此当观察者迎着物光波方向观察时，便可看到物体的再现像。

5、再说黑洞信息丢失，所谓信息不丢失，是说信息守恒。分歧在于信息守恒，是指类似点内和点外这两者的对等？还是指类似点内和点外这两者各自相等？黑洞信息丢失疑难的产生，是 1974 年至 1976 年霍金研究黑洞外的量子力学，发现黑洞不仅能够吸收黑洞外的物质，而且能以热辐射的形式向外“吐出”物质。这种量子力学辐射现象，被称为霍金蒸发或霍金辐射。根据霍金的蒸发理论，黑洞在向外蒸发物质的同时，温度也随之升高。这样黑洞不断地向外蒸发物质，它的温度越来越高，蒸发越来越快，最后将以大爆炸的形式向外吐出所有的物质而结束它的生命。因为黑洞向外蒸发物质是热辐射过程，人们无法从被辐射出来的物质中提取形成黑洞物质的任何信息。最后黑洞也不见了，在黑洞的形成和相继的蒸发过程中，信息也丢失了。

但信息丢失与量子力学告诉的任何物理演化过程应该满足因果律：信息是守恒的，即与信息不可丢失相矛盾。所以大多数物理学家不承认霍金的观点，相信在黑洞的形成和相继的蒸发过程中信息是不丢失的。他们的观点在 20 世纪 90 年代中期，引力的全息原理被发现后得到了加强。1993 年特胡夫特提出引力具有全息性质，1994 年萨斯金德进一步发展了这一观点。引力的全息原理是说一个引力体系（如黑洞）能被量子场论所描述；而在量子场论中演化是应满足因果律的，信息是不丢失的，因此与它等价的引力理论也应该是满足因果关系的，信息是不丢失的。但引力全息原理和超弦理论一样，并没有把破解黑洞信息丢失之谜说清楚。

6、2004 年霍金在都柏林第 17 次广义相对论研讨会上宣布，他解决了困扰已久的黑洞信息“丢失”之谜，这是通过用欧几里得路径积分方法研究了拓扑平凡的路径（不包含黑洞）和拓扑不平凡的路径（包含黑洞）后，发现黑洞演化是满足因果律的，信息是不丢失的。1976 年霍金又提出与这种分析方法不一样的基于马尔德西纳最新的黑洞与膜、弦规范对偶描述的研究，认为假如经过很长的时间段，黑洞完全蒸发时，量子物理学最基本属性的幺正性和信息都能被令人满意地保存在中间阶段，那时黑洞仍在蒸发，将出现信息丢失的情况。但是这一分析，没有说明被令人满意地保存的“信息”，是物体落入黑洞视界之前的“信息”，还是落入黑洞视界之内到“点内空间”之前的“信息”，或是消失在黑洞视界之内的“点内空间”之后的“信息”。2009 年中科院武汉物数所博士研究生张保成、蔡庆宇副研究员、访问教授尤力博士以及詹明生研究员合作，也提出一种黑洞信息丢失之迷的解决方案。他们认为对于黑洞隧穿谱而言，以前的物理学家认为辐射之间不存在关联，即不论初态是什么，都将确定地演化为热态。热态意味着辐射之间不存在关联，而且整个辐射过程中伴随着熵增。但他们在黑洞辐射作为隧穿的图像下，利用统计力学和量子信息的基本理论，使用标准的统计力学方法，证明黑洞隧穿辐射过程，是辐射之间存在关联，证明辐射之间的关联可以携带信息，黑洞辐射整个过程中熵严格守恒。

7、以上解决黑洞信息丢失之迷的说法也许过于高深，也使人迷糊。而用蒋秀夫的反冲力辐射说，却很明白：反冲辐射说类似全息照相术，发生在黑洞区域之外或之前的每个事件的信息记录，因为有反冲辐射的类似激光效应，都可以保存在黑洞区域之外确定的表面或边界上。反之，在发生在黑洞区域之内或之前也成立。它们记录的是宇宙的一个子系统通过相互作用可以获得的关于其他子系统的信息，即类似点内和点外信息守恒，两者各自相等，信息不会丢失。那么，霍金在认识黑洞信息丢失上面，有没有错呢？错是有的，例如他还分不清楚黑洞外与“视界”到“点内空间”类似实数和虚数的不对易。即黑洞吞噬的一切，一旦进入“点内空间”就成了“虚数”信息。这个逻辑可类比人的一生，生和死应是一个整体，死亡只类似进入的是一种虚实生死界、正负阴阳界。把活人类比复数，是偏重实数的；生前死后类比复数，是偏重虚数的。所以，人们无法从被辐射出来的物质中提取形成黑洞物质的任何信息，是自然的。道理类似，谁见过宗教、巫师编撰死人在“阴间”的“神话”、“鬼话”，在现实社会上是可以随处验证的？

所以霍金的信息丢失理论，是与 20 世纪两大物理学成就量子力学和爱因斯坦的广义相对论不矛盾，是等价的。量子力学告诉人们，任何物理演化过程，在实数空间（或“四维空间”）和虚数空间（或“点内空间”），各自分别满足各自的因果律和信息守恒的，各自信息的性质是不可“丢失”的。这正类似科学和宗教在现实社会上，并不产生矛盾，因为科学的真话、假话，还是等于科学的真话、假话，信息是守恒的；宗教的“神话”、“鬼话”，还是等于宗教的“神话”、“鬼话”，信息也是守恒的。

四、反冲力辐射与宇宙是自旋的极问之谜

将“膜”面比作纸，用一张正方形的纸片做一个风灯车风筝，解说蒋秀夫的粒子波动论的微观反冲力作用原理的实物模型就类似有了。风筝风灯车的做法是，沿着正方形纸片的两条对角线，从每个顶角向中心剪开三分之二的长度，然后按顺时针或反时针次序，把半个顶角的纸片卷起来，让纸角尖在中心上面重叠粘贴住，再在上下两个中心点钻好孔，穿在一根细长棍的一端，并使纸片风灯车风筝能够在轴上转动，和不会上下移动。这种纸风灯车风筝是弦、膜、圈的结合，水平或垂直运动能转动；固定下来，有风或气流经过，也能转动。由于顶角纸片卷曲的顺序不同，旋转的方向也可左、右两种旋转。

