Electron as magnetic monopole

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A formula for an electron as a geometrical shape whose axis is a magnetic monopole is proposed. The electron formula is constructed from Planck length, Planck mass, elementary charge and c. This geometrical shape is symmetrical for an electron at rest.

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 unit of distance (1m), such that there are 10 of these '1m' units. 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 in terms of Planck length units, instead we must assign a dimensionless variable to represent this relationship.

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

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

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

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

3 Magnetic monoples:

If the unit for a magnetic monopole is an ampere-meter, then a (Planck) magnetic monople would comprise a (Planck) ampere and Planck length. This is equivalent to e x c (elementary charge x velocity c). A dimensionless magnetic monopole would therefore include e_x x c_x.

Proposed formula for a dimensionless magnetic monopole.

$$M_0 = \frac{2.\pi^2}{3.\alpha^2.e_x.c_x} \tag{1}$$

4 Electron:

Proposed formula for the electron as 2 magnetic monopole structures forming a single standing wave (re: online calculator [3]).
Planck mass = m_P

$$m_e = 2.m_P.t_x.M_0^3 \tag{2}$$

The above was adapted from the book Plato's Code (2007):
the Geometry of Planck Momentum [4].

References

1. http://en.wikipedia.org/wiki/Magnetic-monopole
2. http://en.wikipedia.org/wiki/Ampere-meter
3. online calculator:
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4. Plato's Code: online edtion 2011;
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