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The Three Clocks Theory

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Abstract:

This article is about the rethinking and formulation of the the universe formation and also establishing the relation between time and energy using the relativistic equations and this hypothesis is supported by Noether theorem which is the symmetries present in the nature. As we know from the General theory of Relativity, universe had a beginning and the Einstein's equations describe the structure of space and the time. The concept of singularity is the initial singularity to have existed before the big bang and thought to have contained all the the energy and spacetime of the universe crunched at a point but how it was behaving and nature of these physical properties is what I want to explain, whereas different thermodynamic states must follow the the behavior of the parameters contained.

Keywords —Time, Varying gravitational field, Entropy, Forward time, Reverse time, Cyclic time, Energy

Introduction:

Time is the change which occurs, As entropy and time are interrelated. Time moves forward and the entropy increases. Increase and decrease in the the entropy is somehow associated with the direction in which the time moves forward and backward so the time can move either forward or backward. We can consider the the second law as the probabilistic law in which it tends to proceeds to disordered state, most probable state. Second law is only statistical that's according to Boltzmann, entropy increases most of the time but not all the time. The decrease in the entropy is not an impossibility and seems improbable. The universe works on the three clocks symmetry which is energy dependent. The Noether Theorem states that the action of a physical system is the integral over time of a Lagrangian function and the fluctuation theorem derived by Denis Evans and Debra Searles, which gives a numerical estimate of the probability that a system away from the equilibrium will have a certain value for the dissipation function(often an entropy like property) over a certain amount of time. This considers the probability density the probability density for all the trajectories that are initially small region of phase space, leads to the probability of finding a trajectory in either forward or the reverse trajectory sets, depending on the initial probability distributions as well as the dissipation which is done as the system evolves that is the condition before the Big Bang and the cyclic process is the one which initiated the Big Bang. the Laser Interferometer Gravitational-Wave Observatory (LIGO) Scientific Collaboration announced a detection of gravitational waves caused by the merger of two black holes with masses of about 36 and 29 times the mass of the sun (Abbot et al. 2016). About three times the mass of the sun, i.e. about 5 per cent of the initial total mass of the black holes, was converted into gravitational waves. Recently, an idea of the existence of numerous black holes with masses of 20–100 times the mass of the sun was suggested (Bird et al. 2016). Those massive black holes can serve as 'the dark matter' (Bird et al. 2016). Therefore, the black holes become an important component of cosmological models, particularly, of the bouncing cosmology because the black holes are the only macro object that can survive the Big Crunch and the Big Bang and appear in the next cycle of the Universe (Clifton, Carr & Coley 2017).

In 1998, the accelerated expansion of the Universe was discovered using observations of the distant supernovae (Riess et al. 1998; Perlmutter et al. 1999). An accelerating universe can be described by the Einstein equations with a phenomenological cosmological constant, , which characterizes a repulsive force (Einstein 1952).

$G\mu\nu - g\mu\nu = -8\pi G/c4\ T\mu\nu$

where Gμν is the Einstein tensor; gμν is the metric tensor; Tμν is the energy-momentum tensor; and G is the gravitational constant. Data collected by the Planck satellite instrument allow us to get the following estimate of the cosmological constant (Ade et al. 2016a): ≈ 1.1 × 10−56 cm−2.

At present, cosmological models containing the cosmological constant are widely used to describe main observations: the cosmic microwave background, spectra of the baryonic oscillations, and the chemical composition of the early Universe (Misner et al. 1973; Fixsen et al. 1997; Mather and Boslough 2008; Ade et al. 2016a).

