the general science journal

THE FINE STRUCTURE CONSTANT AND PLANCK'S CONSTANT

by Miles Mathis
milesmathis.com

Abstract: I will show that Planck's constant is a paper wall built to hide the mass of the photon. After that I will unwind the fine structure constant, and answer Feynman's question as to where the number comes from and why it is what it is.

In his book *QED*, Richard Feynman has a final chapter called "Loose Ends" where he tells his audience some of the remaining unknowns of the theory of quantum electrodynamics. Chief among these is the number 1/137.03597, which is the fine structure constant. Feynman calls it the observed coupling constant or "the amplitude for a real electron to emit a real photon."[1] But at a place like Wikipedia, you will find it listed under "fine structure constant." Feynman says that "all good theoretical physicists put this number up on their wall and worry about it."

I don't worry about it because I know it is more misdirection. Feynman says that "a good theory would say that *e* is the square root of 3 over 2 pi squared, or something." But I have an even better theory: **The constant is a fake number**: an outcome of math specifically designed to keep you from looking in the right place.

The standard model defines the fine structure constant like this:

$$\alpha = e^2/2hc\varepsilon_0 = e^2c\mu_0/2h = 2\pi ke^2/hc$$

Modern physics loves to bury mechanics under constants. As you can see, the fine structure constant, which is already a constant, is defined in terms of other constants, like the permittivity and permeability constants. Charge is also now buried under many other constants, including the Rydberg constant, the Josephson constant, Faraday's constant, Avogadro's constant, and more. Now, we don't want to have to fool with the permittivity constant or the vacuum permeability, since I have already shown that they are misdirections http://milesmathis.com/charge.html. So we will look at the third equation.

$$\alpha = 2\pi ke^2/hc$$

At first it is difficult to see what Feynman is asking. He asks why the number is 137, but in the first instance, it is 137 because of the way the equation is built. So why is the equation built this way? You can see that we have Coulomb's constant, but since we are dealing with quanta, we don't need it. have shown that Coulomb's constant is a scaling constant I http://milesmathis.com/coul.html, taking us from the quantum level to our level. But this equation isn't scaling anything to our level. Yes, light is going c relative to us, but it is also going c relative to the quantum level. Both the electron and photon are already at the quantum level, so to me the presence of k is a sure sign that these physicists don't have any idea what they are doing. That is how I know this fine structure constant is a ghost.

The only physically assignable variables or constants we have here are *e* and c, so Feynman must be asking why the relationship of c to the squared charge of the electron is what it is. Notice that the "coupling" is between a squared charge and a velocity. That's rather odd, wouldn't you say? For the coupling constant to be meaningful as a number, it should couple a mass and a mass, or an energy and an energy, or something like that. As it is, this number is just an outcome of a juggled equation, juggled purposely to hide the real interactions.

This fine structure equation, with h and k, is already too complex. But it was not complex enough for modern physicists, who were afraid some graduate student might unwind it. So in the decades since they have created even more complex equations, like this one:

$$h = \frac{M_u A_r(e) c_0 \alpha^2}{R_\infty} \frac{\sqrt{2} d_{220}^3}{V_m(\mathrm{Si})}$$

Where R is Rydberg's constant,

$$R_\infty = \frac{m_e e^4}{8\epsilon_0^2 h^3 c_0} = \frac{m_e c_0 \alpha^2}{2h}$$

Every decade, basic physics and mechanics is plowed under by more and more needless math.

Feynman's question should have been, what is the relationship of the electron's mass to its charge, or what is the relationship of the electron's energy to the photon's energy. He and his colleagues couldn't answer these questions because they had already buried them under so much math, but I can answer them quite easily. To do that, we first have to dig Planck's constant out of the rubble and show what *it* really is.

If we go to the Wikipedia page on Planck's constant and scroll down to the section called "origin of Planck's constant," we find that Planck himself had no idea of the value of the constant. He was working, like Newton before him, with proportions. In looking at Wien's displacement law, Planck proposed that the energy of the light was proportional to its frequency, and then simply made up the equality with his constant. In other words, he had no idea where the constant was coming from. Planck did not develop the equation from mechanics, he developed it from experiment: specifically, the experiments at the turn of the century on black body radiation.