《粒子波动论》一书开篇就说：宇宙中在各个阶梯，各个层次上不同规模的旋涡体是组成粒子的基本形态。旋涡体类似太阳系的扁平状天体，它的黄道面是旋涡体与外界进行物质交换最活跃的平面。作旋涡运动的物质微粒，当它们切线速度大于逃离轨道速度时即被抛出。这里旋涡体外抛的高速运动质点，是由旋涡体内物质内能释放条件下产生的，这其中包括化学反应和其它“核”反应等。旋涡体不断与周围环境发生物质交换，当侵入旋涡体物质相对加强时，由于旋涡体内能释放而抛离物质的质量亏损造成的反冲，使旋涡体沿指向侵入物质相对加强的方向作偏离运动。

以上，是蒋秀夫开篇就把旋转与平移统一起来的论述，并且也许还是暗示平移起源于旋转抛离或吸入物质微粒的不对称，或对称破缺。这是对陈叔瑄先生的《物性论》一书的发展。但旋涡体抛射物质的反冲“吸引”运动，仅仅是只产生与黄道面垂直方向上的与周围环境发生物质交换的线旋或涡旋吗？它是否也许还是旋涡体自旋或我们叫面旋的起源因素呢？蒋秀夫全书始终回避这个问题。但从《粒子波动论》一书 129 页、130 页、132 页的无自转带电球体在磁场中运动受洛仑兹力作用、同向自转带电球体在磁场中运动受洛仑兹力作用、“反向自转”带电球体在磁场中运动受洛仑兹力作用等三组图示可看出，在带电球体的切面上除了有沿电力线方向平移的运动外，还有圆周各处的电力线，从与过圆切面的轴线的平行延伸，到完全与过圆切面的轴线成一个夹角的方向的延伸，这是与风灯车风筝的叶片，向左或向右向偏斜相似，所以无自转带电球体在磁场中运动受洛仑兹力作用、同向自转带电球体在磁场中运动受洛仑兹力作用、“反向自转”带电球体在磁场中运动受洛仑兹力作用等三组图示，活生生像个简易风灯车风筝的示意图。

1、为什么我们一直要纠缠这种自旋的起源呢？因为这个问题是与背景相关？还是与背景独立？一直没有认真的解答。日本物理学家汤川秀树认为，宏观物体不存在自旋，它们的旋转运动都需要外力，外力停止，旋转也会停止。所以只有微观物体，自旋才可能成为内禀性质。即汤川秀树也没有说明自旋的起源。美国麻省理工大学的物理学家维克多·威斯考伯认为，万物为什么都要旋转？因为万物旋转的可能比不旋转的可能大，所以万物要旋转。也有人认为，固体可以在一定条件下转化为流体，而流体的涡旋运动是来自物质结构的不均。而杨振宁教授提出的一个猜想是：自旋是一种“结构”。但自旋到底像个什么结构？杨振宁也没说。

弦论走到了庞加莱猜想，已证明弦论、膜论、圈论等形状类型的统一科学，是可以结合在一起的。进一步可以证明弦膜圈说，是背景独立的理论。众所周知，宇宙间从已知的最小物质夸克到最大物质星体都在旋转，因此可以说，整个宇宙都处于旋转之中。此外，自然界中还可以普遍观察到流体的涡旋运动，而宇宙中 99%以上的物质是流体，可见涡旋运动在整个物质世界中也占着重要的位置。一般固体的旋转与流体的涡旋不同，但也有共性，把它们结合在一起可以问：为什么万物都要旋转？一个简单的证明，是自旋必需有两个界面的运动条件，弦膜圈说把宇宙分为点内空间和点外空间，已构成有两个界面的运动条件。

其次，能量守恒、动量守恒提供了量子起伏、量子涨落、不确定性原理、超导、超流等事实，为自旋准备了物质基础，就差一个反冲力辐射原理了。

2、但反冲力辐射原理还是个背景相关的理论。所以蒋秀夫一直回避这个问题；但《粒子波动论》全书却始终从电子、原子等实际现成的物理现象出发，结合抽象的反冲力现象推证现成的物理公式和常数，这是很有意思的。蒋秀夫不谈自旋，只谈反冲，这涉及电子、原子等物质结构，必然要分“组分”粒子和非“组分”粒子。即产生反冲结构的粒子是有“个数”可数的，而被组分旋转粒子抛射的物质，其微粒的“个数”是可不数的。蒋秀夫从反冲结构的组分“个数”能转移到热力学和统计力学的联系上，这是对张学文先生的《组成论》一书的发展。《粒子波动论》全书最后集中到的二氧化硅单晶面过程图，这也是很有意思的，但蒋秀夫没有说明为什么类似二氧化硅单晶面六边形会与三条弦线有关？这里，蒋秀夫有难言之隐，首先微观电子的自旋物理图像，和宏观物体的自旋图像是不同的。也许泡利把这看成了“隐秩序”，而失掉对电子自旋发现的首创权。研究这段微观物质自旋发现史，是很有价值的，因为这是论证宇宙自旋的一个基础。

3、获得 1945 年诺贝尔奖的泡利，其失误不是太保守，而是太激进。泡利对自旋的反感，不情愿地接受，深层次的原因是，电子自旋，的确不能用经典动力学的球体模型来描述，而急于把经典力学从新物理学中清除出去；对经典力学的警惕几乎成了他的下意识，因此他才把电子自旋概念称为“新的异端”。在物理学基本图景上，泡利有自己的观点。他认为要研究微观现象，就必须与宏观的经典理论一刀两断。他说需要用明确定义的电子轨道和力学模型来当作拐棍的人，是衰弱的；物质粒子自旋二值性困难纯属量子特性，引入经典力学的概念无济于事，不管这概念有多么精巧；相对论式的双重线公式毫无疑问地表明，不仅是经典理论中的力这一动力学概念，而且还有运动这一运动学概念，都必须经历深刻的修订；任何概念都有某种图像这种观点，即使部分地是一种合情合理的要求，这种要求也还是不能在物理学中，被当成一种保持固定的概念体系的论据，因为一旦概念体系被弄清楚，新的概念体系也是会有图画性的。

