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THE PROTON RADIUS PUZZLE

the simple solution

by Miles Mathis

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[Update August 12, 2016: The mainstream is again leading with this story, but now admitting that it proves "physics is broken". They again appear to be *begging* for help, but mysteriously refusing to admit that I exist. This is curious, because you will see below that I not only solve the problem from a theoretical standpoint, I also do the simple math, showing them exactly where their *numbers* are coming from. That is, I am able to calculate the radius differential they are finding with simple highschool algebra and a few clear and concise postulates. Not only that, but I show you they are adjusting their CODATA numbers to fit my math and predictions from previous papers, but giving me no credit for it. This indicates they are reading my papers, adjusting their figures, but looking for some way to move ahead while keeping me outside the circle. That is not really surprising, since my physics utterly destroys decades of mainstream physics. But I remind you and them that they started this war, not me. They could have brought me in years ago and been nice, in which case I would have been nice, too. But they chose not to do that. So now they are in a war they can't ultimately win.]

The February 2014 issue of *Scientific American* led with the proton puzzle on its cover, but it is not the first we have seen of the problem. It arose strongly in 2010, when muon experiments began to show a large discrepancy in the values. Whereas decades of earlier experiments using electrons had shown a value for the radius of the proton of about .877 fm, the muon experiments showed values in the .841 range, a rather large miss (4.3%). Newer experiments have simply confirmed this gap, making it very unlikely the problem is in the measurements themselves. Particle physicists had hoped to explain the gap by experimental issues, that is, but that has not panned out. The gap appears to be real, caused by the interaction and not by some mistake by the experimenters. They are now calling this problem the greatest problem in Hadron physics.

Before we get to the simple solution, I would like to point out once again that all these values are way off. I showed several years ago that the femtometer values were all off by about 50 times, and that is because the equations they are using to calculate the radius are wrong in many ways. You see, the values they are giving you in the articles are *calculated* values, not values measured directly. They have no way of measuring directly at that scale, so they have to calculate sizes based on collisions or interactions. To do that, they have to use old equations for those collisions, and those equations contain things like the fine-structure constant, *pi*, and so on. The equations are compromised in many places, and I have begun to compile all those mistakes and correct them. However, this has very little to do with these new experiments. I have **not** shown that the new experiments are flawed and will not do that here. The big miss I showed back in 2008 is not an experimental miss, it is an equation miss. For more on this, see the links below.

In the current "puzzle", we are seeing a different problem. This puzzle is not an equation miss of that sort, since they are applying the same general equations to both muon and electron interactions. What we are seeing is a failure to recognize the charge field. It is an equation miss only in that none of the current equations include charge variations. They aren't including the charge field as a real field in either experiment, so they can't possibly include charge field variations *between* the two experiments.

In short, in one experiment they are letting the proton interact with muons. In the other, they are letting it interact with electrons. They then measure energy levels and so on, and from that they eventually get to a proton radius. The equations really aren't that difficult or extensive. Since they have pretty firm values for the masses of these particles, they should be able to determine a radius. And, as it turns out, they *are* able to determine a radius with great precision. As we will see, the *relative* radii are very good. What I mean by relative is that although the numbers aren't right in an absolute sense, relative to one another they are very good. Although neither the proton radius calculated from the muon nor the proton radius calculated from the electron is right, the gap between the two radii is about right. This means their experiments are pretty good. The experiments aren't matching only because the equations are incomplete.

In the current literature, they claim great confidence in the equations. They say they can't imagine novel hadron physics or BSM (beyond standard model) physics, but the solution is both, in a sense. It is also neither, in a sense. Since the charge field is known by current physicists, and is part of both hadron physics and the standard model, I am not creating or claiming any new field. But since both hadron physics and the standard model misunderstand the charge field, my field solution *is* novel, in a way. As you will see, it does give physicists another degree of freedom in their equations, and this is certainly new. But for myself, I don't see it as especially novel. I am simply seeing what the older fields have always contained. I am not creating a new field, I am just clarifying an old field.

So let's get right to it: what causes the gap in the first place? Why don't the two interactions give us the same radius for the proton? They don't, because these current physicists are once again leaving out a very important player in the collisions: the charge field. Over the past decade, I have shown this same mistake has caused almost every other problem in both quantum physics and astrophysics. In this problem, their equations don't include the fact that the muon is recycling a larger real charge field than the electron. The muon is larger, has more mass, and more *real* angular momentum: therefore, according to *my* equations, it must recycle more charge. Solving the superposition problem in 2005 allowed me to develop simple quantum spin equations that describe the quantum spin radii and thereby the charge passing through those spin levels.

