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The Theory of Cyclic Universe

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Abstract As known that if there is evolution, there's extinction too. Hence, if there's a birth and death. As known from the Big Bang that the universe started from the Singularity. Hence the destruction of the universe should be such that the final end of the universe be a singularity. If so, how will this Universe end?

Keywords Black hole Mechanics, Hawking Radiation and General Relativity

1. Introduction

It is known that evolution and extinction run along the same path, hence same way creation and destruction run along the same path. As explained by the Big Bang that the universe had a start and following the up given notion one day this universe will end. Hence the question prevails rather, How is this universe will end?

To solve this question needs the help of the following theories:

1. Black Hole Mechanics
2. General Relativity
3. Hawking Radiation

As known that the universe evolved from a singularity. And in my previous paper is describes a phenomena of Space-Time Tearing. Applying this condition for the end of our universe could be a valid explanation. And the phenomena describes what was before the Big Bang and it describes that there was a universe ($Universe_1$) which underwent Space-time Tearing and transformed into a singularity that in order to attain stable condition expanded discharging a small amount of energy. This blast liberating energy can be called the phase of the Big Bang. And after which the new universe evolved ($Universe_2$) and this cycle of creation and destruction is valid in our nature and if we view the Big Bang theory it says that the universe evolved from a singularity but how could a singularity form without a predominant Space – time existing, this could have happened if there would have been a predominant universe ($Universe_1$) that collapsed and formed a singularity from which the new universe evolved ($Universe_2$).

2. Symbols

a. S_{bh} - Entropy of black hole
   1. S_{U1} – Entropy of the $Universe_1$
   2. S_{U2} – Entropy of the $Universe_2$

b. κ_b - Boltzmann's Constant

c. 4lp2- Planck's Length
d. κ - Surface Gravity
e. M - Mass
f. Ω - Angular Velocity
g. J - Angular Momentum
h. ϕ - Electrostatic Poential
i. Q - Charge
j. c - Speed of Light
k. A – Area

3. The Theory of the Cyclic Universe

As known from the Big Bang theory, that if we move further back in time we view the universe evolving from a singularity. As, we know that for the formation of a singularity needs the folding of space and time one on another. This suggests that the singularity is formed from a pre-dominant universe ($Universe_1$).

The $Universe_1$ undergoes Space-time tearing in order to transform into a singularity that would later give rise to $Universe_2$.

In $Universe_1$ a hole in the space-time fabric was formed by the phenomena of Space-time tearing. And the hole increases in size as the universe continues to expand. And as the hole is increasing in size it gulps in matter as well as energy ,as depicted from the equation of Hawking Radiation the Area is directly proportional to the Entropy, therefore if the area of the torn portion increases, automatically the entropy of the torn portion will increase and as known that energy flows from high energy to low energy and from low entropy to high entropy hence as the area of the torn portion would increase due to the expansion of the universe it's area would also increase with respect to the surrounding and following the up given notion energy from $Universe_1$ will flow to the torn

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portion. After all the matter and energy is gulped into the torn portion the left over space – time fabric gets folded on themselves forming a Singularity.

The Singularity has the total energy of $Universe_1$ stored in it.

In order to reach a stable state it had to transform from a low entropy state to a high entropy state. The Big Bang is indeed a phase in which the energy stored in the singularity is released with a bang, forming a mini universe that later expands to form the $Universe_2$.

4. Equation

$$-\delta M = \kappa\delta A/8\pi G + \Omega\delta J + \phi\delta Q \quad (1)$$

$$\delta E/c^2 = \kappa\delta A/8\pi G + \Omega\delta J + \phi\delta Q \quad (2)$$

$$\delta E = c^2\kappa\delta A/8\pi G + c^2\Omega\delta J + c^2\phi\delta Q \quad (3)$$

$$-c^2\kappa\delta A/8\pi G = c^2\Omega\delta J + c^2\phi\delta Q - \delta E \quad (4)$$

$$-\kappa\delta A/8\pi G = \Omega\delta J + \phi\delta Q - \delta E/c^2 \quad (5)$$

