Deduction of equations to determine the age of the universe and its radius at primordial state

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All astronomical bodies of the observable Universe are seen to be orbiting under the influence of gravitation. Notwithstanding the existence of CMB, extrapolation of the expansion of the Universe back in time indicates that astronomical bodies had been in orbital motion at all times. A table with values of orbital velocity (v) of a cosmic body orbiting at various times around the center of the Universe and the distance (d) between the center of the cosmic body and that of the Universe at such times shows that the velocity of the cosmic body orbiting the center of the primordial Universe $= C/$(Radius of the primordial Universe) $= K/C$, where K (Constant) $= v^2 d$ and C a dimensional constant whose numerical value, regardless of the units of measurement, is 1. All orbital time periods of the astronomical body till date are aggregated. The total time of travel of that body till date or the age of the Universe $= 7.55274627K/V^3$, where V is the present orbital velocity of the body.

1. Introduction

The Sun, planets, satellites and most other visible astronomical bodies in our Galaxy are moving in orbital paths. In the observable Universe, the Galaxies too are moving [1]. With millions of glaring stars at millions of miles away, it is difficult to analyze the exact nature of their movements. Solar system orbits around the center of our Galaxy and takes about $225 - 250$ million years to complete one orbit [2]. Our Galaxy is also moving with a velocity measurable with respect to the CMB rest frame [3]. Observation of galaxies moving away from us does not necessarily mean that they are moving in straight lines. So it is likely that under the influence of gravitation, our Galaxy too orbits around an astronomical body of the Universe.

Extrapolation of the expansion of the Universe backwards in time using general relativity yields an infinite density and temperature at a finite time in the past [4]. Known laws of physics are valid till that point (hereafter referred to as the point of origin) and gravitation is believed to have been as strong as the other fundamental forces. The Big Bang model of cosmology predicted existence of background radiation and the discovery of CMB led to the present theories on Galactic evolution. Greatest emphasis has been laid on this prediction but the contribution of the huge energy released from Gamma Ray Bursts (GRB) towards the formation of CMB can not be ruled out either. The GRBs had occurred in galaxies that are one to eight billions of light years away and by studying all of the GRBs detected so far, it is possible to determine whether the GRBs throughout the Universe had happened for a specific period at regular intervals. Returning to our initial enquiry of the precise orbital motions of the visible satellites, planets, stars and galaxies, the extrapolation of the expansion back in time ostensibly leads to an inference that today's astronomical bodies had been in orbital motion from the point of origin to date. My submission here is based on this inference that from the point of origin, all astronomical bodies around the center of the Universe had expanded while moving in outwardly spiral paths while the astronomical body at the center of the Universe drifted in one direction as shown in Fig. 1. The extrapolation of the expansion back in time further shows that all astronomical bodies converge at the point of origin at the same time. So, all astronomical bodies must have moved out from the point of origin at the same time.

We have some universal relationships for orbital motions and we shall keep our calculations simple by adopting a view that the orbital paths of the astronomical bodies are circular. By Keplers 3rd law [5]:

$$D^3 = kT^2 \tag{1}$$

Other proven expressions used in planetary motion are:

$$T = 2\pi D/V, \tag{2}$$

$$g = V^2/D, \tag{3}$$

where D is the distance between the center of the Moon and that of the Earth, T the orbital time period of the

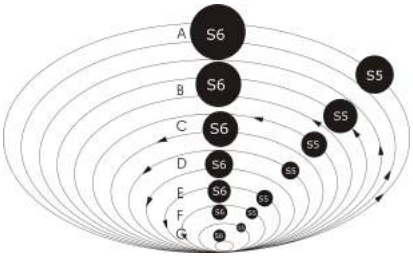

Figure 1. S6 expands while drifting from the point of origin to position A, and S5 expands while orbiting around S6.

Moon, V its orbital velocity, g its gravitational acceleration and k a constant. When the expansion of the Universe is extrapolated back in time, these relationships must be valid till the point of origin. We shall use these well-tested relationships applicable universally to all orbiting bodies to deduce a few equations for determination of the age of the Universe and its radius at primordial state.

2. The Laws of Creation

Combining equations (1) and (2), we find,

$$V^2 D = K, \tag{4}$$

$$T = 2\pi K/V^3. \tag{5}$$

Where $K = 4\pi^2 k$, a constant. Similarly combining equations (3) and (4), we may write,

$$gD^2 = K. \tag{6}$$

As shown in Fig. 1, S5 is an astronomical body orbiting directly around the astronomical body called S6 situated at the center of the Universe. S6 moves up from position G to A during expansion of the Universe. S5 spirals outward and moves up with S6. Let d be the distance between the center of S5 and that of S6 and v the orbital velocity of S5. By equation (4), $v^2 d = K_6 =$ a constant. In Table 1, magnitudes of d and v at various points of assent of S6 are listed.

Table 1. Magnitudes of d, V and $v^2 d$ at various points of assent of S6.

