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Short Communication

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Intrinsic Vacuum Space and the Problem of Hubble Constant

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Abstract

We have defined intrinsic vacuum space as a physical space devoid of any particle of matter and radiation [1]. We want to show here that it is possible to solve the problem of discontinuity in the measurements of Hubble constant (H) by evaluating the difference between its presumed value in this hypothetical space, measured by the analysis of the cosmic microwave background, and that presumed in real vacuum space measured by the red-shift and distance [2].

1. Introduction

The expansion of the universe is a well-accepted notion, but its measurement by the Hubble constant (H), which states that the speed of movement of galaxies is proportional to their distance, presents many difficulties and it is only since about twenty years that we have had results relatively precise.

Traditional measurements are based on the “red-shift” of selected objects for the best knowledge that we have on their distance (Cepheids, Supernovae). The main measurement, here, is the analysis of the light of the sources; the value of 72 km/s /Megaparsec is usually retained but with uncertainty of around 5%. It was also shown that the expansion is accelerating.

The major event of modern cosmology is undoubtedly the analysis of the diffuse background cosmology following the Planck mission and whose Results were published in 2015. Among them a precise value of the Hubble constant of 67.5 km/s/Megaparsec with only 1% of uncertainty was obtained. The gap with above value is the cause of the problem of the Hubble constant.

1.1 Search for a Solution

We started by analyzing the differences physical measurements between traditional measurements and those of diffuse background: the first are based on the properties of the light emitted by the stars, the fossil radiation is completely ignored there. On the contrary, this is the central element taken into account by Planck analysis.

This analysis is based on spatial variations in density of this radiation at a very remote time, which gave us makes one think that, for doing it, it was necessary to locate oneself in a reference frame free from this radiation, hence the idea to use the concept of Intrinsic Vaccum Space that we defined as such in a previous publication [1].

1.2 Relationship between the Hubble Constant and the Fine Structure Constant (Alpha)

This relationship is totally ignored by consensual Physics but it is included in all of the work that we have carried out, see in particular [7]: the analysis of the angular momentum of the electron lead us to establish the relationship: **1/alpha = Log (R/lo)** where lo is the graviton amplitude, equivalent to the Planck length and R the range of the gravitational field or radius of the material universe [2-7].

Furthermore, the Hubble constant is defined by the differential relation dL/L = Hdt, the integration of the function L from lo to R provides the relation: Log(R/lo) = H T+ C where C is a constant and T the age of the universe. So there comes the very simple relationship **1/alpha = H T + C**

1.3 Application to the Hubble Problem

We consider here that the Hubble constants are slightly different between Real Space and Intrinsic Space. We attribute traditional measurements (red-shift) to Real Space and Planck's measurements to Intrinsic Space for the reasons given in paragraph 1.

By setting omega = 1/alpha, we establish the relationship: **(omega 1 – omega 2) = T (H1 - H2)** where the indices 1 and 2 are assigned respectively to Real and Intrinsic Spaces.

*H1 between 70 and 74 km/s/Megaparsec, i.e. between 2.14 and 2.65 10^-18/s
*H2 between 67 and 68 km/s/Megaparsec, i.e. between 2.05 and

2.09 10^-18/s
*T = 13.8 10^9 Light Year = 4.35 10^17 s
*Omega1 = 137.036

We find omega2 between 136.80 and 137.01 (maximum range), this interval contains, in a close manner, the integer value 137 obtained by the relationship between the mass of the electron and the physical constants of Intrinsic Vacuum Space [1].

We can therefore say that this concept probably brings a light, see a solution, to the Hubble problem.

Finally, it seems important to us to highlight the work theory of Freedman and his team who consider that the minimal value

H = 70km/s/Megaparsec would be due to consistency with other cosmological values [8].

In this case, we obtain omega between 136.99 and 137.01 (!).

We also think that traditional measurements could present an error factor towards high values of H which would be linked to a large quantum density of radiation, greater than that of fossil radiation around the source, which is an obviously variable parameter, the Freedman value would then be the value where the fossil radiation is very prevalent around the source analyzed.

2. Conclusion

The notion of Intrinsic Empty Space is able to solve the problem of the Hubble constant if we consider that fossil radiations influence it value. Being able to confirm the whole number 137 (the inverse of the fine structure constant in Intrinsic space), is the best indication and also an important result.

Let us remember that this space is the physical space which contain only the energy of the fundamental level associated with gravitational energy. In this logic, the project of measuring H by the use of gravitational waves should provide a consistent value with that of the analysis of the Planck mission [9,10].

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