

Spherical electron from 'quark' magnetic monopole

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Proposed is a geometrical formula for a dimensionless magnetic monopole constructed from Planck time, elementary charge, $-e$ and α , the fine structure constant. A formula for the electron may be constructed from these monopoles, this formula suggests that the charge distribution of the electron is perfectly symmetrical. As this monopole comprises a 1/3rd part of electron charge, it is analogous to the quark which in turn suggests that the basis for all charge is this monopole, consequently, although charges may have opposite polarity, their magnitudes must be equivalent, the differences between the proton and electron for example being geometrical rather than physical. A temperature particle labeled the 'kelvon' is proposed. Furthermore, these formulas suggest a Mathematical Universe constructed from Planck units, wave-particle duality becoming a wave-state to Planck point-state oscillation.

1 Introduction

A magnetic monopole is a hypothetical particle in particle physics that is a magnet with only one magnetic pole (a north pole without a south pole or vice-versa). In more technical terms, a magnetic monopole would have a net "magnetic charge". Modern interest in the concept stems from particle theories, notably the grand unified and superstring theories, which predict their existence. Magnetism in bar magnets and electromagnets does not arise from magnetic monopoles, and in fact there is no conclusive experimental evidence that magnetic monopoles exist at all in the universe.

The quantum theory of magnetic charge started with a paper by the physicist Paul A.M. Dirac in 1931. In this paper, Dirac showed that if any magnetic monopoles exist in the universe, then all electric charge in the universe must be quantized.

Further advances in theoretical particle physics, particularly developments in grand unified theories and quantum gravity, have led to more compelling arguments that monopoles do exist. Joseph Polchinski, a prominent string-theorist, described the existence of monopoles as "one of the safest bets that one can make about physics not yet seen". These theories are not necessarily inconsistent with the experimental evidence. In some theoretical models, magnetic monopoles are unlikely to be observed, because they are too massive to be created in particle accelerators, and also too rare in the Universe to enter a particle detector with much probability [1].

Einstein proved that a magnetic field is the relativistic part of an electric field. This means that while an electric field acts between charges, a magnetic field acts between moving charges (as a charge moves through space more quickly and through time more slowly, its electromagnetic force becomes more magnetic and less electric). Therefore, the pole strength is the product of charge and velocity [2].

2 Dimensionless SI units:

The SI units refer to standardized reference units; 1m, 1s, 1A, 1kg... When we describe a distance as 10 meters, we are in fact measuring this distance in terms of a defined dimension (the SI unit 1m), such that there are 10 of these '1m' units (10 x 1m). The number 10 itself is a dimensionless number.

The Planck units also define specific reference units, however the SI units were selected independently of the Planck units, there is no exact relationship. Consequently we cannot, for example, numerically measure 1m precisely in terms of Planck length units, instead we must assign a dimensionless variable to represent this relationship.

The conversion from Planck units; Planck time t_p , elementary charge e and speed of light c to SI units 1s, 1C, 1m/s requires dimensionless variables whose numerical values are equivalent (t_x, e_x, c_x).

$$\frac{t_p}{t_x} = \frac{5.3912...e^{-44} s}{5.3912...e^{-44}} = 1s$$

$$\frac{e}{e_x} = \frac{1.6021764...e^{-19} C}{1.6021764...e^{-19}} = 1C$$

$$\frac{c}{c_x} = \frac{299792458 m/s}{299792458} = 1m/s$$

3 Magnetic monopoles:

If the unit for a magnetic monopole is an ampere-meter $A.m$, then a Planck magnetic monopole would comprise a Planck ampere and Planck length ($A.m = e.c$).

Proposed formula for a dimensionless magnetic monopole.

$$\sigma_e = \frac{2.\pi^2}{3.\alpha^2.e_x.c_x} \quad (1)$$

4 Electron:

The formula for an electron at rest. The monopole resembles a quark albeit the charge is cubed, not summed.

$$E_\sigma = t_x \cdot \sigma_e^3 \quad (2)$$

What we normally consider as the electron appears to be a dimensionless formula that dictates the frequency of Planck events.