That Planck had no idea where his constant was coming from is understandable, but that later physicists could not figure it out is beyond belief, especially after Einstein gave them the equation $E=mc^2$. Planck's constant is now taught as a conversion factor between phase (in cycles) and action. But action is an old feint: a longstanding blanket over mechanics. So we can ignore that. The constant is expressed in eV seconds, erg seconds, or Joule seconds, all of which are unhelpful mechanically, so we can ignore them as well.

I will now show that Planck's constant is very easy to derive mechanically, which makes it astonishing that the derivation is not on the Wiki page or in any textbooks. Once you see how easy it is, you will agree that this information must be hidden on purpose. There is no way that a century of particle physicists could have been ignorant of what I am about to prove, so we must assume they were hiding it with full intent to deceive.

We take Einstein's famous equation and apply it straight to the photon. We don't need the transform *gamma*: *gamma* applies to everything except light. Light is a special case, remember? Einstein's postulate 2? So we can apply the equation as is, with no transform.

$E = mc^2$

$c = \lambda\nu$

$E = m(\lambda\nu)^2$

$h = m\lambda^2\nu$

Now, take a common photon like the infrared photon, with a wavelength of about 8×10^{-6} m. In that case $\lambda^2\nu = 2{,}400$. So,

$h = m(2{,}400)$

Planck's constant is about 2,400 times the mass of the photon.

You will say, "But the photon doesn't have mass!" And I say, that is what they want you to think, which is why they never use Einstein's equation on photons. Giving the photon mass, or even a strict mass equivalence, would bring down the entire structure of QED, so they can't let you go there.

You will reply, "But your math is just circular. You haven't explained anything mechanically."

Not yet I haven't—in this paper—but I send you to my paper on photon motion http://milesmathis.com/photon2.html, where I develop a mass for the photon without using Einstein's equation. I will do it again here. We start with the difference between the mass of the electron and the mass of the nucleon, which is called a Dalton, and which is about 1821. I have already shown that this number comes from the stacked spins on the electron http://milesmathis.com/elecpro.html, and I developed an equation that yields not only the Dalton but all the meson levels as well. In other words, I gave a mechanical explanation of the number 1821, with simple math and simple motions. In the paper after that http://milesmathis.com/photon.html, I showed that this same quantum equation will give us the photon mass as well, by assuming the photon inhabits a fundamental level of the equation, just like the electron, nucleon, and all the mesons. This fundamental level is 1821^3 beneath the proton level, or 1821^2 beneath the electron level. All we have to do is multiply the proton mass by $1/1821^3$, which gives us:

$1.67 \times 10^{-27}(1/1821)^3 = 2.77 \times 10^{-37}$ kg

That is the mass of the photon, derived without Einstein's equation. So my math is not circular.

But is it the correct math? Let's see. If we multiply that mass by 2,400 we get 6.63×10^{-34} kg, which is, sure enough, Planck's constant.

I have proved my point. Planck's constant is hiding the mass of the photon.

But how does this answer Feynman's question? We have to go back to the fine structure constant and remove all the fudge.

$\alpha = 2\pi k e^2/hc$

I have shown in other papers that k and π are ghosts, and in this paper I have shown that h and α are ghosts, so we have to dump them. We will use their numerical value to absorb them into the equation.

$e^2 = hc\alpha/2\pi k = 2400mc(.0073)/5.65 \times 10^{10} = .091m$

$e = .3\sqrt{m}$

$e = 1.602 \times 10^{-19}$ C

$1C = 2 \times 10^{-7}$ kg/s

$\boldsymbol{e = 3.204 \times 10^{-26}}$ kg/s

$e = 6.08 \times 10^{-8}[\sqrt{kg})/s](\sqrt{m})$

So, Feynman's question becomes "How do we explain this numerical relationship of m to *e*?" Well, we can't do it from these equations, as you now see, since these equations are not giving us a number relation between m and *e*. They are giving us a number relation between m and e^2. To get the right dimensions for *e*, the dimensions for that last constant must be √kg)/s. Since there is not a 1-to-1 relationship between s and √kg, even that last number is not telling us what we want to know.

