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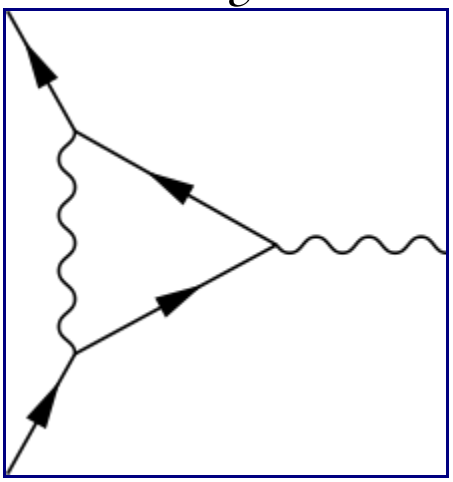
The Anomalous Magnetic Moment

and the *g*-factor



by Miles Mathis

Abstract: The anomalous magnetic moment of the electron is currently found using loop corrections (as in diagram above) and the vertex function. It is said to be the most accurate math ever devised. I will show that it is pushed like all the other quantum math. In doing so I will show that the magnetic moment is just $e/\sqrt{c}$.

The Dirac equation initially predicted a spin *g*-factor for the electron of 2. But the actual number is 2.002319. The difference divided by 2 is called the anomalous magnetic moment of the electron, and currently has the number .00116. This is also the difference between the magnetic moment of the electron m_s and the Bohr magneton μ_B. In other words,

$m_s = 1.00116\mu_B$

In my paper on the Bohr magneton, I showed that it was the charge field of the Earth that was causing the difference between the Bohr magneton and the magnetic moment of the electron, not any quantum mysticism concerning virtual photons, precession, and whatnot. I had already calculated a value for the charge field of the Earth of .009545m/s^2, from a simple comparison of numbers from the Moon and Earth. This means that the electron is not *creating* charge, it is existing in an ambient charge field. The calculation of the Bohr magneton doesn't take this into account, assuming instead that the electron's charge is a simple function of its mass and angular momentum. In other words, the equation

$$\mu_B = \frac{e\hbar}{2m_e}$$

is assuming that the electron is in the proton's field only, and not also in the Earth's field. But that equation could work only in space, far away from any large bodies.

So, rather than push that equation with manufactured loop corrections, we will correct it directly, by adding the charge field of the Earth back in. That should take the equation from a theoretical equation to an equation in a real field.

To do that, we have to realize that both *e* and *h* will be affected by the Earth's charge. In my paper on Millikan, I showed how the charge field of the Earth enters the equation for *e,* causing a .0973% change in *e*. That is, .009545/9.81 = .000973. We divide the Earth's charge by it's solo gravity to discover how much of the unified field is due to charge. That is our correction to *e*.

In a more recent paper on the photon, I rewrote the photon energy equation, dropping *h* out of it and replacing it with the photon radius. I showed that this gave us a 6% correction to the equation. This 6% correction was due to a misuse of π in the equations. But we still have π in the equation above: *h*-bar is equal to $h/2\pi$. Let's write it out in full:

$\mu_B = eh/4\pi m$

To replace π with 4 in the denominator, we have a correction of 1.27324. But we already have a correction to *h* in the numerator of 6% or 1.06225. This gives us a total correction to *h*-bar of 1.06225/1.27324 = .83429. Now, if we divide .000973 by .83429, we get .001166. We have found the correction in a mechanical way. That is the anomalous magnetic moment, from above. I have shown you it is just the correction to the Bohr magneton equation, matching it to data which includes the Earth's charge field.

But the equation is still redundant. Since we have just corrected the equation by correcting the charge field implicit inside *h*-bar, it is clear we don't need both *h*-bar and *e* in the same equation. The equation is over-written.

To see what I mean, we have to go all the way back to the Gans equation, from 1911*. Richard Gans showed that *h* could be expressed as the kinetic energy of the electron over its frequency:

$h = \frac{1}{2}mv^2/2f$

Since the frequency is a function of the angular momentum, and since angular momentum implicitly includes both a radius and a spin speed, the charge field is already included in *h*. Charge is already in that last equation. So we don't need it in the magnetic moment equation *twice*. And you can see that we don't need the mass in the equation again, either, since it is also already inside *h,* as part of the kinetic energy.

We should have already known that, since *h*-bar is already used to stand for the angular momentum L of the electron. The angular momentum is a function of charge, so mechanically we don't need both *e* and *h* in the same equation. We can find the magnetic moment either from *e* or from L, but we don't need both.

