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Short Communication

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The Age of the Universe and the Hubble Constant

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Here, we establish an equation that allows us to calculate the age T of the universe and the Hubble constant. This equation is obtained by equating two derived formulas expressing the mass of the electron. The numerically obtained value of T matches that deduced from the analysis of the cosmic microwave background (CMB) with greater precision. This operation also provides the value of the Hubble constant in agreement with experimental values.

1. Derived Formula for Electron Mass Calculation

Let's start with the very simple formula established in the intermediate stage in our referenced article giving the mass of the electron Me (formula 9) [1].

Me = (alpha/4 c). (h ko) (1)

Where alpha is the fine-structure constant, h is Planck's constant, c is the speed of light, and ko is the fundamental wavenumber.

In publications and, we established the value of ko in relation to the distance L between two vibrators (QF) of the fundamental lattice; this value is [1,2].

ko = pi/L = (pi^2c^2/4 G T h)^1/3 (2)

where G is the gravitational constant and T is the age of the universe.

Combining (1) and (2), we get:

Me = alpha/4 . [(pi^2 h^2) / 4 (G c T)]^1/3 (3)

This formula shows the dependence of the mass, and therefore the intrinsic energy, of the electron on the age of the universe. While simpler than the one given in publication it is less robust due to its dependence on a variable which is precisely the age of the universe [1].

Using the updated CODATA values, and taking T = 13.79 Billion Years (obtained by the CMB [3]), the numerical application of formula (3) gives the value: Me = 0.9111×10^{-30} kg.

This value is greater, by a relative difference of 2×10^{-4}, than the most precise experimental value.

If we now use, as required, the values of the constants in intrinsic space (see [4]), the numerical application gives Me = 0.91089×10^{-30} kg, very close value (5×10^{-5}) to the experimental one Me = 0.91094×10^{-30} kg.

In fact, we must take into account a relative uncertainty of about 2 10^-3 on the value of T deduced from the CMB, this places our result in the range: 0.9106 10^-30 kg < Me < 0.9111 10^-30 kg,

Which is quite satisfactory; the derived formula is therefore correct.

2. Calculation of the Age of the Universe

Equating formula (3) with that given in publication we obtain the following equation:

(pi^2 h^2)/(4 G T c)^1/3 = (16 e^137)^-1/3.(h c/4 G)^1/2 137 is the inverse of alpha in intrinsic space [4].

The solution to this equation is: **T = 16 lo e^137 / pi c = 16 R / pi c** (4) with lo =2 (h G/c^3)^1/2 (transverse dimension of a QF) [1].

The numerical application in intrinsic space gives: **T = 13,773** Billion Years, with an uncertainty of 3×10^{-5}, which is 100 times better than that of the CMB see (13.75 < T < 13.80 in Billions of Years) [3].

This result, which overlaps with that of the CMB with significantly improving the precision, is also a further verification of the results of our work on the electron moreover, it validates (if validation were needed) the CMB measurements [1].

If we use this very precise value of T into the equation (3), we find Me = 0.910936 kg, compared to 0.910938 kg for CODATA, this is excellent and we can speak about a strong validation of our equations.

3. Calculation of the Hubble Constant

This is given directly by relation (4) if we use the evolution curve of the universe given in a previous article [5].

We have H = (1/R). (dR/dT), with dR/dT = 1.04 R/T (according to the curve given in [5]).

Therefore, H = (1.04/R). (πc/16), with an uncertainty of 3%. The numerical application gives **H = 2.30 (+/- 0.1) 10^-18/s,** which can be compared to the average value of measurements on Cepheid variables by the Red Shift: H = 2.25 (+/- 0.08) 10^-18/s, see [6].

Considering the uncertainties, our result is quite satisfactory.

4. Conclusion

We have shown the very moderate dependence of the electron mass on the age of the universe: this mass would have decreased by about 15% since the formation of our galaxy, nearly 9 billion years ago!

The most important results are not this one, but the confirmation of the CMB measurement for the age of the universe, with a significant improvement in precision and a very accurate evaluation of the mass of the electron.

Other result is an evaluation of the Hubble constant, consistent with experimental values.

It is also gratifying for us to see further justification, which seems decisive, for the results of our work on the electron and granular quantum superfluid spacetime.

We ask the reader not to hold it against us for providing a majority of references concerning our publications; this is explained by a very personal research approach, in form, which relies only on proven knowledge in entirely new concepts; our aim is to provide them with additional justification and a better understanding.

References

1. Raverdy, Y. C. (2023). "A formula for electron mass calculation based on new fundamental concepts". *J Pure Appl Math. 7*(2):129-133 and viXra 2208.0154.
2. Raverdy, Y.C. (2024). "About Dark Energy" *viXra 2405.00061.*
3. See Wikipedia: "Cosmic microwave background".
4. Raverdy, Y.C. (2024). "Intrinsic empty space." *viXra 2411.0030.*
5. Raverdy, Y.C. (2025). "The evolution of the Universe from the Big Bang to the Big Bonce" *viXra 2509.0067*, on Quantum Gravity.
6. See Wikipedia, "Hubble constant"; "Observation of Cepheid variables in the Large Magellanic Cloud (after precise calibration) by the Hubble Space Telescope."