In some ways, current physicists know about the charge field, but since they have never defined it as a real field with real mass equivalence, it doesn't get included in their equations. Remember, in current theory, the charge field is virtual. It creates potentials, but they don't really know how it does that mechanically. They quit doing mechanics about a century ago, and they were forced to give up on mechanics precisely because they couldn't deal with charge mechanically. They have assigned charge field interaction to messenger photons which can tell larger particles what to do, but they have assigned no mass to that virtual photon. They haven't even assigned mass to real photons, you know.

This creates a rather large problem here, because during any collision or interaction, these particles will be recycling the charge field all along. That is what charge is. Real photons will be going in the poles of all these particles and coming out the equators. When these particles collide or interact, not only will the particles proper collide, but the charge fields of those particles will collide. In other words, the photons coming out the equators will collide. So we have not just a meeting of particles, we have a meeting of charge fields. The mainstream completely ignores that, and has for 150 years. Because they have never assigned the charge field to a real field of real particles, they leave the charge field out of all experiments like this. They know the particles are charged, but they have no way of including the interaction of charge in the experiment. So they just ignore it.

I will prove that this is the cause of the gap by doing the simple math. We are seeing a 4.3% gap here, which is 4.3% of the radius of the proton. If that is caused by the charge difference between muon and electron, I should be able to show that pretty easily. Of course the mainstream can't possibly calculate this, since they simply give charged particles a ±1 charge. I have shown that is hopelessly naïve and how it causes many of their problems—not just this one. I have proved that in many previous papers by solving those other problems for them in a similar way. For example, I have shown that the charge of the electron is not just opposite to the charge of the proton, it is 1821 times smaller as a matter of density or field strength. This explains for instance why the current Rydberg equation is only able to predict the Balmer lines to 6 parts in 10,000. 6/10,000 ≈ 1/1821. The *effective* fundamental charge is wrong by that amount.

Using my quantum spin equation, we can find charge strengths as a function of these spin levels. Charge is recycled using these real spins and *through* these spins, and therefore it will be a straight function of them. I have shown that if we give the non-spinning electron a spin radius of 1 (as a baseline for comparison), the spinning electron will have a value of 9, the spinning and moving electron will have a value of 65, the muon will have a value of 2,050, and the proton will have a value of 16,385.* Those values are found by giving each new spin double the value of the spin beneath it, as you can see by going to that first paper. If we divide 16,385 by 9, we get about 1821, which tells us the charge difference between proton and normal electron. And if we divide 2,050 by 65, we get 31.5. That is the charge differential between electron and muon, so the electron has 1/31.5=3.17% the charge of the muon. That is what is creating the bulk of the gap between the muon measurement and the electron measurement of the proton radius. Since the electron has 3.17% the charge of the muon, it will interact with the proton's charge field that much less, *tamping it down that much less*.

The rest of the gap is explained by the radius of interaction between the particles. In these experiments, they are not really bombarding the proton with either muons or electrons. They are letting the smaller particle orbit the larger one, then using lasers to excite the orbital level, moving it up. [I hadn't realized that the first time I tried to solve this problem.] Yes, in the muon experiment, they are letting the muon orbit the proton just like an electron would. They even have a name for this beast: muonic hydrogen. By measuring the difference in energy levels, they can then calculate the radius of the proton. The thing is, the muon will not orbit at the same distance as the electron. Since the muon has more charge, it will be bombarding the proton more than the electron does, and so will orbit at a greater distance. In fact, it will be orbiting about 37% further away. Why? Well, we have to do a simple unified field calculation, using both the charge differential and the particle density differential. Both will help determine the orbital distance. We have just calculated the charge differential between muon and electron to be 31.5 times. The mass differential is known to be 207. To find a density, we need a radius. The radius differential is again the charge differential, since we are comparing the spin radii. But we are seeking to compare the densities of electron and muon, so we need a *volume* comparison. Density=Mass/Volume. To get that, we use a radius cubed, which means we need 31.5 cubed, or 31,256. The muon has 207 times the mass in 31,256 times the volume, giving us a density of 1/151. The electron is 151 times more dense than the muon. Now, as I have shown in previous papers, to find the way a charged particle behaves in a unified field, we multiply the mass times the density, which gives us an overall particle/charge density in the field. Therefore, we find the muon has 207/151=1.37 times the unified field presence of the electron.