有人说，科学的发展既有“革命”，也有“改良”，何况“革命”也有多种形式，谁能否认旧瓶装新酒不是一种革命呢？在扑朔迷离的电子自旋假说非常时期，对比年长的爱因斯坦、玻尔、埃伦费斯特等人，虽然也清楚经典理论与量子理论的深刻差别，但他们也许比年轻的泡利更讲求持平折中一些。而泡利对自旋电子图像的态度转变，是随着抽象的数学符号如 ψ，及对应于三维空间中的旋转群的数学特征函数，取代了因形象生动具体的旋转图像的局限之后，人们的观点达成了广泛的一致。其次，电子的自旋概念，是分为三个部分的：（A）很难设想球状的没有旋转角动量的电子的旋转；（B）存在一个在给定方向上的$\pm 1/2$ 角动量；（C）存在一个磁矩为 2 的角动量。泡利接受的是第二和第三部分，不接受第一部分。从弦膜圈说看来，这是对的。泡利全盘否定电子自旋在因子 2 问题解决之后，并把第一部分也作为暂时性的模型接受下来。那么泡利是否知道量子力学，已经产生了一种迥异于以往的全新的情形呢？我们认为没有。道理是，发展了的电子自旋假说不能包容经典图像。

宇宙间所有已知的粒子可以分成两组：组成宇宙中的物质粒子的自旋为 1/2；在物质粒子之间引起力的自旋的粒子为 0、1 和 2。泡利在 1925 年发现的物质粒子服从的泡利不相容原理，起因于 1922 年泡利开始研究的反常塞曼效应。1924 年泡利发现原子的角动量只能来源于外层电子，否则塞曼效应分叉的宽度，就将依赖于原子序数，而这与事实不符。泡利还提出了四个量子数的思想，并致力于四个量子数与壳层电子排列的关系问题的研究。此外，他还发现，其中一个磁量子数只能取$+1/2$ 和$-1/2$ 两个值。他不知道该量子数的物理意义，只把它归于一种特殊的、经典理论无法描述的“二值性”。泡利在 1924 年也曾指出，自旋是单

个粒子的特性，他用核自旋的假设，去解释光谱线的超精细结构的道理是，对复合核而言，可以预期存在一个非零的总角动量。他反对单个电子自旋的理由则是，当电子以可与光速相比的速度旋转时，其磁矩必然随粒子质量的相对论性增大而增大，且角动量也不会保持恒定。原子核的质量远大于电子的质量，角动量的数量级也为 h /2π，因此其旋转的表面速度远小于光速，磁矩也可恒定。但电子不会有非无限小的恒定的角动量，再加之因子 2 问题，泡利便拒绝接受电子自旋概念。也许这正好帮助泡利在 1925 年正式提出了不相容原理。

推出电子自旋假说的克勒尼希，也在下很大功夫研究反常塞曼效应和全部光谱学理论。但在量子力学产生以前，经典力学赖以讨论自旋的唯一基础的模型语言，只能被刻画为电子绕其轴旋转。1925 年当克勒尼希看到泡利表达四个量子数和不相容原理的思想，立刻想到经典力学自旋模型，可以被认为电子的内禀角动量是隐秩序。据此克勒尼希导出了相对论线性公式，并得到了双重谱线分裂的 Z 4 比值。这一结果完全符合实验数据，也与朗德半经验的相对论分裂法则相一致。但为了不与索末菲已经作出的完整解释的类氢光谱的精细结构的实验事实相矛盾，克勒尼希把希望寄托于轨道在其平面上的相对论性进动，和电子在轨道方向上的内禀磁矩的作用的相互补偿上，即各能级具有不同的轨道角动量而有相同的总角动量。原子数的四次幂比值支持了这一观点。但进一步的研究也表明，由于反常旋磁因子为 2，因此双重线分裂的计算结果，总是比实验值大一倍。尽管如此，他仍认为电子自旋隐秩序是一个令人着迷的想法，虽然还没有想到现在的圈态三旋图像。

1925 年乌伦贝克和古兹密特在其导师埃伦费斯特的支持下，也独立地引入了电子自旋的概念。他们指出：具有四个量子数的电子同时也具有四个自由度，泡利的量子数就不再局限于他原来的模型描述，分配给单独电子的四个量子数也失去了它们的原始意义。1926 年 4 月，托马斯又成功地用相对论处理了因子 2 问题，指出在把核静止而电子运动的坐标系，转换为电子静止而核运动的坐标系时，应考虑电子加速而产生的磁场，故自旋轴的进动角速度，应作相应的修正，因而其进动率应当是原来计算的一半。1927 年泡利开始把电子自旋概念纳入了矩阵力学体系。1940 年泡利又证明，引入自旋概念是出于量子场论的需要。这样，自旋成了所有粒子的基本参量。

4、其实泡利不相容原理的所谓生命，用弦膜圈说回采宇宙间分成两组自旋的所有已知的粒子发现，如要轻松自如，物质粒子必须类似三旋圈态。论证的简化是：泡利不相容原理是说，两个类似的粒子不能存在于同一个态中，即它们不能同时具有相同的位置和速度。有人说，不相容原理非常关键，是因为它解释了为何物质粒子，在自旋为 0、1 和 2 的粒子产生的力的影响下，不会坍缩成密度非常之高的状态的原因----如果物质粒子几乎在相同位置，则它们必须有不同的速度，这意味着它们不会长时间存在于同一处。如果世界创生时不相容原理不起作用，夸克将不会形成不相连的、很好定义的质子和中子，进而这些也不可能和电子形成不相连的、很好定义的原子。其实这从分离来规定自旋，而弦膜圈说也能自然说明：

联系类圈体三旋模型，对泡利不相容原理能作出更为直观的解释，这是由“圈体”所含的特殊性引起的。因为如果面旋指类圈体绕垂直于圈面的轴的旋转；体旋指类圈体绕圈面内的轴的旋转；线旋指类圈体绕圈体内中心圈线的旋转，那么精彩的是，体旋所含的多点不相容性，能对每个电子轨道圈最多只可以容纳两个自转相反电子的泡利不相容原理，给出一种新的证明。这就是如果该轨道圆圈作三旋，虽然面旋和线旋都能容纳多个电子，但作体旋，如决定一根圆圈面内的轴为转轴，排列在圆圈轨道上的所有电子作体旋而垂直转轴

