The Electron's Charge Sign Indicates Electron's Self-Rotation

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Abstract: Handedness of self-rotation distinguishes between the neutral neutrino, and anti-neutrino.
the anti-neutrino has left-handed self-rotation, and the neutrino has right-handed self-rotation.
The two flavors of electron charge, plus, and minus, indicates self-rotation of the electron. The electron has a negative charge due to right-handed self-rotation, and the anti-electron has a positive charge due to left-handed self-rotation.

The electric force law is modeled after the gravitational force law.
If the distance between two masses is r, the gravitational force between them is

$$G\frac{m_1 m_2}{r^2}$$

In electricity, a charge q replaces the mass m. But electrically neutral mass does have two flavors. There are no positive mass, and negative mass.

The question rises how do charges be negative, and positive.

The electric field of the proton at distance r is defined as

$$E^{+}(r)=\frac{1}{4\pi\varepsilon_0}\frac{e^{+}}{r^2}$$

Due to the positive sign of e^{+}, the field $E^{+}(r)$ is positive.

The electric field of the electron at distance r is defined as

$$E^{-}(r)=\frac{1}{4\pi\varepsilon_0}\frac{e^{-}}{r^2}$$

Due to the negative sign of e^{-}, the field $E^{-}(r)$ is negative.

The sign of a charge follows the sign of its electric field.

To see what determines the sign of an electric field, we appeal to its analogy with the magnetic field.

An electric current through a solenoid creates a magnetic field along the axis of the solenoid with a north and the south poles.

If the current flows anti-clockwise, I^{+}, the magnetic induction along the axis is directed to the north. Along an infinite axis,

$$B^{+}(r)=\frac{\mu_0 I^{+}}{2\pi r}$$

If the current flows clockwise, I^{-}, the magnetic induction along the axis points to the south, along an infinite axis,

$$B^{-}(r)=\frac{\mu_0 I^{-}}{2\pi r}.$$

This suggests that anti-clockwise flow of current endows a charge with positive sign, while clock-wise flow of current endows a charge with negative sign

That is, a proton revolves about itself counter-clockwise, and has a positive charge. And an electron revolves about itself clockwise, and has a negative charge.

Similarly, handedness distinguishes between the neutrino, and the anti-neutrino.

The $\overline{\nu}$ anti-neutrino rotates clockwise, and is right handed.

The ν neutrino rotates anti-clockwise, and is left handed.

In the annihilation of a neutrino, ν and an anti-neutrino $\overline{\nu}$ that creates electron e^-, and anti-electron e^+, left handed ν, and right handed $\overline{\nu}$ annihilate to create left handed matter wave of e^+, and right handed matter wave of e^-.

The observation of fractional electron charges of size $\frac{1}{3}e^-$, years ago, suggested that the electron is a composite particle, with charge made of the charges of three subelectrons of say $\frac{1}{3}e^+, \frac{2}{3}e^-, \frac{2}{3}e^-$ This applied later to the proton where the charges of the sub-protons were assumed to be $\frac{1}{3}e^-, \frac{2}{3}e^+, \frac{2}{3}e^+$.

To keep those subparticles from falling on each other, the electron has to be self revolving[1].

The charge sign that can be explained by left handedness or right handedness revolution of the charge another indication of the electron's, and the proton's self-revolutions.

[1] self-rotation used to mean "spinning", until quantum mechanics related "spin" to phase, and internal angular momentum, and $\hbar$.

References

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