$$\kappa\delta A/8\pi G = \delta M - \Omega\delta J - \phi\delta Q \quad (6)$$

$$\kappa\delta A = 8\pi G(\delta M - \Omega\delta J - \phi\delta Q) \quad (7)$$

$$\delta A = 8\pi G(\delta M - \Omega\delta J - \phi\delta Q)/\kappa \quad (8)$$

From the Hawking Radiation:

$$S_{bh} = \kappa_b A/4lp^2 \quad (9)$$

$$\delta A = \delta S_{bh} * 4lp^2/\kappa_b \quad (10)$$

As known that the universe has evolved from a singularity, hence implementing the formulation of Hawking radiation to the whole universe.

$$\delta S_U * 4lp^2/\kappa_b = 8\pi G(\delta M - \Omega\delta J - \phi\delta Q)/\kappa \quad (11)$$

$$\delta S_U * 4lp^2 = \kappa_b\{8\pi G(\delta M - \Omega\delta J - \phi\delta Q)/\kappa\} \quad (12)$$

$$\delta S_U = \kappa_b\{8\pi G(\delta M - \Omega\delta J - \phi\delta Q)/\kappa\}/4lp^2 \quad (13)$$

From the General Theory Of Relativity:

$$G_{\mu\nu} = R_{\mu\nu} - 1/2\, Rg_{\mu\nu} = 8\pi G/c^4 \,.\, T_{\mu\nu} \quad (14)$$

$$R_{\mu\nu} - 1/2\, Rg_{\mu\nu} = 8\pi G/c^4 \,.\, T_{\mu\nu} \quad (15)$$

$$c^4(R_{\mu\nu} - 1/2\, Rg_{\mu\nu}) = 8\pi G \,.\, T_{\mu\nu} \quad (16)$$

$$c^4(R_{\mu\nu} - 1/2\, Rg_{\mu\nu})/T_{\mu\nu} = 8\pi G \quad (17)$$

$$8\pi G = c^4(R_{\mu\nu} - 1/2\, Rg_{\mu\nu})/T_{\mu\nu} \quad (18)$$

$$\delta S_U = \kappa_b[\{c^4(R_{\mu\nu} - 1/2\, Rg_{\mu\nu})/T_{\mu\nu}\} (\delta M - \Omega\delta J - \phi\delta Q)/\kappa]/4lp^2 \quad (19)$$

5. Results

Placing the up given Equation in the Following Conditions:

1. Predominant Universe ($UNIVERSE_1$) –

$$\delta S_{U1} = \kappa_b[\{c^4(R_{\mu\nu} - 1/2\, Rg_{\mu\nu})/T_{\mu\nu}\} (\delta M_{U1} - \Omega_{U1}\delta J_{u1} - \phi_{u1}\delta Q)/\kappa]/4lp^2$$

2. Torn portion -

$$\delta S_T = \kappa_b[\{c^4(R_{\mu\nu} - 1/2\, Rg_{\mu\nu})/T_{\mu\nu}\} (\delta M - \Omega\delta J - \phi\delta Q)/\kappa]/4lp^2$$

3. Current Universe (UNIVERSE2) -

$$\delta S_{U2} = \kappa_b[\{c^4(R_{\mu\nu} - 1/2\, Rg_{\mu\nu})/T_{\mu\nu}\} (\delta M_{U2} - \Omega_{U2}\delta J_{u2} - \phi_{U2}\delta Q)/\kappa]/4lp^2$$

From the up given equations we can calculate the entropy, the curvature of the space-time fabric etc. for the following condition such as when the predominant universe prevails ($UNIVERSE_1$), when Space – time tearing occurs (Torn Portion) & the current universe ($UNIVERSE_2$).

6. Conclusions

Hence the universe certainly doesn't seems to be the consequence of the Big Bang where everything was created from nothing, whereas Big Bang is merely a phase in which the Singularity formed from the previous universe ($UNIVERSE_1$) undergoing Space-time Tearing releases certain amount of Energy in order to expand.

REFFERENCES

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[2] A note : The Big Bang Theory by Prithwijit Sarkar (page - 2)

[3] Particle Creation In Black hole by Sir S.W Hawking (pages - 43).

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