Now, watch this: if we divide 31.5 by 1.37, we get 22.98. 1/22.98 = .0435 or 4.35%. Remember, that is the gap we were trying to find. I just showed you the field numbers it comes from. I have solved the problem with simple math and simple field mechanics.

If you are confused, I will hit it again in a slightly different way, with an even fuller mechanical explanation. The muon must recycle more charge simply because it is bigger. The extra angular momentum allows it to pull more photons into its poles, so that at any given dt, the muon will contain more charge than the electron. Since that charge has a mass equivalence, the muon must "weigh" more. It has more mass, 207 times more. It contains 207 times more photons at any dt than the electron. But in solving problems like the current one, we need to know not just amount of charge, but density of charge. Therefore we have to compare the volume of the muon to the volume of the electron. And we need to know amount of charge and charge density *at the same time*.

You might think the charge density would give us the amount of charge, but it doesn't. Why not? Because we actually have two fields here: the external or ambient charge field, and the internal charge field. Although they are functions of one another, you need both in the equations. This is why you seem to need the mass twice to calculate the particle in the charge field. My readers will have noticed long ago that to calculate the way any body reacts in the charge field, I multiply the body's mass differential by the density differential. I used this several years ago to calculate axial tilts and Bode's law, among other things, so this applies to planets just as much as to muons or electrons. Well, if you break that down, mass times density simplifies to

MD = MM/V

It looks like we are squaring the mass in order to find the unified field presence of a body. In current theory, that doesn't seem to make any sense. But in the unified field it makes perfect sense, because you need to know how that large particle is acting in a field of real smaller particles. So you not only need to know its mass—which it would have in no charge field—you need to know how that mass is affected by the ambient field of photons. The mass by itself tells you how that body relates to other bodies, and the density tells you how that body relates to the charge field. Together, the two terms tell you how one body relates to another body *in the unified field of charge*. You can also think of the mass as the gravity field term in the equation and the density as the charge field term in the equation. This is why the product MD is already a unified field equation.

Using that logic, we found the muon had 1.37 times the unified field presence of the electron. For that reason, it will orbit the proton 1.37 times further away than the electron will. That means its effective charge strength will be 1.37 times *less* than if it were orbiting at the same distance. Therefore, although it would have an emitted charge density 31.5 times that of the electron at equal orbiting distances, at this greater distance, it has only 22.98 times as much charge density.

A few of my readers who have followed me this far still won't understand why that causes a 4.3% change in the radius measurement of the proton. Yes, 22.98 is the inverse of .043, but why am I taking the inverse? If the muon has 22.98 times as much charge as the electron, why don't we find an error of 2,298%? There are several ways to answer that, mathematical and physical, but I will start with the logical. The proton is much larger than the muon or electron, right? That being so, there is no way these smaller particles could cause measurement failures in the proton of 2,298%. To find that, the muon experiment would have to give us a radius of 1 for the proton, while the electron experiment gave us a radius of 2,298. Illogical. So we know the number 22.98 can't be working that way in the equations. Some will say, "Yes, but doesn't taking the inverse imply that the proton is *very much* larger than these smaller particles? The proton is larger than the muon, but not *very much*. Therefore, this taking the inverse seems like an unjustified trick."

What justifies it is that the fields are added, not multiplied. In other words, if you bring the unified field of the muon together with the unified field of the proton, giving one a strength of 10, say, and the other a strength of 80, you don't multiply them together to get 800. You add them, to get 90. And if the two particles are repulsing one another in an interacting field, you subtract them to get 70. In this case, one field *interferes* with the other field. It interferes because they are in vector opposition.

I will show you what I mean by applying it to this problem. We are finding a radius of the proton as measured by the electron of .877, and a radius of the proton as measured by the muon of .841. Well, those numbers should be coming out of an equation with a sum or difference in it, not an equation with a product or quotient. What I mean is, the real radius of the proton is something like .87748, but the electron is shielding 1/1821 of that radius measurement in the equations by interfering charge, so the measured radius is .87748 – .00048 = .877. See, we are subtracting there. That subtraction represents the vector opposition of the real fields.