We have more work to do. Let's look first at that number for *e* in the next to the last equation, which is the current one. I have expressed it in kg/s, and this brings a lot of things to light. Remember that the electron has a mass of 9.11×10^{-31} kg. According to this equation the electron is emitting a charge every second that outweighs it by 35,000 times. The electron is emitting the mass equivalent of 35,000 electrons every second, or 1.16×10^{11} photons per second. So it is not just my charge field that has mass. The standard model charge field has a huge mass, it is just hidden by these dimensions like the Coulomb. Ask yourself why the standard model and textbooks never write the fundamental charge as kg/s. Textbooks tell you that charge is mediated by virtual photons, but they don't tell you that the electron emits 35,000 times its own mass of these virtual photons every second, just to create charge. You see, if they told you this, they would have to field your next question, which is, "How can the electron emit so much mass and not dissolve? How does this conserve energy?" In my theory, I put that question out in the open and try to answer it, but the standard model prefers to dodge it with all their sloppy math and undefined constants and complex dimensions like the Coulomb and Ampere and Volt.

What allows us to solve this easily is the loss of the constant k. Remember that I said k is a scaling constant, and we don't need it here. The reason is because in these equations we are comparing quanta to eachother: no scaling is involved. For the same reason, we can import a trick I used in my quantum gravity paper http://milesmathis.com/quantumg.html, where I showed that as long as we are staying at the quantum level, and not scaling, we can use a very familiar number for gravity at the quantum level. If we are measuring gravity at the quantum level from our level, then we have to scale down using the radius as the scaling transform. But if we are *not* scaling, we can use 9.8 m/s^2 as the number for gravity. I showed that if the quanta measure their own gravity, this is the number they would get. It sounds crazy, I know, but I will show how it works again here. We just find a unified field force for the proton, using its mass and its acceleration.

$F = ma = (1.673 \times 10^{-27} kg)9.8 m/s^2 = 1.639 \times 10^{-26}$ N

Multiplying by two to represent the vector meeting of the fields of both electron and proton gives us 3.279×10^{-26} N. Amazingly close to our bolded number above for *e*, isn't it?

You will say "Yes, but you have a pretty significant difference, 7.5×10^{-28} N. You also have the wrong dimensions. The elementary charge is in kg/s, and your number is in N."

Let's look at my margin of error, first. If we divide, we find my error is about 2.3%. But I have already shown in my papers on the Bohr magneton http://milesmathis.com/magneton.html and Millikan's oil drop experiment http://milesmathis.com/millikan.html that the Earth's charge field is skewing all experiments done on the Earth. It is responsible for the .1% difference between the Bohr magneton and the magnetic moment of the electron. It was responsible for Millikan's error. And so it must also be responsible for a .1% error in computing quantum masses. The proton's mass is determined in experiments done here on the Earth, and physicists have never included the effect of the Earth's charge field, since they don't know it exists.

You will say, "Your error is 2%, not .1%". First of all, it is not my error: it is the standard model's error. And the error enters this problem in multiple places. Just as in Millikan's oil drop experiment, we have a confluence of errors. Let's look at the mass spectrometer, used to "weigh" the proton:

As you can see, the spectrometer must suffer the same problems as the oil drop experiment, since the magnet is in the plane of the Earth's charge field. The ions are moving straight down to start with and have a downward vector throughout the experiment. This can't work. The magnetic field is also rather weak, so it has no chance of burying the error simply by field strength

But even if the machine is turned 90^o, so that all motion is horizontal instead of vertical, the problem will remain. Unlike Venus http://milesmathis.com/venus.html, the Earth is both electrical and magnetic. If the experiment is done vertically, the electrical field of the Earth interacts. If the experiment is done horizontally, the magnetic field interacts. Both fields have the same strength, as produced by the charge field, so you are damned either way.