的直径，会出现从小到大对称的排列，中间最大的直径只有一条，只能容纳一对运动方向相反的电子。如果保持该轨道上所有电子的体旋能量的一致性，其余的电子必然要发生分离。

但这里泡利不相容原理和弦膜圈说只能证明需要自旋、需要分离、存在自旋，不能说明自旋的起源。那么蒋秀夫的反冲力作用原理能说明自旋的起源吗？也还不能。反冲力作用原理似乎主要说明，物体向外抛射物质后会类似留下“虚空”，虚空的吸引力似乎使原物体有一个向后的坐力，即有一个向后的平移运动，这类似一种隐秩序。即反冲力辐射说能说明一种平动的起源，这种平动的起源与风灯车风筝类似的弦膜圈说结合，似乎能够说明自旋的起源和宇宙自旋的原因。甚至能说明泡利反对单个电子自旋的理由的局限，这是反冲力辐射说的最伟大之处，它解答了自旋的对偶性。即电子自旋泡利设想的或测量到的光速运动，也许只是一种显秩序的自旋----是电子反冲力辐射物质的速度，而任何隐秩序的自旋都比光速小，这经典能量守恒、动量守恒公式就能推证的。它也为自旋的起源提供了一种背景相关性，即只要弦膜圈说是背景独立的，微观单独的粒子就能产生自旋。因为一张单独的“膜”能轨形拓扑为类似风灯车风筝结构的粒子，而只要有风灯车风筝结构类似的粒子，就会像自然界中风灯车风筝一样会旋转，不管它的质心是静止还是平动。

5、也许有人会说，东北刘老根大舞台“二人转”标志性的旋转手帕的招牌动作，没有蒋秀夫的反冲力辐射现象或没有蒋秀夫的反冲力作用原理，“二人转”用的手帕也能旋转，能说明弦膜圈说的背景独立和反冲力辐射说相关吗？能！东北“二人转”标志性的旋转手帕与风灯车风筝类似，是典型的弦、膜。圈结合的课程设计模型。例如，手帕对应膜。手指、手臂或手里拿的棍子，对应弦。人是口与肛门相通，对应圈。是人体及大脑这个圈态，向手臂、手指、棍子的“信息”辐射，通过一点传给手帕，使手帕发生了旋转。这里与风灯车风筝类似的涡旋体不同，涡旋体是边缘向外“辐射”，“二人转”旋转手帕是从中心点向内“辐射”，再从边缘向外“辐射”。而且，蒋秀夫说的涡旋体有两类模型，一种类似水池里的漩涡，是从涡旋体中心的外面到中心的内部再到边缘的立体的漩涡。一种类似二氧化硅单晶面六边形的从中心到边缘的涡旋，是平面螺旋型的涡旋体组成的结构。这种平面螺旋型涡旋体，为什么多为三条螺旋线或三个中心圆圈开始螺旋组成的结构？蒋秀夫没说。但用弦膜圈说的背景独立来研究，就很自然。虽然平面螺旋型涡旋体可以是一条螺旋线的，如蜗牛背壳上的螺旋线。也可以是两条螺旋线的，如两条螺旋臂的银河系。也可以是多条螺旋线的，如平面极限环式的水旋涡、火旋涡、风旋涡产生的粒子流线。但从分形分维的自相似上说，如果弦膜圈说是背景独立的，那么唯有三条边才能组成一个三角形，唯有三个圆圈才能组成一个新圈。

这是在上世纪 80 年代初，三旋理论用弦膜圈说模型而不用球量子模型，为解释暴胀起伏模型和宇宙弦模型的矛盾发现的新思路，例如相邻的圈子只交一次，要组成一个新圈，就象组成三角形要三条边一样，至少要三个圈子。用此规则联系分形的自相似嵌套性质，取一个半径为 Rn 的大圆作源多边形和生成线，即作圆内接正三角形，再取内切于该正三角形的小圆，可在平面上画一个有自相似嵌套结构的图形。构造的规则是每一级的圆圈由三个相同的小圆圈组成。三个小圆圈的耦合相交，用它们之间的相切近似代表，并表示新一级的圈所能构成的最大内空限度。这样小圆圈的半径与前面的大圆圈的半径 Rn（n=1、2、3…）的关系，其公式有初中数学水平的人都能推算得出来。按此方法作图，如此变形下去，随着变形的进行，会发现小圆圈不但向外扩展，而且还向中心位置堆积，以及在其周围形成等级式的成团分布等重要特征。这与实际观察中的大爆炸烟云、癌细胞的生成、化学反应溶液浓度的扩散、原子里的原子核与电子云结构模型等极为相似。而且在天文观察中，从科学家发现的宇宙声波“印记”也与此相似而能得到证实。

细心研究在宇宙系统中环量子三旋的该分形得出的圈态结耦分形图，是它可变换成以一个圆内接正三角形为源多边形，和以一条 V 字形折线段为生成线的图形，折线段的每条线段长为 Rn，生成线两端的距离等于正三角形一边的长。根据分形曲线的分数维数定义和分形曲线的维数公式，能推算得出圈态结耦分形的维数值 D=1.26179 。令人惊奇的是，这个圈态结耦分形的维数值，与国内外一些天文学家研究宇宙的分形结构，实际测得的星系分布的分形维数相近。目前解释不平等的宇宙起源的有暴胀起伏模型和宇宙弦模型。而通过三旋圈态结耦分形的维数计算，证明这两种模型实际是等价的。它们都是说的同一件事情的前后两个不同侧重点。因为按照圈态结耦分形的分析，基圆的圆圈必须要有适当大尺度的半径，这正是由类似吐烟圈式的暴胀来完成的。而吐烟圈可以用有少量兰黑墨水的移液管在离开水面 2 至 3 厘米高处滴一滴较大的墨水到水中来演示，这也是一种分形的自相似嵌套结构：这滴大墨水滴在水中立即形成一个墨水线旋环，但这线旋环不久会变成几个较小的线旋环，如此这样不断分裂下去。而宇宙的相变，正是按类似墨水线旋环的方式由时空点的量子环圈来结耦、结网的。

