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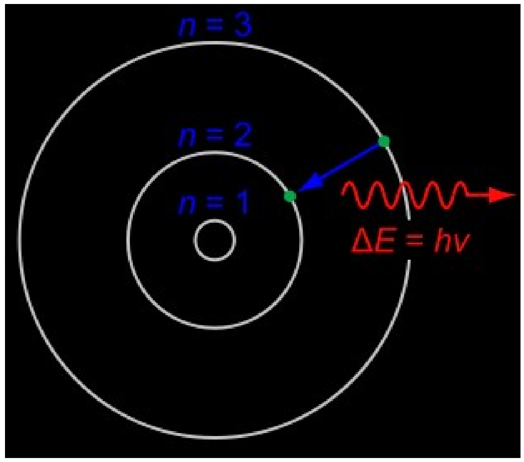
More Problems with Bohr



by Miles Mathis

This paper is a lead-in to an upcoming paper on the Rydberg series. I have recently thrown out all electron bonding theory and electron orbital theory, while creating a new model of the atom and a new diagram of the nucleus. Although my models are already quite convincing, they of course beg a large number of questions. In overhauling a century's worth of theory, one cannot answer all questions at once, and I admit I have left a large number of problems hanging for the moment. I can only promise to get to them as I can. In my mind, the most pressing problem is explaining the cause of the absorption bands and the equations that describe them. But to do that I must first analyze at some length the standing theories. And to do that, I must go back to the Bohr model of the hydrogen atom and his equations which claimed to have explained the Rydberg series and the absorption lines.

I have already written several papers on the Bohr model and equations, so I am not starting from scratch. I have also done some major corrections to the Rutherford scattering equations, and those corrections will serve me well in what is upcoming. But what I would like to do now is go through a recent graduate level textbook, pulling apart the historical equations and assumptions once more. I will use Lawrence Lerner's 1996 textbook *Modern Physics for Scientists and Engineers, volume 2*. I use this particular text because it is available at GoogleBooks, so that my readers may follow along with me. We start on p. 1124, where we are told that a problem with the electron orbital models of the atom before Bohr was that, classically, an electron in orbit must accelerate—and therefore radiate electromagnetic energy continuously. This is contradicted by the data from line spectra. Then we skip ahead to p. 1128, where we hear Bohr's solution to this: the orbits are quantized, and the quantized orbits are stable. When going from one quantized orbit to another, the electron emits a photon of a certain energy. This photon energy corresponds to the energy difference between the two orbits.

Does Bohr answer the question? Not at all. The emitted photon might explain the energy difference between levels, but it doesn't explain how the electron maintains its energy at any one level. Bohr has answered the question simply by ignoring it. *Why is the orbit stable?* Because quantized orbits are allowed, and are therefore stable. Apparently what Bohr means is that orbits are stable because he allows it. Or, he allows you to believe it with no proof.

Now we do the math. We start by comparing the electron in orbit to a planet in orbit. This is interesting because whenever anyone *not* deriving the Bohr equations now makes an analogy like that they are shouted down as fools. But we are told we must make that analogy to follow the derivation in this contemporary textbook. Since newer models are extensions of the Bohr model, what we have historically is a math based on the analogy of the orbit, using potential energy equations and so on, then some updates and pushes to this math, and finally the jettisoning and forbidding of the first assumption. Peculiar, to say the least.

With a planet in orbit, we are told that we can equate the total energy to the potential energy:

$E = ½U$

That comes from the Virial, but it should look odd to anyone with any common sense or any memory. The total energy is half the potential energy? Shouldn't that be $E = 2U$? How can the total energy be less than a constituent energy? Doesn't that contradict the meaning of the word “total”? Plus, it contradicts his next equation

$E = K + U$

For the first equation to be true, K in the second equation has to be $– ½ U$. And the author confirms that:

$K = -E$

But how is the kinetic energy half the potential energy? The kinetic and potential energies should either sum to zero, as with Newton, or they should sum to a total energy that is greater than either. In no case can the potential energy be twice the kinetic energy. That is to ignore Newton's own definition of potential energy. It is energy stored in the relationships. So if kinetic energy is half of potential energy, what is the other half? Just look at the absolute values of each, rather than the vectors. A body in orbit is unconstrained, meaning nothing is keeping it from moving. So why isn't its full potential expressed? Why doesn't its kinetic energy equal its potential energy? The orbit is balanced and stable, so they should balance. If the planet were falling straight into the Sun, the full potential would be expressed, and the kinetic energy would equal the potential energy. This is precisely how the equation is run on an asteriod coming straight down to Earth, in the same textbooks.