In fact, In a previous paper** I showed that **the magnetic moment of the electron and its charge are really the same thing.** I showed that by using √c as a simple dimensional transform, we can derive one number straight from the other. In other words,

1.602×10^{-19} C = 9.284×10^{-24} J/T

The numerical differerence there is just √c. The numbers are different *only because* they are written as different dimensions. If we write them in the same dimensions, the numbers are **the same**. [We have an error in transform there of only .0034, and we will dissolve that in a moment]. But of course this means that the equations for both the Bohr magneton and the magnetic moment are badly overwritten. Basically it means that $h/4\pi m = 1/\sqrt{c}$. That's right, *h*-bar over 2m equals $1/\sqrt{c}$. And $1/\sqrt{c}$ is just a dimensional transform between Coulombs and Joules/Tesla.

Let me be clear. If we were willing to write the magnetic moment in terms of Coulombs, we wouldn't need a dimensional transform at all. In that case,

$\mu_B = m_s = e$

And even if we want to write the Bohr magneton in terms of Joules/Tesla, we only need this equation

$\boldsymbol{\mu_B = m_s = e/\sqrt{c}}$

The only problem is that error of .003388. It allows us to correct this equation from the other end. You just saw me correct it by showing the errors within *h*-bar. But we can now correct the equation by correcting the error in *e* instead. Again, we have a .3388% miss between the current number for *e* and the number for m_s. As I pointed out in my Millikan paper, **the current number for *e* doesn't actually come from any experiment**. Even Wikipedia admits that it comes from CODATA adjustments, using this equation

$e^2 = 2h\alpha/\mu_0 c$ where μ_0 is the magnetic constant or permeability of free space

It turns out that equation is badly overwritten as well. Let's rewrite μ_0 in terms of ε_0.

$\varepsilon_0 = 1/c^2\mu_0$

$e^2 = 2h\alpha\varepsilon_0 c$

There is no reason for the fine structure constant to be in there, since we are calculating *e* from ε_0, not from the photon. What I mean is, in other papers I have shown that α is a correction to the Bohr equations, due to his conflation of the momenta of the photon and electron. It is a sort of correcting transform. But here we are calculating *e* from ε_0, which I have shown is really the gravity of the proton. So we don't need α. The equation should be written as

$e^2 = \beta h\varepsilon_0 c$

Where the constant β is yet to be determined. Unfortunately, we hit the same problem with *h* we had above. We don't have *h*-bar, so we don't need the number 1.27. We just divide .000973 by 1.062252, to get .00091597. If we multiply that by 8, we get .00732776, which is ≈ α.

$\alpha = .00729735$
$8[E_E/g_E//^4\sqrt{4/\pi})] = .00732776$

So the corrected equation is

$e^2 = 16[E_E/g_E//^4\sqrt{4/\pi})]h\varepsilon_0 c$

The difference between the two is about .4%, which explains a large part of the .3388% error. The other .0006 is due to ε_0, which I still haven't corrected. Since ε_0 depends on π like the rest, we do what we did above once again. The charge field of the Earth .000973 times 1.27 equals .00124. That's twice the correction we need, and I'm guessing that's because the current derivation of ε_0 uses 4π while the current derivation of *h* uses 2π. Since we have them sitting right next to eachother in the equation, we would have to scale the corrections relative to one another as well.

This means that the mainstream was just filling out a constant when they put 2α in there. We should have known that from the 2. You should not only ask yourself why α was ever in there, you should ask yourself why the 2 was ever in there. Even if there is some reason for α to be in there, why would we need to double it? The equation never made any mechanical sense.

There is work left to do, since I want to get *h* out of there and write *e* in terms of the radius or energy of the photon. I will save that for another paper.

But already these corrections have allowed us a way to check our numbers against eachother in a much more direct fashion. The dimensional transform $1/\sqrt{c}$ is telling us that the number for *e* should be 1.607605 rather than 1.602177. This is because the mainstream admits it has trouble measuring *e* directly. That is why they use CODATA rather than Millikan, Josephson or Hall. But then they claim to be able to measure m_s directly to one part in a trillion. If that is so, then we simply have to match *e* to m_s, using $1/\sqrt{c}$.

From all this, we can see that Feynman's loop corrections are just a non-mechanical attempt to resolve errors in the equations, without admitting the equations have errors. His corrections are actually another form of renormalization, and I would include the vertex function in a large list of "dippy processes." Feynman himself called renormalization "dippy" and "hocus-pocus," and although I don't know if he meant to include loop corrections in that admission, he should have.