Planck mass: [3]

$$m_e = m_p \cdot E_\sigma \quad (3)$$

Compton wavelength:

$$\lambda_e = \frac{2\pi \cdot l_p}{E_\sigma} \quad (4)$$

Frequency:

$$T_e = \frac{2\pi \cdot l_p}{E_\sigma \cdot c} = \frac{t_p}{E_\sigma} = \frac{1}{\sigma_e^3} \cdot \frac{t_p}{t_x} \quad (5)$$

Gravitation coupling constant:

$$\alpha_G = \left(\frac{m_p \cdot E_\sigma}{m_p} \right)^2 = E_\sigma^2 \quad (6)$$

para-positronium lifetime:

$$t_0 = \frac{\alpha^5}{\sigma_e^3} \cdot \frac{t_p}{t_x} \quad (7)$$

ortho-positronium lifetime:

$$t_1 = \frac{9\pi \cdot \alpha^6}{4\sigma_e^3 \cdot (\pi^2 - 9)} \cdot \frac{t_p}{t_x} \quad (8)$$

5 Quark:

Traditional Quark theory suggests that the basic unit of charge is a 1/3th part of elementary charge 'e', such that;

Electron: -1

Proton: U + U + D = 2/3 + 2/3 - 1/3 = 1

Neutron: U + D + D = 2/3 - 1/3 - 1/3 = 0

The monopole equivalent

Electron: $-\sigma_e^3$

Proton: $U\sigma_e^2 \times U\sigma_e^2 \times D\sigma_e^{-1} = UUD\sigma_e^3$

Neutron: $U\sigma_e^2 \times D\sigma_e^{-1} \times D\sigma_e^{-1} = UDD\sigma_e^0$

This suggests that there is only 1 unit for charge; the magnetic monopole, and so the charge 'component' of the proton becomes indistinguishable from that of the positron, the difference being geometrical rather than fundamental.

6 Kelvon

The following particle groups may also be possible.

A $t_x \cdot \sigma_e^2$ particle would have only 1 space dimension, be electrically neutral, and have a mass in the neutrino mass range; $m_e * 10^{-7}$ to 10^{-9} kg.

A $t_x \cdot \sigma_e^4$ particle would have 3 space dimensions and a mass in the top quark range; $m_e * 10^7$ kg.

A $t_x \cdot \sigma_e^1$ particle would have 0 space dimensions and have charge along 1 axis. Without space dimensions it presumably cannot move in 3-D space of its on volition and so may have to be carried by particles and transferred by direct collision. It is the inverse of Planck temperature which suggests that it is this particle that is responsible for carrying temperature. As such I have labeled it a kelvon [5].

k_B = Boltzmanns constant

A baseline $t_x \cdot \sigma_e$ particle [4];

$$(kelvon) = t_x \cdot \sigma_e = \frac{2\pi}{3\alpha^2 \cdot T_p} \quad (9)$$

$$E = E_p \cdot t_x \cdot \sigma_e = \frac{2\pi \cdot E_p}{3\alpha^2 \cdot T_p} = \frac{2\pi \cdot k_B}{3\alpha^2} \quad (10)$$

This 'kelvon' (eq.9) compares with the lowest possible temperature [5].

$$t_{min} = \frac{8\pi}{T_p} = 0.177 \cdot 10^{-30} \text{ K} \quad (11)$$

7 Summary

I suggest that what we refer to as the electron is a dimensionless mathematical formula that dictates the frequency of Planck events as measured over Planck time. Wave-particle duality then reduces to an oscillation between a periodic analog electric wave-shape (the particle frequency) and a time-less ($t_p = 1$) integer Planck-event (Planck-mass) point-state.

The duration of the point-state defines or is defined by a single unit of Planck time.

Both $E=hv$ and $E=mc^2$ would then be functions of this frequency formula; where v refers to the analog state and m refers to the point state. We need therefore only to reduce the frequency of E_σ along the universe time-line [3], by adding momentum to the electron, in order to increase both the frequency of v and of m .

If time and c are both constants, then relativity reduces to Pythagorean geometry.

whereby for a particle;

electric wave-state: time = t_{freq} , mass = 0

digital point-state: time = $1t_p$, mass = $1m_p$

References

1. <http://en.wikipedia.org/wiki/Magnetic-monopole>
 2. <http://en.wikipedia.org/wiki/Ampere-meter>
 3. www.planckmomentum.com
 4. Macleod. M, Fine structure constant and sqrt of Planck momentum
<http://vixra.org/abs/1308.0118>
 5. M.J.Macleod, Time and the black hole universe
<http://vixra.org/abs/1310.0191>
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