Since the muon has 22.98 times more charge in this problem, it will shield that much more of the radius measurement, preventing our equations from "seeing" it. This will make the measured radius .87748 – .03818 = .8393. That's how you would get a radius from charge fields, you see. But a shortcut for the estimate allows me to just take an inverse, as I did above. If one field is 22.98 times another one, it will cause a mis-measure here of 4.3%. Hopefully, you now understand why.

What this means is that on top of all the other problems with the current equations, these physicists and mathematicians are also failing to add that baseline error back in. We have seen that although the muon is shielding more of the radius measurement in these experiments, both the muon and electron are shielding some amount. Therefore, the actual value for the proton radius, even using current equations and assumptions, must be some amount *above* .877fm. Since the electron has 1/1821 the charge strength of the proton, that amount of shielded charge must be added back into the equations. In other words, if we could measure the proton radius directly with a near-zero mass and near-zero charged particle like a photon, we would find a radius of the proton of about .877 + .877(1/1821) = .87748.

You may be interested to know that they have moved the CODATA value for the proton radius up in the past three years. What have they moved it up to? .8775fm. Curious, no?

Now that we have solved that, let us go back to my previous claim, that being that the current equations are wrong from the foundations. Using my corrected equations, I have found a radius of the proton of 40.9fm, which is about 46.6 times larger than the current number. How has that huge error occurred?

As I said, it occurred not through experimental error, but only through equation failure. I showed that the fine structure constant has been misunderstood from the beginning. It is not a constant, it is simply an error in the old Rutherford scattering equations from 1909. I showed that the Rutherford equation was written in a wrong form, as a mixed mass and charge equation, giving them the wrong impact parameter. Since the impact parameter was a sort of radius—like the proton or Bohr radius—these radii have been wrong for a century. The Rutherford equation needed a correction in the amount of the fine-structure constant, causing an error in the impact parameter of about 136X. That error has infected the quantum equations ever since, and it still infects the calculation of the proton radius. They are still using the same equations they used more than a century ago. This also applies to the Rydberg constant equation, which is still in exactly the same form it was in a hundred years ago. Although I have shown about a dozen fundamental errors in Bohr's derivation, the equation still stands.

But even if we make that correction in the Rutherford equations, the current proton radius is still different from my radius by 137/46.6 = 2.94 times. That's not such a great amount, but I can still show you where it comes from. In short, there is a whole nest of other problems in the current equations, including a problem with *pi*. We have to replace *pi* with 4 in every instance, and since *pi* is used four times in these equations, we have another correction of $1.273^4 = 2.63$ times. That leaves us with a remaining error of 1.18 times. Since I have shown *e* is wrong by 1/1821 every time it comes up, and since it enters these equations eight times**, the total error from *e* is $1.00055^8 = 1.15$ times. The other .026 error is due mostly to my own rounding errors here.

If we correct the current equations in all the ways necessary, these new experiments spit out completely different numbers for things like the proton radius. Same experiment + different equation=different numbers out. As I say, the proton radius should be 40.9fm. I realize that doesn't appear to work given all the other things we think we know at the quantum level, but all the other things we think we know also have to be corrected in the same amount—which means after all is said and done, we get to keep most of the relative values we currently have at the quantum level. Most relationships won't change. We simply scale the entire quantum level up by around 50 times. I will be told that can't work, but it actually works a lot better than the standard model. By making these corrections, I have shown that I can not only solve these specific experimental puzzles, I can solve the huge physics-ending problems like the vacuum catastrophe, the dark matter puzzle, the superposition and entanglement puzzles, and all the others.

*Although I showed the primary spin value of the third level (meson level) is 1,025, we know from the energy of the real muon that it is occupying the level just above that, or 2 times 1,025. This indicates that the muon was originally spun up from two electrons, or that it has a doubled outer spin for some other reason.

**It enters via the Rydberg constant, which is in the form $R = me^4/8\varepsilon_0^2h^3c$. I have shown the multiple pushes Bohr used to derive that equation here. There you can see that to derive the Rydberg constant, they have to use the energy equation $E = me^4/8\varepsilon_0^2h^2n^2$ twice, which brings *e* into the equations 8 times. Since π is found inside the constant ε_0, it enters the equations 4 times.