If Electromagnetic Fine structure =1/137 then Hubble Constant=73 km/s Mpc^{-1}

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Abstract

Recent overview of the results of the research of Hubble constant by Joshua Sokol is very interesting[1]. We can learn that the numerical value of Hubble constant is still open.

In Essay I present my own research results which are very old but in the light of Sokol discussion are valuable. I state and answer the question Can Hubble constant be calculated in the frame of Planck Epoch constant. The answer is yes

In his seminal book The Theory of Heat Radiation Professor Max Planck [2] introduced profoundly original ideas , for example he formulated the set of fundamental constants of length, time and mass as the functions of G, h,c. He stated

….*These quantities retain their natural significance as long as the law of gravitation and that of the propagation of light in a vacuum and two principles of thermodynamics remain valid, they therefore must be found always the same, when measured by the most widely differing intelligences according to to the most widely differing methods*

The Hubble constant *H* can be written as

$$H= 10^{2}\ h_0\ \mathrm{km\ s^{-1}\ Mpc^{-1}} \qquad (1)$$

The number h_0 which describes the observational discrepancy of H in the present6 Epoch is in the region

$$0.4< h_o< 1 \qquad (2)$$

(compare to the Table in [1])

It was pointed by by Teller[3] and Gamov [4] that the logarithm of the of the gravitional fine structure constant a_G^{-1} is of the order of the electromagnetic fine structure constant a_{EM}

$$\alpha_{EM}^{-1} = 1.5 ln\left(\hbar c / \ G\ m_N^{\ 2} \right) \qquad (3)$$

In my paper[5] I have shown that

$$\alpha_{Em}^{-1} = \ 97.5\ h_0^{-1} \qquad (4)$$

and

$$114.7\ \leq \alpha_{EM}^{-1}\ \leq\ 195 \qquad (5)$$

From formula (5) one obtains for Hubble constant

$$H = \ 6.5\ 10^3\ \left(\ ln\ \left(\hbar c / G m_N^{\ 2} \right) \right)^{-1} \quad km\ s^{-1}\ Mpc^{-1} \qquad (6)$$

References

1. J.Sokol, Science,,Vol 365,p305, 2019
2. M.Planck, The Theory of Heat Radiation, Dover Publication, 1959
3. E.Teller, Phys. Rev. 73,891,1948
4. G. Gamow, Phys. Rev. Lett,19,759,, 1967
5. M.Kozlowski Physics EssaysVol 7,261,1994