Position of S6	Magnitude of d	Magnitude of v	Magnitude of $v^2 d$ $(= K_6)$
A	100	1	100
B	25	2	100
C	4	5	100
D	1	10	100
E	0.25	20	100
F	0.04	50	100
G	0.01	100	100

At point G which can be said to be the point of origin, magnitude of $v = 1/$(magnitude of d) = magnitude of$v^2 d$ $(= K_6)$ and S6 is in its minutest form. At that point, S5 orbits on the surface of S6 and hence $d =$ the radius R_6 of S6. If V_G be the orbital velocity of S5 at G, then

$$V_G = K_6/C, \tag{7}$$

$$C/R_6 = K_6/C. \tag{8}$$

Where C is a dimensional constant whose numerical value, regardless of the units of measurement, is 1 and $K_6 = V_G^2 R_6$. If the unit of R_6 is km and that of time is second, the unit of C is km^2/sec and the value of $C = 1$

km^2/sec. So, during the expansion of the Universe from the point of origin, $(V_G =)\ V_G^2 R_6/C$ is the initial orbital velocity of S5. Since the magnitude of $C = 1$, $V_G^2 R_6\ (= K6)$ is the magnitude of the initial orbital velocity of S5.

Therefore, if V be the orbital velocity of an astronomical body at a given time and D the distance between the center of the astronomical body and that of its orbital path at that time, $V^2 D$ of the astronomical body can be said to be the magnitude of its initial orbital velocity.

Referring to Fig. 1, the aggregate of all orbital time periods of S5 till date should be the present age of the Universe. Let in the present T_1 orbital time, S5 has an orbital velocity V_1, in the previous T_2 orbital time it had an orbital velocity $2V_1$, in T_3 orbital time it had an orbital velocity $3V_1$ and so on. By equation (5),

$$T_1 = 2\pi K_6/(V_1.1)^3$$

$$T_2 = 2\pi K_6/(V_1.2)^3$$

$$T_3 = 2\pi K_6/(V_1.3)^3$$

And so on. Or,

$$\sum_{Z=1}^{\infty} T_Z = (2\pi K_6/V_1^3) \times \sum_{n=1}^{\infty} (1/n^3).$$

Or, total of all orbital times $= t = (2\pi K_6/V_1^3) \times N$, where $N =$ Apery's constant, the approximate value of which is 1.202056903 and $\pi = 3.141592653$. Or, the present age of the Universe is

$$t = 7.55274627 K_6/V_1^3. \tag{9}$$

3. Results and Discussion

To have an indicative estimation of the radius and surface gravity of the primordial Universe, lets assume that the astronomical body at the center of our galaxy is directly orbiting around the center of the Universe. Its estimated velocity is 552 km/sec and the estimated age of the Universe is 13.8 billion years = 4.3549488×10^{17} seconds.

By Equation (9),

$K_6 = tV_1^3/7.55274627 = (4.3549488 \times 10^{17} \times 552^3)/7.55274627$ km^3/sec^2 $= 9.698295031 \times 10^{24}$ km^3/sec^2.

As defined, $C = 1$ km^2/sec. By Equation (8), R_6 or the radius of the primordial Universe = $1/(9.698295031 \times 10^{24})$ km $= 10^{-7}$fm.

By Equation (6), surface gravity of the primordial Universe $\times\ R_6^2 = K_6$. $R_6 = 10^{-7}$ fm $= 10^{-25}$ km, $K_6 = 9.698295031 \times 10^{24}$ km^3/sec^2. Surface gravity of the primordial Universe $= K_6/R_6^2 = (9.698295031 \times 10^{24})/(10^{-25})^2$ km/sec^2 $= 9.698295031 \times 10^{74}$ km/sec^2

4. Conclusion

The theoretical basis of this paper that the astronomical bodies around the center of the Universe had been in orbital motion at all times seems to be more reasonable than the present theories which depict a somewhat chaotic process of galactic evolution with the role of all important gravitation which had been very strong at the initial stages, kept in abeyance for a long period of evolutionary time. GRBs are presently not visible in our Galaxy and nearby Galaxies because the last spate of GRB throughout the Universe seemed to have happened more than one billion years back.

As indicated, the radius of the primordial Universe is much smaller than the classical electron or Lorentz radius of 2.8 fm. Its surface gravity of 9.7×10^{77} meter/sec^2 is enormous when we compare the same with the Earth's present surface gravity of 9.8 meter/sec^2. The indicative initial orbital velocity of the astronomical body at the center of our Galaxy is $K_6/C = 9.7 \times 10^{24}$ km/sec. $V^2 D\ (= K)$ of the solar planets is 1.3×10^{11} km^3/sec^2. Therefore, the initial orbital velocity of each planet is 1.3×10^{11} km/sec, much larger than the velocity of light. So, the orbital velocity of the Earth has decreased from the initial 130 billion km/sec to the present 30 km/sec.

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