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Magnetic Charge Theory Part 4: Fermion Angular Momentum

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Abstract

The magnetic charge concept is further developed to define the vibrational motion of a charged particle moving in the ether/dark matter. The angular momentum of the resulting motion is derived to be $\hbar/2$ at all velocities. The vibrational motion also provides additional justification for the Coulomb and gravitational forces not having a singularity. Additional insights into antimatter composition and annihilation are also developed.

Keywords

Particle Spin, Antimatter, Particle Vibration, Particle Angular Momentum, Magnetic Charge, Dark Matter, Ether

1. Introduction

Magnetic Charge Theory (MCT) assumes that matter has a magnetic charge that produces a magnetic field proportional to a particle's velocity (**Figure 1**). Assigning a magnetic charge to dark matter results in a transverse wave producing the electromagnetic properties of a photon and thus correlates dark matter to the ether [1] leading to: an understanding of the photon [2] as a localized transverse wave, the transmission of the Coulomb force by vortex photons [2], gravity being transmitted by Gaussian photons [2], and an explanation where the neutron is produced by the magnetic fields binding the electron to the proton [3]. In addition, equating dark matter with the ether led to the speed of light being dependent on the ether density [1], which leads to the possibility that the universe's expansion appears to be accelerating when in fact it is decelerating as would be expected from the big bang [1], and which leads to space-time varying with ether density [1].

A key result of MCT is that a particle's motion, both its vibration and translation, with its electric and magnetic charges, creates fields that contain the particle's

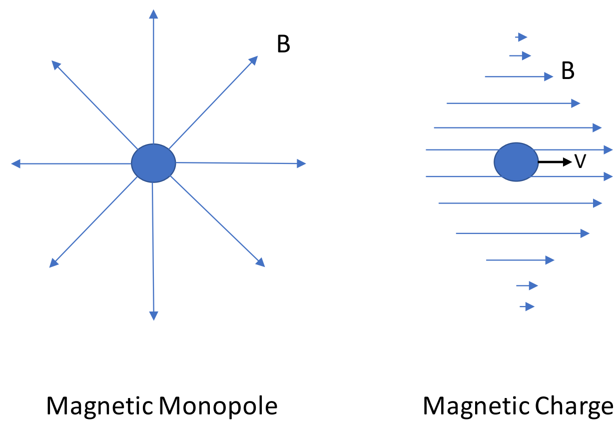

Figure 1. Magnetic monopole/magnetic charge distinction [2].

energy. The previous work assumed the basic vibrational motion of a particle at rest to be linear, however, with electric charge, the ground state vibrational motion of a particle about its classical position is more complicated when the particle is moving through the ether.

2. Particle Motion

MCT assumes that particles have a magnetic charge that produces a magnetic field proportional to the particle's velocity and magnetic charge. A particle traveling through the magnetically charged ether will have its fundamental vibration modified by the magnetic field's forces on the electric charge. As such, the linear harmonic motion assumed for a stationary particle will be perturbed.

As a particle transits the ether, two forces determine its motion about its center of mass, or more accurately, its center of motion as it vibrates. The first force is on the electric charge moving in the magnetic field which is produced by the flow of ether in the particle's reference frame. The second force is the fundamental vibration of a particle in its ground state, which will be modeled as the ground state of a quantum mechanical simple harmonic oscillator (SHO). This results in the following equation to determine the motion of the particle (in Gaussian units):

$$\boldsymbol{F} = \left(q_e/c\right)\boldsymbol{v}\times\boldsymbol{B} - k\boldsymbol{r} = m\boldsymbol{a}\ , \tag{1}$$

where $\boldsymbol{F}$ is the force on the particle, q_e is the electric charge, $\boldsymbol{r}$ is the position, $\boldsymbol{v}$ is the velocity of the particle relative to the center of motion, k is the restoration constant of a SHO, $\boldsymbol{a}$ is the acceleration of the particle relative to the center of motion, m is the mass, and $\boldsymbol{B}$ is the magnetic field created by the ether in the particle's frame of reference and is proportional to the magnetic charge of the ether and the velocity of the particle's center of motion in the ether [2]. Assuming the direction of the center of motion of the particle in the ether is in the z direction, $\boldsymbol{B} = B\hat{z}$ and solving Equation (1) results in the following general solution:

$$\boldsymbol{r} = A_{xy}\sin\left(\omega_{xy}t\right)\hat{x} + A_{xy}\cos\left(\omega_{xy}t\right)\hat{y} + A_z\sin\left(\omega t\right)\hat{z}, \tag{2}$$

where A_{xy} and A_z are amplitudes, $\omega^2 = k/m$, and

$$\omega_{xy} = \frac{q_e B}{2mc} \pm \sqrt{\frac{q_e^2 B^2}{4m^2 c^2} + \frac{k}{m}}. \tag{3}$$

The amplitudes are determined by two constraints. First, the obvious rotational motion implies an angular momentum and with angular momentum, the electric charge would imply a magnetic moment parallel to the angular momentum. In addition, the magnetic moment will align parallel to the magnetic field, hence, $A_z = 0$. Without the $\hat{z}$ component, the particle motion is circular in a plane normal to $\boldsymbol{B}$. The second constraint comes from reference [2], where the analysis of the Coulomb force implied that the peak velocity of the vibrating electrically charged particle is equal to the speed of light, c. Hence:

$$A_{xy}\omega_{xy} = c\,. \tag{4}$$

Therefore, the fundament motion of a particle is circular with a constant speed of c in a plane normal to the particle's velocity through the ether. The particle's rotational velocity increases the faster it moves through the ether while its radius of curvature decreases.

