<u>Calculation of the anomalous magnetic moment of the electron</u>

Weak coupling and the mass of the electron-neutrino?

The electron is bound by the strong interaction. It possesses a negative electric charge and a magnetic moment. It is involved in the weak interaction and has a gravitational proper mass (or rest mass).

According to my theory, the Compton wavelength is the circumference of the unified field of the electron, bound by the strong interaction. There are only two forces: the electromagnetic force and the gravitational force.

We can express the electron radius as a sum of corrections, each specific to a force or an interaction:

$$\mathbf{R = \Delta_S \pm \Delta_E \pm \Delta_M \pm \Delta_W \pm \Delta_G}$$

Where the subscripts are

S: Strong interaction
E: Electric force
M: Magnetic interaction
W: Weak interaction
G: Gravitational force

Firstly, we can neglect the gravitational force due to its extreme weakness.

$$\mathbf{\Delta_G \rightarrow 0}$$

Secondly, there is no magnetic interaction, just a magnetic moment generated (spatial relation), because there is no interaction with other particles. It is about a “free” electron radius. It is the calculation of the magnetic moment after all… Experimentally, the electron doesn’t **seem** to have other magnetic anomalies than the anomalous magnetic dipole moment. If there are other anomalies, they must be too small in comparison to affect this calculation. The half charges are supposed static to each other… Therefore,

$$\mathbf{\Delta_M = 0} \text{ or } \mathbf{\rightarrow 0}$$

Thirdly, let us define the strong interaction component as being normalized to 1 for simplicity.

$\Delta_S = R_S$ = Compton wavelength/2π = 1, thus we are left with

$$\mathbf{R = 1 \pm \Delta_E/R_S \pm \Delta_W/R_S}$$

It is important to note that having only two forces and that these two forces follow the same law of $1 / r^2$, only one relation is needed in terms of force, energy and momentum.

$$\mathbf{GM_p^2 = (1/\alpha) * e^2/4\pi\varepsilon_0}$$

Where α is the fine structure constant. It is the relative strength of the strong interaction compared to the electromagnetic force. M_p is the Planck mass. To fully understand you may have to read my theory almost entirely.

$\alpha = 1/137.035999074(44) = 7.2973525698(24)\times10^{-3}$

http://en.wikipedia.org/wiki/Fine-structure_constant

In my theory, the core of the electron is made of two loops of matter-wave, or what I call "gravitational light-wave", bound by the strong force (gravity at the Planck scale). The two loops are either side-by-side or concentric to each other (important for matter vs antimatter). They are produced by two rotating half charges or its equivalent. The two loops are separated by the Planck Length (L_p) and have an effective radius of R. The electron having two half charges possesses twice the potentials of one half (there are 2 relations included in the system; this is true for EM energy and the strong energy). We have:

$$\mathbf{GM_{el}^2/L_p = GM_p^2/R_S = (1/\alpha) * e^2/(R_s * 4\pi\varepsilon 0)}$$

Generalizing for my electron model (multiplying one side by x/x):

$$\mathbf{GM_p^2/R_S = (x / \alpha) *(e^2 / (x * R_S * 4\pi\varepsilon 0)),}$$

Where
G is the gravitational constant
M_{el} is the mass of the electron and M_P is the Planck mass
R_S = electron Compton wavelength / 2π
$x * R_S$ is the ***effective*** distance between the half charges of an elementary particle
$\alpha/x = \Delta_E/R_S$, this is what we are looking for, this is the correction to the electron charge radius due to the electrical repulsive force evaluated at the first order.

It is important to note that the charge is probably divided in two halves, forming two loops for entanglement purpose. But each half charge may possibly be subdivided along its loop. The basic model is two halves on opposite side of the electron, but you could use two quarter for each loop, and you could divide further. The fractional charges must be separated by equal distances and alternate from one loop to the other when viewed from a single unified loop. My solution is good in any of these cases. For simplicity, I used only two half charges.

Solution to the electric repulsion component of the magnetic moment

The effective distances between the charges are not $2*R_S$ as you might be expecting, but $\pi * R_S$ or half the circumference. In the electron, the effective distance is the path, the sum of momenta. Inertia and momentum are directly associated to the electric force and the particle radius.

The total electrical repulsive energy of the bound half charges is given by

$$\mathbf{E_E = 2 * (e/2)^2 / (\pi * R_s * 4\pi\varepsilon 0) = e^2 / (2\pi * R_s * 4\pi\varepsilon 0)}$$

Therefore, $x = 2\pi$,

and $\Delta_E/R_S = \alpha/x = \alpha/2\pi$, evaluated at the first order. By increasing the radius, the electrical repulsion is lowered, decreasing the radius. A decrease in the radius produces a higher repulsion, increasing the radius and so on, with always a smaller amount of correction by a factor of $\alpha/2\pi$. The relation of R to E being linear and of the first order then,

$$\mathbf{\Delta_E/R_S = \alpha/2\pi - (\alpha/2\pi)^2 + (\alpha/2\pi)^3 - (\alpha/2\pi)^4 + \ldots - \ldots\ldots = (\alpha/2\pi) / (1 + \alpha/2\pi)}$$

$$\mathbf{\Delta_E/R_S = 0.0011600624252}$$

$$\mathbf{R/R_S = 1 + 0.0011600624252 \pm \Delta_W/R_S}$$

(that should be good for the electron, the muon and the tau)

The experimental value of the electron magnetic moment is

$$\mathbf{1.0011596521807 = R_{exp} / R_S = R}$$

Therefore, the correction for the weak interaction is

$$\mathbf{\Delta_W/R_S = -4.10244\ x10e\text{-}7}$$

http://en.wikipedia.org/wiki/Weak_interaction

Remarks and interpretations:

I implied that all types of corrections are unrelated, why? Remember that there are only two forces, gravity and electromagnetism. All interactions are effective at very different scales. Beyond the strong interaction, where the kinetic energy is equal to the binding energy, what you give as momentum you must take from the binding energy and vice versa. **So, due to the**

electrical repulsion, the electron has an excess of intrinsic momentum and a deficiency in its binding potential (within itself) when the electron is "free". That is why the electron can interact electromagnetically with other particles…

This is where we may find a breakthrough for the physics of particles:

What is the most interesting correlation I found, and I think it is probably right, is regarding the weak interaction coupling constant possible value of **4.10244 x10e-7**. First observation, it is negative for the electron, it indicates a deficiency in its Weak momentum and an excess in its Weak binding energy, which is the opposite of its electromagnetic coupling. **That is also why the electron can interact weakly with other particles…** What is more striking is the value of the Weak interaction energy of the electron:

E_W = -4.10244 x10e-7 * electron mass-energy = 0.2096344 eV /c^2

Could this be the mass of the electron-neutrino?

http://en.wikipedia.org/wiki/Neutrino#Mass

In my theory, the electron comes from the neutron via the beta decay process. The electron, the electron-antineutrino and the proton are included in the neutron. The proof of that is the neutron star. The neutron star formation is the reverse process of the electron generation process of the big bang. Information is never lost.

http://en.wikipedia.org/wiki/Beta_decay

For the muon, it is more complex because it is unstable. We have to find how to calculate the instability with everything it implies. The muon has obviously a relatively large excess of intrinsic momentum. Where does it come from? Let just say that the electron-neutrino, the muon-neutrino and the tau-neutrino may or may not have different proper masses and that there could be different values for each Weak coupling.

This might explain the variations of the radioactive decays due to solar flares and due to our relative distance from the sun… What if we are in a sea of Cold Dark Neutrinos (CDN)?

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