Although the mass spectrometer, either horizontal or vertical, must encounter the Earth's charge field, it does not encounter it precisely like the oil drop experiment did. Millikan set up the his electrical field in vector opposition to the gravity field, and included gravity in his calculations. But the math of the mass spectrometer attempts to ignore gravity, as an experimental constant. Masses in mass spectrometers are not calculated from gravity (in the experiment), they are calculated relative to eachother. Wikipedia admits that "there is no direct method for measuring the mass of the electron at rest,"[2] and this is also true of the proton. You can see that the proton must be moving in the spectrometer, and its path must be bent by a field. The relative bend then tells us the mass.

At any rate, gravity is present throughout the experiment, and though it can be ignored as a matter of relative mass, it cannot be ignored mechanically. Because it is present, it must be included in any correction. Both it and the induced magnetic field are affected, but because they are not in vector opposition we don't treat them the same as we did with Millikan. With Millikan, we applied the charge field correction directly to his electrical field, since he aligned them. Here we halve the correction and then take the square root to square the effect. We halve the correction because the motion of the particle in the curve goes from (nearly) all gravity to (nearly) all induced magnetic field. Look at the curve in the diagram. At the end of the path, the particle is not moving down at all. So we go from "gravity is the entire cause of motion" to "gravity is almost no cause of the motion." If we sum that path, from all to none, all being 1 and none being 0, then the average will be about ½, given a smooth curve. So we only get half our error during the experiment. We only get half of it, but we still have to take the square root, since the error affects both the gravitational field and the induced magnetic field. Two effects will give us an increased total effect.

The charge field of the Earth http://milesmathis.com/moon.html is .009545 m/s^2, which is .0974% of gravity. Half that is .000487, and the square root is .0221 or 2.21%. Above, my error was 2.3%, so I am now within .0009. The rest of that error is probably due to my math alone, since, as a theoretician, I almost never carry my calculations past the thousandths place. I will let those who love precision fine tune my math.

Now let's look at the dimensions. I have a force; the standard model Coulomb reduces to kg/s or Ns/m. But remember that the standard model is not too picky about its dimensions. The cgs system is still used, and in that system charge was kg or Ns^2/m. Yes, before SI, charge used to reduce to mass, although they never promoted that fact. So the dimension changes with the system. It changes again with my system, so that charge is a force, not a mass. I can change the dimensions without changing the number, because s/m reduces to one in my mechanics. Charge is the mass of the photon field, but a mass cannot give us a strength of interaction or a force by itself. You need a mass and a velocity, as I have shown elsewhere. This will give you a field strength, which will give you a force. Well, velocity is m/s. If you multiply s/m by m/s, you get one, and the field dimension reduces to N.

Conclusion: The elementary charge is not a charge, it is a unified field force http://milesmathis.com/uft2.html. The standard model believes that forces at the planetary or astral level are all gravitational and at the quantum level are all E/M, but this is false. The forces at all levels are unified field forces. The elementary charge includes gravity. For this reason we can use Newton's equations at the quantum level. Newton's equation is a unified field equation, and if we use it correctly, we can use it at any level. The measured masses of quanta are unified field numbers. *All* masses are unified field numbers, since they represent compound motions and forces. Quantum masses are hiding *both* fields, and this allows us to calculate "charges" straight from masses, without Coulomb's equation and without Planck's constant.

The elementary charge is not only a unified field force, it is a compound of emission by both the electron and the proton. Even when we are measuring the charge of the electron alone, the field will be composed of proton and electron emission. You cannot study electron charge alone, or proton charge alone, since you cannot go anywhere in the universe where the charge field is unipolar. Even on the surface of the proton or electron, you will find a bi-polar field. The charge field is everywhere, and it its strength is everywhere determined by compound emissions.

For the record, this is also why you can't have a magnetic monopole in the real world. There are no walls: the charge field is everywhere, and it is everywhere created by both protons and electrons (and anti-protons and positrons).

[1]*QED*, p. 129.

[2]http://en.wikipedia.org/wiki/Planck%27s_constant