其次，如果基圆的圆圈太小，就只能形成轻子、强子、原子核、原子、分子等一类微观粒子。正是由暴胀形成了基圆的大圆圈，宇宙弦圈结耦、结网才在一个新的基点上进行演化。三旋弦圈联络结耦的支付选择，也是一种起伏变化。因此说，暴胀起伏模型和宇宙弦模型都能用三旋圈态结耦的分形研究来综合；并且该分维图形还能具体地揭示大爆炸宇宙机制中过去未曾考察到的情况：即开始的爆炸不是象一个不断胀大的气球的表面那样爆炸，而是象吐烟圈式的爆炸，然后才象水中线旋环的奇异变化一样，所有的物质粒子才开始互相远离，即宇宙在三维方向才开始作扩张，但同时又还有物质粒子向中心区域集聚，形成明显的等级式成团结构的现象。原子有中心，太阳系有中心，银河系有中心……就是这种等级现象的明证。即三旋大爆炸宇宙的分维分析，能形象地对宇宙膨胀作出说明。

6、一张四边形的正方形的纸片能做一个风灯车风筝，一张三边形的正三角形的纸片也能做一个风灯车风筝，但没有两边形的纸片。所以从四方八面反冲力辐射自旋平稳性上说，“3”是涡旋体切面平面螺旋型的最好基数，从此开始它可以有很多条螺旋线。二氧化硅单晶面六边形的从中心到边缘的涡旋类似的这些线，可以变换对应是“弦”，也可以变换对应是粒子，是人。因为粒子，人，加上时间的一维运动，实际也可以抽象为螺旋的线，螺旋的弦。如果再加上反冲力辐射抽象，物质粒子运动隐秩序是有自旋的，人类社会运动隐秩序也是有自旋的，甚至宇宙运动隐秩序也还是有自旋的。例如，把人生儿育女类比一种辐射，死亡类比一种辐射，人类社会的自旋，出生类似涡旋体的吸入线旋，老死类似涡旋体的抛射面旋。人虽是个体，类似点粒子，但从生到死是连续几十年，如果时间的连接是类似变成的振动着的一条线。一条弦，那么把所有的人的“生” 集中在一处，抽象成类似二氧化硅单晶面六边形的中心，把所有的人的“死”集中在一处，抽象成类似二氧化硅单晶面六边形的边缘，可推论人类社会“涡旋体”由于有这两种“生”、“死”弦线反冲力“辐射”，自然是会自旋的。

但人类社会的这种自旋，相对于宇宙的自旋，才类似六边形的二氧化硅单晶面是平面螺旋型的“自旋”，而宇宙的自旋要复杂得多。首先，宇宙自旋是一种点外无外的宏观量子现象。其次，它的逻辑，是属宇宙极问时代的考虑。上世纪 40 年代，哥德尔利用爱因斯坦的相对论分析过黑洞的自旋，以后参与研究黑洞自旋的科学家也不少。2010 年还有科学家首次测定黑洞的自转速度，显示黑洞自转速度只有光速的五分之一。这否定了之前不少科学家提出大型黑洞自转速度为光速的 45%的假想。由于黑洞不发光，难以观察，此次观测为了准确测定自转速度，是通过分析红外线数据，计算出黑洞的自转速度为光速的 22%的。他们认为在自转

中，黑洞可能越转越慢，这可能是因为自转使黑洞损失部分能量。这符合蒋秀夫的反冲力辐射隐秩序自旋原则。但认真研究宇宙自旋的科学家还不多。

斯莫林说，“为工作着的宇宙学而存在的逻辑”称为拓扑斯理论。它是一种特殊逻辑，区别于我们在学校所学的标准逻辑学----普通逻辑是由直观的公设、公理，再到定理、推论组成的逻辑。拓扑斯逻辑，是为宇宙极问准备的逻辑。斯莫林说，作为一种数学表达形式，拓扑斯理论并不简单，它可能是他遇到过的最难的数学课题。为了研究宇宙学，我们需要另外一种形式逻辑，人们不能假定每个陈述非真即伪。我们现在无法分辨它是否正确，但是在未来我们或许能知道。例如在宇宙极问时代也许弦论、膜论、圈论、非对易几何、扭量理论、标度相对论、关系量子论、随机动力学、全息原理等大统一的最基本的一些理论，是多元一体。如A、弦膜圈说背景相关与背景独立，极问证明等价。B、弦膜圈说宇宙非高斯性与高斯性猜想，极问证明等价。C、终极理论的有和无，极问和“应用空间”等价。这类似盖莫夫极问苹果的外部交接证明：盖莫夫的《从一到无穷大》的书，在《把空间翻过来》一节提供的线索是，联系到数学上的两种著名的结构，如墨比乌斯带和克莱因瓶结构，设想有个苹果，被黑、白两种虫子吃出了两条弯弯曲曲盘结又互不相通的隧道，它们只有走出表面才能相通。那么宇宙我们能走出去吗？国学自然认为，宇宙是类似“点内无内，点外无外”的定义，那么联系宇宙自旋，我们能判定这种自旋的任何一类方向，也是拓扑斯逻辑锁定的。

7、论证的简化是：人类穷尽了各种数学方法去描述的事物，实际上都是在描述三旋的信息丰富多彩，但都没有将它捅破，没有将它解构。例如它既可以联系黑洞、白洞和蛀洞，又可以从宏观深入到微观。它像意识的自我，又不是自我。要观察判定它时，它既在其中又不在其中。现做一个实验：观察一个蛀洞的孔口的变化。如果蛀洞存在三旋，把它变换为类圈体，要观察蛀洞口，就要分孔口是穿入还是穿出？这主要是由线旋方向决定。又由于类圈体同时还存在面旋和体旋，这种观察就会因手征规则的不同而有极向守恒和极向对称两种变化。

如观察之前作一个约定：在一次性观察中，三旋的方向是连续的，不能有逆向性的变化。其次，观察应该有一定的客观性：观察是与意识同构的，它应在三旋之外；参与其中也应在其外。