The repulsive force is caused by vacuum dark energy. A density of the dark energy, ρvac, is related to the cosmological constant by the following equation: $\Lambda = 8\pi G\rho vac$

The paper discusses the three clocks which is the key to understand how the universe works and for which the the friedmann's equations are reconsidered.,

CLOCK I : Forward Time (Positive Entropy)

This is the condition after the big bang in which the universe expands. As we observe the galaxies are stretched further and further apart that is the Hubble law. In Albert Einstein's theory of relativity, for example, time is woven together with the three dimensions of space, forming a bendy, four-dimensional space-time continuum. Einstein's equations portray about the initial conditions of the universe and what comes after. The General theory of relativity relate the geometry of spacetime to the distribution of matter within it. Entropy may be understood either as a statistical property of canonical systems or as a mechanical property, that is monotonic function of the phase along trajectories. The first Friedmann's equation tells how the fabric of the universe expands or contracts as a function of time.

$$H^2 = \left(\frac{\dot{a}}{a}\right)^2 = \frac{8\pi G}{3}\rho - \frac{kc^2}{a^2} + \frac{\Lambda c^2}{3}$$

Energy/information cannot be created or destroyed. The existence of the matter upon the universal medium of spacetime which maintains zero sum difference that is the cosmological continuum.The Dark matter infiltrates the spaces in matter providing it with the ability to interact,bond etc. Dark matter engenders a force of gravity for ordinary matter to bond then accumulation of ordinary matter is just the consequence of this force.

To describe an expanding universe, the FRW metric is used. The classical Friedmann equation is derived from the Einstein equations assuming the FRW metric. According to this metric for a flat space, the time–space interval is expressed in the Cartesian coordinates as follows: $ds^2 = c^2\ dt^2 - a^2(t)(dx_*^2 + dy_*^2 + dz_*^2)$,

where $dr_*^2 = dx_*^2 + dy_*^2 + dz_*^2$ is the distance in the comoving coordinate system. The physical distance is related to the distance in the comoving coordinate system by the scalefactor a: $r = a(t)r_*$. The FRW metric describes an isotropic and uniform universe in the comoving coordinate system. At the present time, the scalefactor is equal to unity: a(t) = 1. Assuming that the matter has no pressure, i.e. $T_{00} = \rho c^2$,

We get the first clock equation that is :

$(a/a)^2 = \Lambda c^2/3 + 8\pi G\rho/3$.

Differentiating over time we get :

$a¨/a = \Lambda c^2/3 + 8\pi G\rho/3 + 4\pi G\rho˙/3\ a/a˙$

CLOCK II : Backward Time (Negative Entropy)

This is the condition before the big bang in which the universe contracted that is the negative entropy. The time flows backward. Matter creation takes place within the pre existing dark energy medium of spacetime.

Creation of matter as a whole induces a complementary displacement in the dark energy medium of spacetime fabric. From this wrapping another perturbation in whole matter creation, a dual relationship of new created positive density matter in an envelopment of negative density matter. Negative density matter is dark matter. One dimensional singularity existed before the big bang as the pre existing fabric of spacetime without any real matter.

The Schwarzschild metric in the Cartesian coordinates for a weak gravitational field is written as $ds^2 = (1 - b0)c^2\,dt^2 - (1 + b0)(dx^2 + dy^2 + dz^2)$

where $b_0 = 2GM_0/(rc^2)$

Here, we use the physical distance, r, in a fixed coordinate system. In the modified Schwarzschild metric, the constant mass, M_0, is replaced with a variable mass M(t, r). The equation in the comoving coordinates transforms to :

$ds^2 = [1 - b(t,r)]c^2dt^2 - a^2(t,r)[1 + b(t,r)](dx_*^2 + dy_*^2 + dz_*^2)$,

where b(t, r) = 2GM(t, r)/(rc^2) is the known function and a(t, r) is the unknown scalefactor.

The case of weak gravitational fields, b(t, r)<<1,:

$(a^{\cdot}/a)^2 + (a^{\cdot}/a)b^{\cdot} = \Lambda(t,r)c^2/3 + 8\pi G\rho/3$

Where the cosmological function $\Lambda(t,r)$ is given by

$\Lambda(t,r) = 1/a^2(\partial^2 b/\partial_* x^2 + \partial^2 b/\partial y_*^2 + \partial^2 b/\partial z_*^2) =$

$(\partial^2 b/\partial x^2 + \partial^2 b/\partial y^2 + \partial^2 b\,\partial z^2)$

where the Schwarzschild radius $r_0 = 2GM(t, r)/c^2$. It is logical to relate the α parameter to the time of the Universe existence after the Big Bang, T: α = f/T, where f is the dimensionless coefficient. f = 1 means that the BBH mass has changed by e times since the Big Bang.