$E = K + U = ½mv^2 - GmM/r$

So why are we using the equation $E = ½U$ here?

In fact, we are told that bodies in orbit are “free-falling” in the field, with just an added sideways motion. So why the difference in equations?

I will be told that the planet's tangential motion makes up the difference. The tangential kinetic energy plus the kinetic energy from the gravity field equals the potential. That would explain why K is smaller than U in the equations above, but it doesn't explain the 2. We know that an orbiter doesn't just divide its energy in two like that. Yes, we can assign tangential and centripetal vectors, but they aren't equal. Even more damning to that explanation is that, if true, it means that K in the equations above isn't really the kinetic energy of the orbiter. It is only a part of it. These equations are fudged no matter how you look at it.

Again, that first equation comes from the Virial, and that is why all this is a hash. I have shown that Lagrange's proof of the Virial is pushed with loads of faked calculus. He differentiates constants in order to push his equations where he wants them to go. So this proof is already falsified. But I will go on. Our author then brings in the electric potential near the proton, $V = e/4\pi\varepsilon_0 r$. But that includes Coulomb's constant, since $k = 1/4\pi\varepsilon_0$. I have shown that Coulomb's constant is actually a scaling constant between the atomic level and the level of his pith balls. It is scaling up the local charge to a macro-charge that Coulomb can measure at our level. It is also acting as the unified field scaler, since Coulomb's equation includes the gravity field, also inside the value of k. What this means is k isn't needed here. We are doing our calculations at the quantum level, and not scaling up to our level, so we don't need k. This falsifies this proof once more. I have shown that this mistake is one of the causes of the vacuum catastrophe, if you are interested.

If that doesn't convince you, I will show you a cheat that doesn't require you to read or understand any of my previous papers. Let us look at a different textbook. I will look at *Physics*, by James S. Walker, from 2002, a book I just happen to have on my shelf. On p. 1016, he derives the Bohr equation by telling us that, given the same sort of orbit as above, "the force of attraction between the electron and the nucleus must be equal in magnitude to the mass of the electron times its centripetal acceleration."

$$mv^2/r = ke^2/r^2$$

So let's pull that apart. We must suppose that Walker is intending to compare the centripetal force of the charge field to the centripetal force of a gravity field. But to write that equality, he must assume that the charge field works just like the gravity field. Since the electron has been shown to be very spherical and the nucleus is assumed to be roughly spherical, Walker must be assuming that the charge field falls off with the inverse square as it leaves a sphere, as the gravity field does. But that only works for the point charges of Coulomb, which aren't spherical, they are points. Points are not spherical. It doesn't work for any real bodies, as we know. I will be told that for a sphere of uniform charge, the equation is

$$E = Q/4\pi\varepsilon_0 r^2$$

But that math is a fudge, because we are also told, "The electric field outside the sphere (**r > R**) is seen to be identical to that of a point charge Q at the center of the sphere." We know that isn't true, because it would imply that the spherical shape has no impact on the field. The sphere acts just like a point in that equation. Not only is that illogical, it doesn't match the gravity field to which this is being compared. In Newton's or Einstein's gravity field, a point doesn't act just like a sphere. A sphere emitting a real field must cause a density drop off beyond its surface, simply due to the surface area equation $SA=4\pi r^2$. I have shown that this means that the E/M field must drop off by the fourth power, not the square. This means that Walker's assumption is false. The E/M field is not a straight analogue of the gravity field.