（1）测试之一（单手在其中）：质心不动。将类圈体线旋出口对准自己，用左手或右手握住类圈体，其四指弯曲的方向指示类圈体的面旋；而大姆指垂直圈面，再上端弯曲，方向指示类圈体的体旋。以此单手规则固定于蛀洞出口一处不变，跟随类圈体作面旋和体旋，检查蛀洞出口的观察效应，发现只能看到蛀洞出口。我们称做蛀洞极向守恒律，这同处于自然现象之中的观察相关。

（2）测试之二（两手参与，一手在外）：质心不动。如果以左手或右手握住为类圈体，其四指弯曲的方向指示类圈体的面旋，固定于蛀洞出口一处跟随转动，另外以右手或左手固定其垂直向上的指向，以指示类圈体坚持在这个方位作体旋，以此双手规则不变检查蛀洞出口的观察效应，发现蛀洞进出口都能看到。我们称做蛀洞极向对称律，这同远离自然现象之外的观察相联。

以上说明：自然现象不仅同事物的本质有关，而且还同人的观察操作或同人是处于事物之中还是之外不可分。只要你愿意试做这两个实验，你会感受人类的观察是难于统一，不管是还原解构，还是整体整合，都存在不定性。所以研究宇宙自旋，从蒋秀夫的反冲力辐射隐秩序自旋原则出发，必然涉及宇宙的三旋。宇宙三旋无论在宇宙内的实际测量，还是处在宇宙外的思维假想，都会遇到手征守恒与不守恒非真即伪的拓扑斯逻辑。

读完《粒子波动论》全书，笔者一直在探讨蒋秀夫先生形成反冲力辐射隐秩序自旋假说的原因。据报道，美国科学家已首次成功地将人眼可见的物体置于量子状态，让它处于动和不动的叠加状态。这和反冲力辐射隐秩序自旋假说有没有关系呢？该实验是，用了一个约 30 微米长的细小的木桨（“量子鼓”），当该木桨以一定的频率运动时会震动。接着，给这个木桨通上了遵守量子力学法则的超导电路，随后将整个系统冷却，让系统处于量子基态。处于基态的木桨没有任何振动能。接着，通过同样的超导电路，给木桨一个推动力，随后，观察到该木桨以一个特定的能量摆动。接下来，将量子电路置于“推动”和“不推”的叠加状态，并且将它同木桨联通，通过一系列非常精细的测试，证明木桨同时处在振动和不振动的叠加状态。众所周知，反冲力辐射是一种置于“推动”和“后退”叠加状态的宏观现象隐秩序。令人吃惊的是，美国科学家的研究结论这不正好表明，适用于宏观物体反冲力辐射“推动”和“不推”的叠加状态是联系着量子力学法则的，蒋秀夫先生已经把在日常生活中观察到的宏观量子现象推导到处于量子状态。

蒋秀夫先生是从我国东北走出来的科学家，以后数十年在我国西北和南方的水利电力工程建设工地和设计院工作。也许从东北田间走入城市的“二人转”标志性的顶手帕、抛手帕的旋转，到西北沙尘暴和黄河、长江可见的风旋涡、水旋涡，为蒋秀夫辐射插上了灵感，让它与霍金辐射、郭光灿辐射一起飞翔。

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The circle gathering momentum to the principle of radiation

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Abstract: This article describes the circle gathering momentum to the principle of radiation [Academia Arena, 2010;2(8):61-78] (ISSN 1553-992X).

Keywords: water; hydrocarbon; oil; secret

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揭秘“水变烃”或“水变油”秘密

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摘要：本文由作者将论坛文章投稿，揭秘“水变烃”或“水变油”秘密。[Academia Arena, 2010;2(8):79-83] (ISSN 1553-992X).

关键词：水；烃；油；秘密

不知中国有没有“前理学院化学系高分子教研室”这个单位？不知“前理学院化学系高分子教研室”有没有“刘延勋”这个人？不知“刘延勋”是不是网友“浩宇一舟”先生？

“浩宇一舟”先生在新华网论坛上发文说：作者见过“水变油”实验，而且参与过部分操作。重要的是，我对自己参与工作得到的样品以及经过甄别由别人提供的样品，曾用多种方法进行过测试和表征。所有测试结果都表明，王洪成与水有关的油，不论当初加多少水，最后都是不含水的混合烃。据此，我认为王洪成的“水变油”是个真实发生的过程。一个真实发生的过程，它必然是符合规律的。

对于“浩宇一舟”先生的这一说法：“所有测试结果都表明，不论当初加多少水，最后都是不含水的混合烃”---可以肯定地说，是假设的。道理是：严谷良和许驭先生，曾是 20 年前，中国媒体曾报道王洪成在常温常压下把水变成石油燃料的新闻的国家法定实验组织负责人之一，他们虽然也有类似“刘延勋”和“浩宇一舟”先生的说法，但所谓“不论加多少水，最后都是不含水的混合烃”是一个悖论---即使是真正的“油”，无限加水也不能燃烧。所以，我们当面问过严谷良和许驭先生，他们亲自测定这个所谓的“混合烃”没有？他们都回答没有，是手下人员做的。此事还涉及上海市科委老主任魏瑚同志，据陶康华教授讲，魏瑚同志 1984 年在上海市科委接待过王洪成和见过此表演。我们问陶康华教授：魏瑚同志亲自测定这个所谓的“混合烃”没有？陶康华教授回答说，也没有。

我们为什么要设定这个“检验”？是因为 1984 年，马成金先生在盐亭县科协也表演过类似实验。据马成金先生后来讲，他用的是类似氧化钾、硝基苯、苯酚、盐等材料制造的粉剂，用少量粉剂可立马让一大碗水燃烧尽。这个实验可得出有几点注意事项：

1）该实验有剧毒，一般人不能去作，也不应去作。后果自负。

2）该实验有爆炸性，一般人不能去作，也不应去作。后果自负。

3）该实验说明，水的变化，是在燃烧或爆炸等剧烈反应时，才产生的。反之，没有燃烧或爆炸等剧烈反应时，水的变化不会有巨变。以此，马成金先生当面对严谷良先生说，水不能直接变成油，即变成“混合烃”，要变，也许是在汽缸的冲程过程中，因为那里有高压、高温等反应。严谷良先生没有反驳马成金的反驳。