You see, rather than correct the old quantum equations—which I have shown were in terrible shape from the very beginning—later physicists piled a load of fancy pushing math on top of them. This pushing math had two big upsides and only one downside. The downside is that the old equations were never actually corrected, so they continued to fail decade after decade, creating an awful mess. Upside number one (for the mainstream) is that this mess was partially hidden from view. The famous old guys like Bohr remained famous, and their students therefore didn't have to watch them fall and try to survive the crash. Physics was propped up, in other words. Upside number two was that this fancy new math impressed a lot of gullible young people and credulous mid-level physicists who found it an impressive form of magic. Feynman eventually admitted it was black magic, but to those in the field with stars in their eyes, it looked white enough. A lot of physicists and mathematicians are impressed by any new operators or fields or manipulations, and they don't really care if they are true are not, if they are physical or not, or if they are covering up old mistakes or not. In fact, a lot of new physicists appear to believe that it is the job of new math to cover up old math. Math as a push or a fudge is all they have ever known, and so they have long since come to terms with it. Feynman (along with Schwinger) was the prince of this sort of math and of this attitude toward math.

I am not going to pull apart the vertex function here in full, since anyone who studies it for half a

moment can see what a pile it is. To solve this simple problem, Feynman, Schwinger, (and many others) imported multiple pushes, in the form of the effective action, the gamma matrix, a virtual photon, and wave function renormalization. Primarily this is a cheat because like all virtual and vaccum cheats, the photon that is supposed to cause the anomaly is never seen. Photons are not like quarks or gluons: photons exist on their own, are detectable, and have rather large energies. They also persist—they don't live for 10^{-24}s or something. There is absolutely no reason or excuse to postulate virtual photons, unless you are fudging equations.

Another huge theoretical problem here is that Feynman has conveniently forgotten that virtual photons belong to the charge field, and that the charge field is quantized. Why is that a problem? Because it would mean that the precession and the photon/electron coupling and the anomalous magnetic moment should be quantized as well. So that if we increased charge in an experiment, we should be able to bump the charge field up a quantum and increase the coupling energy. In other words, if the anomaly is created as Feynman says it is, it should be quantized. **It shouldn't be a constant at .00116!**

This is why Feynman has to hide all the mechanics behind flashy math. Look closely at any explanation of the vertex function or loop corrections or effective action, and you see that you get no mechanics. They won't tell you what is going on as a matter of physics. It is all cloaking math.

$$\Gamma^\mu = \gamma^\mu F_1(q^2) + \frac{i\sigma^{\mu\nu}q_\nu}{2m}F_2(q^2)$$

That is the vertex function meant to cloak this solution, but we find that

At tree level (or leading order), $F_1(q^2) = 1$ and $F_2(q^2) = 0$. Beyond leading order, the corrections to $F_1(0)$ are exactly canceled by the wave function renormalization of the incoming and outgoing electron lines according to the Ward-Takahashi identity.

To put that in standard English, it means that to find the number .00116 that we need here, we can get rid of most of that hash. The second term goes to zero, and the first term reduces to γ^μ. Leaving us with $\Gamma^\mu = \gamma^\mu$. We can also lose the gamma matrix γ^μ without any harm, since this equation can be written in more pedestrian terms as $a = \alpha/2\pi = .00116$.

So why are we told of this other stuff? Only so that they can continue to solve to more precision, claiming to find *a* to one part in a billion and announce that "the magnetic moment of the electron is the most accurately verified prediction in the history of physics." Unfortunately, that is more fake horntooting, since no prediction was involved. They admit in the next sentence (at Wiki) that, "This required measuring *g* to an accuracy of around 1 part in 1 trillion (10^{12})." And what they did is push the number to data as more accuracy came in. That is the beauty of math that has no mechanics and no physical foundation. When you are dealing with virtual particles, gamma matrices, effective action, and *i*, you have an infinitely malleable equation that can match any incoming data. That is precisely why this new math is used. Feynman could have matched data to a *thousand* decimal places, given this sort of perturbation math and enough time. Perturbation math is simply the enshrinement of the mathematical push. With it, you can prove *anything*.

*John Heilbron; Thomas Kuhn (1969). "The genesis of the Bohr atom". *Historical Studies in the Physical Sciences* **1**: 232.
** See the last page of that paper.