Using the cosmological time, we get from equation: $\Lambda(t,r) = f^2/c^2T^2\ r0/r \approx 0.7 \times 10^{-56} f^2\ 2\ r_0/r$ (in cm^{-2}), where $T \approx 4 \times 10^{17}$ s.

We get the second clock equation that is :
Differentiating the equation over time we get :

$$\frac{\ddot{a}}{a} = \frac{\Lambda(t,r)c^2}{3} + \frac{8\pi G\rho}{3} - \frac{\ddot{b}}{2} + \frac{\frac{\dot{\Lambda}(t,r)c^2}{6} + \frac{4\pi G\dot{\rho}}{3}}{\sqrt{\frac{\Lambda(t,r)c^2}{3} + \frac{8\pi G\rho}{3}}}.$$

CLOCK III : Cyclic Time (Both the Neg. & Pos. Entropy)

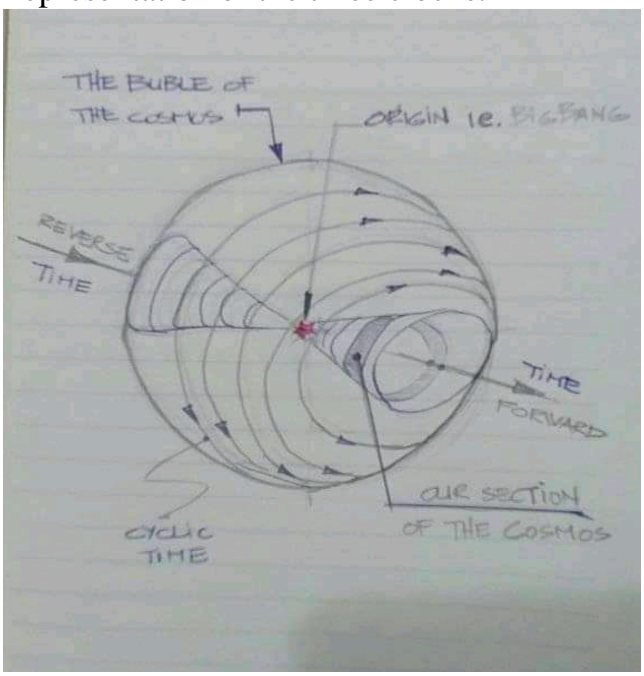
Both positive & negative entropy goes in cyclic manner. It initiates to cause the Big Bang and the universe starts following Clock I. It is like the oscillating universe the Clock II firstly comes to the existence then all become cyclic causing the Big Bang. The Clock III is the state where energy flows through the planck level.

Let us consider the case when the term with the cosmological function dominates the term with mean density of the Universe. Assuming an exponential change of the mass of the BBH, we get $\Lambda^{\cdot}(t,r) = \alpha\Lambda(t,r)$Then the equation is :

We get the third clock equation that is :

$$\frac{\ddot{a}}{a} = -\frac{\Lambda(t,r)c^2}{6} - \frac{\alpha}{2}\sqrt{\frac{\Lambda(t,r)c^2}{3}}.$$

Representation of the three clocks:



Conclusion :

I generalized the Friedmann equations for a model of the Universe. I managed to derive the equations for the three clocks. The three clocks describe the nature of the cosmos. The cosmos vibrates and the energy vibration was always there. a change of the gravitational mass of the Universe could be verified by observations of the monopole component of non-stationary gravitational field.

a fraction of the black holes survives the stage of maximal contracting of the universe . These relict black holes can produce the supermassive black holes in the galaxy centres and are responsible for the effects of 'dark matter'. Hence, we can conclude the cosmos works on the three clocks that is dependent on time and energy.

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