4）严谷良先生当面对我们说过，王洪成用过的材料中，有类似马成金用的材料。

5）严谷良和许驭先生都说过，王洪成曾是军人，曾做过军事实验的保卫工作，从中学习过东西。

6）马成金先生与王洪成不同，马成金完全是自发的。起因于 1960 年，他在中专校大炼钢铁时，开水洒落铁水槽，发生爆炸。

7）1997 年 9 月 3 日新华社报道，欧洲核子研究中心科学家提出，把制成“夸克球”放入水中，如果用

质子去轰击它，就会释放出大量的能量，可以将水加至高温汽化，驱动发动机发电。这就是“水变油”或“水变烃”未来版。

其实，“水变油”或“水变烃”也许来源于所谓类似“贫铀弹”之类的军事实验研究的副产品。所以，“水变油”或“水变烃”实验，一般人不能去作，也不应去作。后果自负。

8）所谓的“夸克球”，是根据“超对称”理论来设想的。夸克的“超对称”粒子就是“超夸克”，电子的“超对称”粒子就是“超电子”。“超夸克”、“超电子”是玻色子，可以集中在一起。如用“超夸克”加“超电子”做“夸克球”，小可到原子，大可到星球。但欧洲核子研究中心等西方科学家，都没有找到“超夸克”、“超电子”等超伴粒子。

9）其实，第三次弦膜圈说革命证明，夸克，一般指的是组分夸克，这是属于费米子。非弹性实验证明，还有“海夸克”，海夸克是属于玻色子。如果理论上，把海夸克认定为是夸克的“超对称”粒子“超夸克”，把实验证明的正、负电子湮灭生成的光量子，认定为是电子的“超对称”粒子“超电子”，在数学方程上也是和“超对称”理论设想等价的，并且可以在水变低碳的量子色动化学实验中，得到验证。1984 年马成金先生在盐亭县科协做的就是此类似实验。

10）水变低碳的量子色动化学实验的方程式类似：

8=（6+2）+1 希格斯粒子（能量）

11）“浩宇一舟”先生在新华网论坛上发文说：水真能变成油吗？这是一个高度质疑的问题。我们知道，石油的元素组成中，碳占 85%，氢占 15%。如果石油真是水变来的，必须经历以下过程：水分子中大约占 89%的氧转变成混合烃中占 85%的碳和 4%的氢，而原水分子中大约占 11%的氢被保留下来并进入混合烃的组成中。这过程涉及氧元素向碳和氢的转变，是核过程。持传统观念的人，认为这是根本不可能发生的。此前，王洪成曾在多种场合做过演示实验，见过他的实验的人，多数认为“水变油”是真的，但他们却说不出“水变油”为什么是真的道理。于是，“水变油”在中国就成了一个非共识问题。“浩宇一舟”先生说他撰写了几篇论文，其中就包括《水变烃假说》。在这个假说中，他把“水变油”过程的发生机制，概括成《水分子内氧核重排——自由基历程》。其中他建议的与氧原子有关但与裂变、聚变不同的核过程；以及后来“水变油”过程中，伴有的化学过程，是按自由基历程进行的。但这类说法等，也是不成立的。

12）低碳和低氧量子色动几何初探

地球上的碳原子和氧原子，是人类不可或缺的能源元素和生命元素。在地壳元素中，分布最多的前 9 个元素，排在首位的就是氧元素。霍金辐射和量子真空卡西米尔效应与能量量子隧道效应是同理的，也是缠结的。即卡西米尔效应也是真空量子起伏引起的。量子起伏是由不确定性原理决定的，这其中就含有能量守恒原理。卡西米尔效应中，两片平行板之间的吸引压力，是由平板之间的虚粒子的数目比正常数目减小造成的，这是卡西米尔在 1948 年提出的一项检测真空能量存在的方案。而早在上世纪 40 年代，荷兰科学家卡西米尔和奥弗比克从流行的胶体理论存在的缺陷中发现这个秘密后，就开始做起的这种“游戏”。他们给予的实验证明和解释是，真空能量以粒子的形态出现，并不断以微小的规模形成和消失。在正常情况下。真空中充满着几乎各种波长的粒子，如果使两个不带电的金属薄盘紧紧靠在一起，较长的波长就会被排除出去。接着，金属盘外的其他波就会产生一种往往使它们相互聚拢的力，金属盘越靠近，两者之间的吸引力就越强。到 1996 年物理学家首次对这种卡西米尔效应进行的测定，实际测量结果与理论计算结果也是十分吻合。

真空卡西米尔效应和能量量子隧道效应不但紧密相连，而且是量子色动化学的增长极。但这里先不说“量子色动化学”，而是先来做“量子色动几何”的科学“游戏”。众所周知，从普通的化学反应到核化学反应，都是以元素周期表中元素原子的原子核所含的质子数，可分和不可分的变化来决定的。理论上真空的量子起

伏，也类似“真空粒子”的“衰变”。 卡西米尔“游戏”做到原子核，如果质子数不是一个简单的强力系统，而是有很多起伏，那么在原子核内部空间的弱力“共振”，也能够以一种通过同位素质谱仪以及严格的色谱-质谱联用的检测结果的方式，测量到这类弱力能源反应的起伏。因此，也就能把“氧核”包含的相当于卡西米尔板的“量子色动几何”科学“游戏”设计出来。