Only if we treat the quantum field as a *unified field* can we use inverse square equations, because the unified field acts as an inverse square equation, as I have shown. Both Newton's equation and Coulomb's equation are unified field equations, and they are inverse square equations. So Walker is partially correct. He is getting his analogy from the historical analogy between Newton's equation and Coulomb's equation, and that analogy is partially true. They are the same equation in different forms, as I have shown. Problem is, his sloppy and incomplete logic ignores several pertinent complications here. One, once we know that Coulomb's equation is a UFE (unified field equation), we have to admit that the quantum field includes gravity, and we have to include that idea in all future computations. QED doesn't do that, of course.

Two, since Walker is using $F = mv^2/r$, instead of $F = GmM/r^2$, his equation has a velocity dependence in it. And if you increase an orbital velocity, you also increase F. But the other side of his equation ke^2/r^2 has no velocity variable in it, so he can't include that variance. In other words, we have no way of representing the electron's orbital velocity. The equation, as it stands, assumes that any velocity of the electron in orbit will give us the same charge. The electron could be going 1m/s or c and it wouldn't matter. But we know that isn't true, either. To start with, ke^2/r^2 is derived from Coulomb's equation, and Coulomb's equation wasn't written for orbiting charges. It was written for static charges. More than that, if Walker is proposing an analogy between a planetary orbit and an electron orbit, then the charge would have to increase as we increased the velocity of the electron. In that sense, Walker's mistake is trying to write an equality between a specific equation and a general equation. The term mv^2/r tells us a specific velocity at a specific radius, so we are being told a specific force. But the term ke^2/r^2 is telling us only the radius. Depending on the speed of the electron, its charge e at that distance r could give us almost any value for F. So the equality is not allowed. The equation is a fudge.

But let us return to the first textbook at Google. In equation 41.7b, the author fudges us again. We have this equation:

$E= -e^2/8\pi\varepsilon_0 r^2$

Isn't it curious that the total energy of the electron is negative? Of course if we study the derivation, that is only because the charge is negative. Since E is not a charge vector or charge entity, E shouldn't be written as negative. But the derivation requires that E be negative, to somehow make the Virial fudge work out. You see we need K to be positive, and from the Virial we found E = -K. So we need E to be negative, so that we get

$K = e^2/8\pi\varepsilon_0 r^2$

That was the desired end of this part of the derivation, and the proof had to be fudged to get it. But physically, or as vectors, how is the kinetic energy of the electron negative to its total energy? Are they opposite in any way? No. They are opposite only to continue the initial illogic of E = ½U.

So we have seen that to get the last equation for K above, the derivation has to be pushed in multiple ways. It includes k where it shouldn't, it starts from a false Virial, and creates negative vectors where there are none.

That was the first half of the fudge. Now let us look at the second. We have the kinetic energy of the orbiting electron, so now we need the energy of the emitted photon, which we are told is hν. Since Planck's constant won't help us, the author suggests replacing it with equivalent dimensions. He lets

nh = (mv)(vt)

He then assigns mv to the momentum of the electron and vt to the circumference of orbit, to get

$nh = mv2\pi r$

Is that not a spectacular fudge? He went from "equivalent dimensions" to an equality! Unfortunately h is not just a pile of dimensions, it is a number too. It is a constant while all these other things are variables. Just think about it. If I say that you and I have equivalent dimensions, does that imply any number equality about us? My height and your height are both measured in inches, say, so therefore my height equals your height? Come on! These equations he is deriving give us number equalities, not just dimensional equalities, so this is a fudge of historic proportions.

But that isn't all. We were expanding h into equivalent dimensions, and h is first said to be part of the energy of the photon, remember? $E = h\nu$? That energy is explicitly assigned to the emitted photon. When the electron emits that photon to make the jump between orbits, the energy change is the energy of the emitted photon, not the energy of the electron. For it to be the energy of the electron, the electron would have to emit itself. Notice that the expanded equation was

$E_f - E_i = h\nu$

The change in energy is the energy of the emitted photon, which means that the frequency ν belongs to the photon, and h is a constant that is modifying that frequency, to give us E. That is what the equation means. So why do they then assign mv to the momentum of the electron? Shouldn't they assign it to the momentum of the photon? The author says it "makes sense" to assign the momentum to the electron, but it makes no sense. It is the opposite of sensible. It is an another blatant fudge.

