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ON THE FINE STRUCTURE CONSTANT

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ABSTRACT

We investigate the role of the fine structure constant. We deduce that is an elementary term used in expansions and that probably it is used to describe the polarization of charge or mass as a ratio of two unknown quantities possibly from a fifth dimension.

Keywords: Quantum Mechanics; Special Relativity; Hidden Variables;Quantum Electrodynamics; Philosophy;

1 INTRODUCTION

The fine structure constant is symbolized by the Greek alpha and its value is:

$$\alpha = \frac{e^2}{4\pi\hbar c} \quad (1)$$

The author has suggested during 30 years of research that during the appearance of an event such as a photon absorption appear monopole antimonopole pairs virtually as a transformation of mass. We have also found that there is a curvature of spacetime due to the energy of the mass distinct from the gravitational one which is symbolized by K and is connected to the fine structure constant alpha. Both findings point to the probability that mass may be polarized.

2 MAIN PART

The two semiclassical conditions in the Bohr atom is the quantization of angular momentum and the equality of the electric potential energy to the kinetic energy:

$$\frac{mv^2}{2} = \frac{e^2}{4\pi\varepsilon_0 r} \quad (2)$$

$$mvr = \hbar \quad (3)$$

From the two above conditions (2) and (3) we arrive at the conclusions that for the electron in the first radius of the Bohr atom:

$$v = \alpha c \quad (4)$$

$$\frac{mv^2}{2} = \alpha^2 mc^2 \quad (5)$$

The ratio of electrostatic to magnetostatic energy in the first radius for the electron atom is approximately the inverse of the fine structure constant squared. The ratio of the electrostatic to magnetostatic energy in the first orbit of the electron in the Bohr atom is proportional to the inverse of the fine structure squared. One does not need to repeat the calculations as they have been performed. A question to the artificial intelligence may prove this. This property of the electron together with the aforementioned has a further sequence. The ratio of the electric energy of the electron to its rest energy classically is equal to the ratio of the electrostatic to the magnetic. Therefore the relativistic energy of the electron is magnetic one.

From the above discussion combined with equation (5) we deduce that the ratio of the kinetic energy of the electron over its rest mass energy is the same as the ratio of its electrostatic over its magnetic energy in the Sommerfeld approximation.

The relativistic approximations to the Lagrangian are:

$$L = mc^2 + \frac{1}{2}mv^2 + \cdots \quad (6)$$

The Lagrangian of the charge gives:

$$\text{L=Electrostatic + Magnetostatic + Dipolar +....} \quad (7)$$

An examination of equations (6) and (7) together with the up to now gained knowledge suggests that the inverse of the fine structure constant alpha is some kind of term used in Taylor expansions as suggested by the findings of QED as well and probably a ratio of two other quantities since it is dimensionless.

This suggests that as dx is infinitely small but yet finite as we expand in Taylor series there is some kind of polarization of mass since the first Lagrangian in equation (6) is obtained expanding as to velocity and the second in equation (7) by expanding as the inverse of the radius. Both velocity and radius are connected by mass.

3 CONCLUSION

We offered some insight for the existence of an undefined fine structure constant related to a possible polarization of the mass or the charge. The reason the fathers of the theory chose alpha has to do with the solid angles specifically four dimensional solid angles being named after the last letter of the Greek alphabet Omega

We hope we have contributed to the field of research of hidden variables.

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