A、如果氧基的内部空间类似“真空”，氧核的 8 个质子构成的立方体，类似形成 3 对卡西米尔平板效应，这种“量子色动几何” 效应是元素周期表中其他任何元素原子的原子核所含的质子数的“自然数”不能比拟的。这其中的平面几何道理是：形成一个最简单的平面需要 3 个点和 4 个点，即 3 个点构成一个三角形平面，4 个点构成一个正方形平面。卡西米尔效应需要两片平行的平板，三角形平板就需要 6 个点，这类似碳基；正方形平板就需要 8 个点，这类似氧基。如果把这些“点”看成是“质子数”， 6 个质子虽然比 8 个质子用得少，但比较量卡西米尔效应，8 个质子点的立方体是上下、左右、前后，可平行形成 3 对卡西米尔平板效应，即它是不论方位的。而 6 个质子点的三角形连接的五面立体，只有一对平板是平行的。同理，16 个质子点的超立方体，也是上下、左右、前后对称包含小立方体在内的大立方体，又是可平行形成 3 对卡西米尔平板效应。所以量子色动几何“游戏”以“8”为基数，在 16 项中设计了 11 种“量子色动化学”生成元“游戏”：即把元素周期表中所有元素原子的原子核所含的质子数相应减去“8”，剩下的数字凡是大于“8”的，又减去“8”，形成以“8”分层级的“卡西米尔元素周期表”膜世界。

B、具体这 11 种生成元的图像，第一层级是 4 个：

1、一个点，就保留一个“点”图像。此数不具卡西米尔效应。

2、两个点，是一段“线”图像。此数不具卡西米尔效应。

3、三个点，是一个“三角形” 平板图像。此数不具卡西米尔效应。

4、四个点，分两起。此数不具卡西米尔效应。

a、是一个“正方形” 图像。

b、是一个三角形加上面一个“点”形成的正四面体图像。

5、五个点，是一个正方形加上面一个“点”形成的五面立体图像。此数不具卡西米尔效应。

6、六个点，分两起：

a、是两个三角形连接形成的含平行的五面立体图像。6 数生成元以此为主。

b、一个正方形加上面一段“线”形成的五面立体，此图像不是生成元。

7、七个点，是一个三角形加（4b）型正四面体形成的平行而不对称的立体，此图像是生成元。

8、八个点，分两起：

a、是上下、左右、前后平行的正立方体图像。8 数以此为主是生成元。

b、是两个（4b）型正四面体形成的对称立体，8 数一般不以此为主。

C、第二层级，前 9 至 13 是在 8 点图像的基础上按前 4 至 6 的方法变化：

9、九个点，是一个正方形加（5）型五面体形成的平行而不对称立体，此图像是生成元。。

10、十个点，是两个（5）型五面体形成的对称立体，此图像是生成元。

11、十一个点，是一个（6 b）型五面立体和一个（5）型五面立体形成的不对称立体，此图像是生成元。

12、十二个点，是两个（6 b）型五面立体，形成的对称立体图像生成元。

13、十三个点，是一个（8a）型立方体和一个（5）型五面立体形成的平行而不对称立体，此图像是生成元。

14、十四个点，是一个（8a）型立方体与一个（6a）型五面立体分离的图像。这已是两个生成元图像分离的组合。

15、十五个点，也是一个（8a）型立方体与一个（7）型立体分离的图像。16、十六个点，分三起：

a、是两个（8a）型立方体分离的图像。16 数以此为主。

b、上下、左右、前后对称包含小立方体的大立方体的超立方体生成元。

c、两个（8a）型立方体形成的平行的长方柱立体图像的生成元。

元素周期表中元素原子的原子核所含的质子数大于 16 的，把“8”逐层分离，小于 16 时，按上面第二层级的在 8 点图像的基础上按前 4 至 6 的方法变化构图。

13)低碳和低氧量子色动化学初探

从上面可以看出，6 个质子的碳原子核的理想的量子色动几何图案，是两个三角形连接形成的含平行的五面立体图像；我们称为碳基量子色动几何图像。而 8 个质子的氧原子核的理想的量子色动几何图案，是两个正方形连接形成的上下、左右、前后平行的正立方体图像；我们称为氧基量子色动几何图像。由此来说量子色动化学，碳基量子色动几何图像比氧基量子色动几何图像虽然“经济”，但没有上下、左右、前后对称的 3 对卡西米尔平板效应作用力大。

而量子相互作用力，是最基本的实验可证实的力。所以地壳元素中分布最多的前 9 个元素，氧占据首位，正是由于类似几十亿年以来地壳发生的无数次大地震和火山爆发等力量的化学“微调”，才排列出的。这可以通过前面介绍的量子色动几何层级图像的严格计算与分析，定性与定量规律地表达出来。

即这个最简约的数“8”，类似正方形的 8 个顶点，在局域和全域也是最接近、最简约的是一对或上下左右前后三对卡西米尔效应平板的经验图像和先验图像。它对于所有的自然数，甚至包括所有的实数、复数来说，后者虽然是无限的多，“8”虽然只有一个，使 8 的概率在自然界只是无限分之一，即没有奇迹能发生；为什么生命的奇迹却离不开氧呢？除原子与原子核原理，知道的之内不再多说，之外从量子色动力学与量子色动几何来探索低碳和低氧的量子色动化学，能不能在原子与原子核空间外的整个反应，感受不到没有裂变或聚变，而又能起到高碳和高氧整个反应的能源效果呢？即此种效果的原理并非热反应，不会产生核废料和放射性。效果达到之后，丢弃的材料也不会产生放射性污染----虽然这与核能有很大关系，但整个过程是类似于风筝飞上天，利用的是自然存在的风或气流的作用，自身不需要自带能量。此不同于飞机飞上天、火箭飞上天、氢气球飞上天、孔明灯飞上天、鸟飞上天等类型，是需要自身还要外在自带能量的。

14）现在来解释“8=（6+2）+1 希格斯粒子”的量子色动化学实验方程。这类似氢弹反应，要实现“8=（6+2）+1 希格斯粒子”条件，必须先有外力。8、6、2 都指质子数，1 希格斯粒子指能量释放。8 与（6+2）不同，不是质子不同，而是几何形状结构不同，它们都是氧核的同数异构体。前面 8 的几何形状结构是上下、左右、前后平行的正立方体图像。后面（6+2）的几何形状结构是两个类似，一个三角形加上面一个“点”，形成的正四面体图像型正四面体形成的对称立体。这两个类似正四面体形成的对称立体，是与碳核的卡西米尔效应平板。如果在外力作用下，氧核从正立方体图像变成两个类似正四面体形成的对称立体图像，就会释放出类似 1 希格斯粒子的能量。这也是大地震、火山等爆发的拟大型强子对撞机原理。

"Water Becomes Hydrocarbons" and "Change of Oil" Secret

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