This becomes crystal clear if you read my papers on the photon and Planck's constant, where I show that the constant is hiding the mass of the photon. There is absolutely no reason to apply this fudged momentum to the electron and every reason to apply it to the photon.

I will be told that the energy can apply either to the electron or the photon, since what the photon takes away, the electron loses. But in that case, mv would have to apply to *the change* in the momentum of the electron during emission, not the momentum of the electron. In the current equations, that is not what the momentum mv stands for. **We insert the *whole mass* of the electron into these equations. We find its entire momentum, not its change in momentum. That one mistake destroys the entire derivation.**

To say it another way, since we are finding a change in the energy of the electron ΔE from one level to another, we should also be finding a change in momentum from one energy level to the other. That would be Δp, not p. Notice that $\Delta p \neq mv$.

Since that is true, the other assignment is equally illogical. If the momentum applies to the photon, then it makes no sense to apply the length to the circumference of orbit. The photon is not orbiting, so why would we make that assignment? This derivation is pushed in every line and in every manipulation.

The next step is juggling the variables to get

$L = mvr = nh/2\pi$

and assigning that to the orbital angular momentum of the electron or the **Bohr quantization condition**. But I have shown that the derivation is completely compromised. That equation is nothing but fluff.

There are further problems in combining this L equation with the K equation above, since the velocity in $½mv^2$ is not the same as the velocity in mvr. One is orbital and one is tangential. One is curved and one is straight. But since I have covered that in many previous papers, I will not repeat the analyisis here. Suffice it to say that the derivation is compromised in at least a dozen places already.

The next step is to apply this to the Rydberg equation. First we rewrite the emitted photon equation as

$(E_j – E_n)/hc = 1/\lambda$

where E_j is the initial level and E_n is the lower level. We then use the equation we just derived $E = me^4/8\varepsilon_0^2h^2n^2$ twice to fill in those energies. That gives us the Rydberg equation with a constant in the form $me^4/8\varepsilon_0^2h^3c$. We are then shown that value is equal to the value of the Rydberg constant R_H. But despite that match to data, we know the equation has been pushed to match the data because I have shown that the m in that constant comes from the momentum mv. Since $(E_j – E_n)$ represents a change in the energy of the electron, mv should represent a change in momentum of the electron. As written, it *can't* represent a change in the momentum of the electron, it can only represent the momentum itself. Therefore the equalities given us above were faked, and the constant has also been faked. Yes, it has been faked very thoroughly to match data to within a sliver, but it is still faked. Because the equations have been so thoroughly pushed, we have no proof or evidence that the emitted photons are what is causing the absorption lines.

If you still don't believe me, let's go back to the equation

$mv2\pi r = nh$

That is equation 41.10a in the online textbook. Let's just see if that equation makes any physical sense. I say it doesn't, because h is at the level of the photon and the rest is at the level of the electron. Without even putting the numbers in, that equation should look suspicious to you. Let's see what velocity for the electron that gives us:

$v = nh/2m\pi r = 2.2 \times 10^6 m/s$

That's c/136.4. Which means several things. The electron should be considerably mass increased at that speed, so why are they using non-Relative equations? The equation $K = ½mv^2$ isn't supposed to work at such high speeds. But they use it anyway. The velocity equation also gives us different velocities for different levels. How do they explain that? But most importantly, given such a speed of orbit implies an incredible acceleration. They still haven't explained how an electron with such an acceleration is stable. They have had almost a century to explain it, and we still get nothing but a dodge into clouds and probabilities.

You should also notice that 136.4 is very near the fine structure constant. That is no accident. They make similar errors here as in other places, and get the same margin of error, which is the fine structure "constant." It isn't a constant, it is a margin of error. It is like a flag on the mistake they are making. The specific error they make over and over is mistaking the energy of the emitted photon for the energy of the electron (see my paper on Compton scattering for more on this).

