About the Fine Structure Constant

Yvan-Claude Raverdy*

*Corresponding Author
Yvan-Claude Raverdy, France

Abstract
This study builds on a previous publication entitled "a formula for electron mass calculation based on new fundamental concepts (ref.1), it shows that the relationship obtained between the mass of the electron and the four fundamental constants of physics, including fine structure constant, is precisely satisfied (to the millionth) if we take the inverse of the latter equal to the whole number 137. This value is interpreted as "ideal" for a Vacuum which would be free from radiation and other particles, therefore consisting exclusively of dark energy, this would imply a slight modification of the speed of light and Planck's constant, in this medium.

1. Introduction

The calculation of the mass of the electron, carried out according to the established formula, see reference (1) and further, gives a precisely correct result for omega value (inverse of the fine structure constant) which is **137.0036** using the real and precise experimental values of others physical constants.

The experimental omega value is **137.0360;** why such a difference ? ; we think that the reason is that the Vacuum energy is not entirely pure because at least the photons of the fossil radiation are added to the anti-graviton gas constituting most of the vacuum energy (dark energy) and with which the electron is in equilibrium (ref 1). However, a very slight variation for omega must cause a small modification of the permittivity of the vacuum, therefore the speed of light. The aim of this study is to clarify the omega value for an ideal vacuum containing only anti-gravitons dark energy (reference 3), taking into account the very weak variations induced on the other constants.

2. Development

The formula providing the electron mass that we have demonstrated is as follows (reference 1)

Me = (pi / 8 omega) . 1 / (16 e^omega)^1/3 . (h c / G)^1/2   (1)

where h is Planck's constant, c the speed of light and G the gravitational constant.
We also showed that we could express omega by a very simple relationship between the two fundamental extreme lengths which are the "radius" of the universe R and the radius of the graviton lo (comparable to the Planck distance), this relationship is:

omega = Ln (R / lo)   (2) (Ln: natural logarithm)

We have also explained the value of lo within the framework of a theory corpuscular for the gravitation (reference 2) :2

lo = 2 (h G / c^3)^1/2   (3)

By setting k = (h c / G)^1/2 and using formulas (2) and (3), a calculation, which we do not report here, results in the differential relation :

d(omega) = (omega 1 – omega o) = 3 Ln (k1 / ko)

The comparison of this relationship with the formula for the mass of the electron (1) in the two cases where it gives a correct result:
1) omega = 137.0036, k unmodified (index 1)
2) Values with index o integrating the variation of k (k(o)) provides the value: **omega (o) = 137.0000…**

This result incorporates a modification of the speed of light such that $c(o) = 0.9992\ c(1)$ and a variation, twice this, of the Planck constant h.

3. Conclusion and Discussion

Thus, strictly speaking, the formula for calculating the mass of the electron is precisely exact for a value of omega which is the whole number **137**, as far as we can tell it for a millionth precision.

This implies a relative reduction in the speed of light of 810^{-4}, this is a fairly significant variation that can be explained by the subtraction of all the radiation present and capable of acting, indirectly, on the dielectric permittivity of the vacuum, in agreement with the found value of the fine structure constant **(1/137).** The concequence is that the three constants, **omega, c** and **h** are totally universal if fossil radiation is the only addition to anti-gravitons of dark energy, because its density is constant everywhere.

The fact that **omega** can be a whole number has been considered since the beginning of the consideration of the fine structure constant by *Sommerfeld in 1916*.

Eddington was convinced of this and had imagined a justification which had not been accepted, especially since the details made to the measurement have completely excluded it from reality.

The discovery of a relationship between the mass of the electron and the four fundamental constants of Physics (ref.1), reintroduces the number **137** for an ideal case where the vacuum would be purified of every electromagnetic radiation and other particles, it is possible that this condition can lead on a path of understanding this fact, possibly in relying, why not, on the reasoning of Eddington (ref.3) and others. In any case, a practical application would be the selection and weighting of radiation having an impact on the permittivity of the vacuum.

In fact, knowledge of the influence of these radiations on dielectric properties of the vacuum is likely to provide information on the nature of dark energy.

References

1. Raverdy, Y. C. [2023]. "A formula for electron mass calculation based on new fundamental concepts". *viXra, Hight Energy Particles Physics 22*(8).
2. Raverdy Y. C. [2023]. "A corpuscular space-time to explain the gravitation" *J. Mod. Appl. Phys. 6*(2):1-4.
3. Kilmister, C. W. (1994). *Eddington's search for a fundamental theory: a key to the universe*. Cambridge University Press.