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New Perspective of Expanding Universe and Estimate for Mass of Universe by New Gravity Equation

Siva Prasad Kodukula

Visakhapatnam, India

Abstract It is an application of a new classical equation for gravity which is applicable even in plank scale with a new parameter Siva's constant 'K'. The result concluded a new perspective of 'Expanding Universe' and says that the universe is not expanding. All the observations will show that the universe is expanding due to the consideration of constant 'rest mass' throughout the expansion. The constant 'rest mass' has been estimated by new gravity equations. It is numerically equal to the some of the earlier estimates concluded by other methods.

Keywords Mass of Universe, Siva's constant 'K', New gravity equation, Expanding universe, Plank scale

1. Introduction

The physical interpretation of inertial frame of reference and its change has been explained as force of gravitation with an absolute velocity 'V' and follows $Vd = K$ as explained in previous papers [1]. In this process it is concluded that there will exist two forces obeys $V = Hd$ and $Vd = K$ and explained as expansion and gravitational contraction respectively. Where 'H' is Hubble's constant and 'K' is Siva's constant. The universe at any stage with diameter 'd' will have both the forces in opposite directions. When the universe reaches its maximum diameter, the velocity ' V' will be equal to velocity of light 'c'.

After next ' t_p ' seconds it will be with 'plank length' ' t_p '.

Thus this is the final diameter in expansion and commencement of gravitational collapse and contraction. This change is a natural phenomenon of space time and follows law of observation. A new gravitational equation [2] has been introduced to explain gravitational force with respect to this phenomenon in the previous paper [2]. It has been utilized for calculations and discussions. The new equation

$G\,t_p\left(\frac{M}{d}\right) = K$ along with $Vd = K$ an equation for gravity with absolute velocity 'V' as explained in previous papers [1, 2] has been used for the estimate of mass of Universe.

The result is numerically equal to some of the earlier estimates made by other researchers [3, 4].

* Corresponding author:
sivkod@gmail.com (Siva Prasad Kodukula)
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2. Calculation & Discussion

Sivas gravity equation [2]

$$\text{i. e } K = Gt_p\left(\frac{M}{d}\right) \quad (1)$$

Where 'G' is Newton's gravitational constant

'K' is Siva's constant

't_p ' is plank time

'M' is mass of the body

'd' is the distance between two points in the space time associated to mass 'M'.

We have [5]

$G = 6.67408 \times 10^{-11}\ m^3\ kg^{-1}\ sec^{-2}$

$t_p = 5.39116 \times 10^{-44}$ sec

If we consider it for whole universe,

M_U is mass of Universe and 'd' is Hubble's diameter

$$\text{i.e } d = \frac{V}{H} \quad (2)$$

Where

Hubble's constant $H = 2.255582386 \times 10^{-18} s^{-1}$

($H = 69.6 \pm 0.7\ \ Kms^{-1}Mpc^{-1}$ [6]

The length of one parsec [7] is

$3.085677581491 \times 10^{16}$ m)

'V' is the velocity at a distance 'd' as per Hubble's law.

Substitute

$M = M_U$

$d = \frac{V}{H}$

$G = 6.67408 \times 10^{-11}\ m^3\ kg^{-1}\ s^{-2}$

$t_p = 5.39116 \times 10^{-44}$ s

$V = c$ in (1)

$$\therefore K = 2.70714564 \times 10^{-80}\ M_U \quad (3)$$

We have gravity equation $Vd = K$ [1]

At this stage 'V' will be minimum

We can calculate that minimum velocity 'V' by

$$d = \frac{K}{V} \quad (4)$$

Substitute 'd' of (4) in (1)

$$\therefore K^2 = 3.5981 \times 10^{-54}\ V\ M_U \quad (5)$$

We have plank length $l_p = 1.616\,229 \times 10^{-35}$ m

Plank mass $m_p = 2.176\,470 \times 10^{-8}$ Kg

Substitute $d = l_p$ & $M = m_p$ in (1)

$K = Gt_p \left(\frac{M}{d}\right)$

$$\therefore K = 4.84533 \times 10^{-27} m^2\ s^{-2} \quad (6)$$

Units of dimension will be changed wherever we use the equation $Vd = K$.

The numerical value remains constant.

Substitute this K value in (3)

Total mass of the universe

$\therefore M_U = 1.7898298 \times 10^{53}$ Kgs

Substitute M_U and K value in (5)

Final velocity of expansion

$$\therefore V = 3.645539 \times 10^{-53}\ m.s^{-1} \quad (7)$$

The physical meaning is-

If values of K and M_U are constants, the distance'd' will be different with different velocity of expansion or contraction.

If K is constant, the ratio of M_U and'd' will be constant. But M_U will change with'd'.

Therefore,

To satisfy both the points K and M_U must be constant at any stage of universe and there exist a specific velocity at a distance 'd' viewed as expanding universe.

Here if we won't consider the expansion, there will not be any variation in 'd' and concerned 'V'.

Thus the diameter 'd' of total mass of universe M_U = Mass of the Universe with 'plank mass' m_p and diameter as plank length l_p to keep K as constant.

Both the cases are same. For both the cases K will be constant but there will be a variation in mass of the universe in non expansion case. If mass is constant all the observations will show that the universe is expanding. The expansion and non expansion are same when we consider the mass variation. Mass variation is an affect of variation in its own space time density. Here, it is to be noted that the density of mass is different from its space time density associated to that mass. If we consider that there is no variation in space time density, there will not be variation in mass and it remains constant throughout the expansion. If mass is constant and the diameter of the universe changes then the result of observation is 'expanding Universe' for which 'K' is constant.

Mathematically,

we have two equations (1) and (3)

$K = Gt_p \left(\frac{M}{d}\right)$ and Vd=K respectively.

In order to keep both K and M as constants and to satisfy both the equations the d must be associated with a velocity and as the 'd' changes with velocity, there exist a change of velocity with 'd' and viewed as a force of expansion. The same will be applicable for contraction also.

Thus we can conclude that the expansion of universe is a considerable phenomenon in the aspect of observation. The Universe is not at all expanding or contracting. It remains as it is. The concept of observation has to be reconsidered on fundamental basis.

In the aspect of expanding universe concept, the final velocity of expansion at far end of Hubble Universe reaches light velocity, the force of gravity will be weak and the expansion will be halted. But the velocity will not be zero. It will be $3.645539 \times 10^{-53}\ m.s^{-1}$. This velocity will gradually increase towards the gravitational collapse.

3. Conclusions

1. The application of Siva's gravity equation $K = Gt_p \left(\frac{M}{d}\right)$ to the universe estimated the mass of universe as 1.7898298×10^{53} Kgs. which is coinciding with one of the earlier estimates made by other researchers [3, 4].
2. The universe is expanding as per physical observations defined by present laws of physics. In another perspective of observation the universe is not expanding. It is a change in space time density related to a new parameter termed as Siva's Constant 'K'.
3. In the perspective of the expanding universe concept, the estimated mass of the universe is 1.7898298×10^{53} Kgs the final velocity of the expanding universe is calculated as $3.645539 \times 10^{-53}\ m.s^{-1}$. After this stage, gravitational collapse will start.

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