Since we now know all this math was pushed, we can skip ahead to the end, to see what it was pushed to:

$E = me^4/8\varepsilon_0^2h^2 = (m)2.4 \times 10^{12} = mc^2/37{,}500$
$E = 9mc^2\sqrt{\varepsilon_0}$

What I have done is combine all those constants and variables except m into one value, to see what it is. Then I have let c^2 stand for part of that, to see what is left over. In other words, I assumed they were pushing this equation toward $E = mc^2$, with something left over. I then refilled that something with my own terms, to simplify the equation and make it mechanical. That last equation is my replacement for the Bohr equations. I have shown that all their terms were pushed, so I just threw them out and started over. I replaced them with a much simplified equation that is now also a *unified field equation*.

That is the energy it takes to knock the ground state electron out of hydrogen, and of course it matches their own numbers. It gives us around 13.6eV, just like the old faked equation. But what does it mean? Well, it is a unified field equation, to start with. Why? Because I have shown that ε_0 is standing for the gravity of the proton. It is not the permittivity of free space, since free space can have no characteristics. We have to assign it to a body, and I have shown that the value of ε_0 matches my unified field value for the gravity of the proton. It can be written as either $2.95 \times 10^{-20}m/s^2$, or $8.85 \times 10^{-12}/s^2$, with 1/c as the tranform between the two numbers.

But why the square root? Because the E/M field is changing by the quad as the gravity field is changing by the square. To put both fields in the same UFE, we have to scale gravity to charge. We have to measure both fields over the same time period or dt. To do that, we have to take the square root of the gravity field.

But why the number 9? Because we have circular motion here. The mass we have in the charts is the electron mass at rest. But we are looking for a moving mass or moving energy *in a circl*e. I have shown in my quantum spin equations how and why the moving electron has an energy 9 times the energy of the electron at rest.

A close reader will say, "Didn't you show that a moving electron will increase by 7.22 in that paper, not 9? What gives?" Yes, but that is for an electron with a linear motion. We are looking at circular motion here. For the same reason the electron's energy increases by 9 when it goes from no spin to axial spin, the energy increases by a further 9 when the electron circles in an orbit like this. See that paper and also my papers on *pi* to understand this.

Why multiply the proton's gravity by the electron's moving energy? Because the energy we are finding here E isn't just the energy of the electron. It is the energy that the unified field is using to bind the electron to the proton. E is the energy of the unified field, and it includes gravity. In this case, both charge and gravity are binding: gravity in the usual way, and charge by charge pressure from the outside. The electron is in a charge low near the proton, and it is held there by a surrounding higher charge. So the two fields stack. I have shown that they are not in vector opposition here, as they are at the macro-level. As a matter of mechanics, they are in vector summation, hence the multiplying.

But where is the charge in that unified field equation? The energy of the electron IS the charge energy in the equation, since the motion of the electron is caused directly by the charge field. Anytime you have c^2 in an equation, the charge field is already there, since it is real photons causing the field. I have shown previously that c^2 is a simple transform that expresses the charge field.

Now that I have shown you how to pop a simple unified field equation out of the fudged Bohr equations, we can move on. The first thing to remind you is that I have shown that the electron does not orbit the nucleus. The electron orbits a charge mininum “hole” at the top or bottom of the spin axis of the proton. In alpha particles, the electrons exist inside the alpha, between the stacked protons, orbiting one or other of the axis holes. This explains the first question of this paper, concerning why the electron in any orbit is stable. The current theory can't explain it and must hide it. I can explain it very simply. The charge field existing everywhere—including around the nucleus and in channels through the nucleus—is made of real charge photons. They create a charge pressure that both keeps the orbiting electron from escaping and keeps the orbit energized. The electron is feeding off the charge field all the time. The charge field is causing the orbit in the first place by creating these eddies in the charge field around the nucleus and around the baryons. For this reason the electron can maintain an orbit without any logical problems.

The next thing to answer is how the hydrogen electron can inhabit higher levels, and how these levels create absorption lines. But I will save that for the next paper, in which I recreate the Balmer and Rydberg series with far simpler math and postulates.