The circular motion also provides insight into the Coulomb and gravitational forces. Since the v-photons and g-photons are generated from the particle's motion, none of the photons originate from the origin, the classical location of a particle; they all are emitted at A_{xy} from the origin and, hence, there are no Coulomb or gravitational forces inside A_{xy}. Previously, MCT determined that there was a cutoff range in the Coulomb force that prevented the force from being singular at the particle's origin [3]. The circular motion of the particle provides additional justification. The same logic would justify there not being a singularity in the gravitational force.

3. Spin Angular Momentum

The calculation of the spin angular momentum, $\boldsymbol{S}$, is straight-forward and given by the following:

$$\boldsymbol{S} = \boldsymbol{r} \times \boldsymbol{p} \tag{5}$$

where $\boldsymbol{r}$ is the radius of rotation and $\boldsymbol{p}$ is the momentum. The radius is equal to A_{xy} and the momentum equals mass times velocity, *i.e.*, $p = mc$. Hence:

$$|\boldsymbol{S}| = A_{xy} mc. \tag{6}$$

Using Equation (4) eliminates A_{xy} yielding:

$$|\boldsymbol{S}| = \frac{mc^2}{\omega_{xy}}. \tag{7}$$

The energy of the particle is mc^2 and is equal to the ground state energy of a SHO, $\hbar\omega_{xy}/2$, in this case. Thus:

$$|\boldsymbol{S}| = \frac{\hbar}{2}. \tag{8}$$

Both the amplitude and frequency are velocity dependent, so this result is valid at all particle velocities in the ether in agreement with known facts.

The above analysis is similar to another situation, namely an electrically charged particle in an external magnetic field. Equation (1) and its solution Equations (2 & 3) are the same, as is the first constraint, *i.e.*, the magnetic moment being parallel to the magnetic field. However, without MCT, Equation (4) is not a given. If the circular motion is assumed to be at the speed of light, then spin angular momentum would be the same. With MCT and an external magnetic field, the spin angular momentum would also be the same.

4. Mass

Previously, MCT showed that mass was a calculated parameter for a particle [2] [3] and its energy is contained in its electric and magnetic fields. Thus, the calculated mass based on energy, the energy-mass, is a function of the electric and magnetic charges. Gravity, on the other hand, is based on the interaction with g-photons with the magnetic charge of a particle. Thus, the calculated mass based on gravity, the gravity-mass, is based only on the magnetic charge. In the case of a particle with only a magnetic charge, the energy-mass and the gravity-mass are equal. Outside of gravity, the mass in all other situations is the energy-mass.

5. Antimatter

The magnetic charge of an antiparticle would seem to be the opposite of its associated particle since it already has the opposite electric charge and then, in annihilation, the charges would cancel out, but there is a more compelling logic.

A particle and its antiparticle would be attracted to each other due to their opposite electric charges and the Coulomb force outside of the cutoff range [3]. As the particles approach each other, their motion through the ether would define their circular orbits normal to their velocities. The rotations are in the same direction due to their opposite electric charges and opposite velocities. As the particles close in on each other within the cutoff range, their magnetic charges govern their motion as the Coulomb force goes to zero. If the magnetic charges are the same, the particles would repel each other like two bar magnets aligned parallel, as well as, not having their magnetic fields cancel. However, if the two particles magnetic charges are opposite, then the particles attract each other like two bar magnets aligned antiparallel. As they superimpose on each other, annihilation occurs as the fields of both particles being equal and opposite cancel and the energy is emitted in the form of t-photons. The field cancellation also explains why an antiparticle only annihilates with its associated particle. This leaves an obvious question, is there nothing remaining or is there a particle with no electric or magnetic charge and therefore would have no energy?

Another logic for the antiparticle's magnetic charge being the opposite is from its gravity-mass. The antiparticle's energy-mass would be the same for either polarity of the magnetic charge, however, the gravitational force would be opposite. G-photons attract normal matter because the magnetic field impulse of the g-photon provides an attractive impulsive force on normal matter. However, in the case of the antiparticle, the magnetic charge is the opposite of normal matter, and the g-photon's impulse produces a repulsive force on the antiparticle. This would explain why antimatter is missing in our known universe; the antimatter was repelled out of our known universe soon after the big bang and continues to be repelled where the ether exists. However, current consensus is that antimatter should be attracted by matter, but measurements have been unable to confirm, and the issue remains unresolved [4].

6. Summary

The success of MCT to predict the correct spin angular momentum for a charged particle, $\hbar/2$, adds one more success for the theory, as well as being able to describe a particle's ground state vibration as being circular in a plane normal to the local magnetic field. MCT continues to support the model that a particle's energy is all contained in the electric and magnetic fields that are generated by its motion, and for antimatter these fields are the opposite, providing the mechanism for annihilation and the means for antimatter to be repelled by gravity. In addition, waves in a magnetically charged ether can explain the photon, gravity, and the Coulomb force.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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