Pilot Waves? No.
Charge

by Miles Mathis

Some readers have thought my theory of charge photons is of a piece with the old pilot wave theory of de Broglie. While there are some points of contact, my theory is actually nothing like pilot wave theory, Bohm theory, or the newer theories that emerged from these. In this paper, I will show precisely how my theory is different and why it is better.

I was alerted to this problem by being sent by one of my readers to a Science Channel "Through the Wormhole" edition (the Morgan Freeman hosted series, season 2, episode VI) that included Antony Valentini, a theoretical physicist at Clemson. To start with, these "Through the Wormhole" programs are the perfect example of mainstream pseudo-science, offering no new or good ideas, but only acting as advertising for various insiders and their research projects. I don't know how these things work: how someone like Valentini gets this sort of promotion despite being a "quantum heretic" who "loudly proclaims that physics went off the rails in the 1920's." A couple of decades ago it wouldn't have been possible to hear from a quantum heretic via the mainstream media. The mainstream media was and is set up to prevent heretics in all fields, as we know. And while I don't mind hearing from heretics and agree with Valentini that physics went off the rails about that time, it looks at a glance like Valentini may not be the heretic he is sold as. He may simply be more misdirection.

Valentini seems to be dredging up a bunch of old ideas and trying to jumpstart a dying physics with them. But a closer look shows that these old ideas are as enmeshed in bad theory and math as the physics Valentini is trying to replace. He is just off the rails on a parallel track, in a slightly different color caboose.

To see this, we will look at pilot wave theory, Bohm theory, Bell theory, and finally Valentini theory. Pilot wave theory comes from de Broglie in 1927. At the Solvay conference of that year, de Broglie proposed that waves in the medium "piloted" quantum particles from place to place, explaining the wave-particle duality by giving real characteristics to both particle and wave. Pauli and von Neumann both attacked de Broglie, Pauli regarding the action of the wave in inelastic scattering (collision), and von Neumann on mathematical grounds. De Broglie also had the misfortune to be working with Born, who helped convince him mechanical explanations were not the way to go in the new physics. So de Broglie gave up on his theory, just as Maxwell had given up on vortices and Newton had given up on spinning corpuscles. As Newton had been diverted into cloaking math by the criticisms of Huygens and Hooke, and as Maxwell had been diverted into quaternions by criticisms of Kelvin, de Broglie was diverted into mathematical formalisms by Born, Pauli and the rest.

Fortunately, David Bohm took up de Broglie's cudgels in the 1950's, quickly dispensing with von Neumann's proof that hidden variable theories were impossible (Grete Hermann had shown the flaw in

1935 in a more formal manner, but no one noticed that until the 1980's). Bohm also dismissed the Copenhagen interpretation, attempting to explain quantum interactions in a more direct way.

Then, beginning in the 1960's, John Bell extended some of the work of Bohm, arguing against the main line of quantum theory and especially the interpretations of Bohr and Heisenberg.

Both Bohm and Bell did some good work, and I was interested in their papers in college (1980's). However, even then I was not satisfied with their conclusions, which seemed to me to be only a halfway return to sense. As an example, I was always displeased that Bohm seemed to care no more for visualizations than Bohr. And Bell's theorem was a big step backwards toward von Neumann, since although it brought back hidden variables, it threw out locality. Locality is even more central to a healthy physics than real variables, since without locality all your variables are fudges, hidden or not.

This is the first—and one might the primary—place my theory diverges from that of Bohm-Valentini. In many places I have reminded my readers that we have no evidence of non-locality to this day. Even Wikipedia, the main mouthpiece of contemporary propaganda, admits that.* Until we have absolute proof of non-locality, we should assume locality and continue to try to create a local, realist explanation of the quantum level. The history of every endeavor is littered with those who have said with all assurity that this or that is impossible, often supplying the math and photos to prove it. And history is also littered with people who nonetheless did what was said to be impossible, often just days or months after it was proven to be impossible. For this reason and many others, I have as little respect for Bell's theorem as I have for the Copenhagen interpretation.

In short, Bell's theorem is that quantum physics must violate either locality or definiteness. That is to say, quantum physics must be either acausal or non-deterministic. Either we must allow particles separated by long distances to affect one another instanteously, or we must allow that there are no real objects. Either we must allow the spooky force at a distance, or we must allow the virtual particle-quantum smear-borrowing from the vacuum fudge. Why? Because in Bell's mind there was no other way to explain certain experiments.

Not only is Bell's theorem absolutely unacceptable as a physical postulate, it has been directly disproven. *I* have directly disproven it by showing a real, local, visual explanation of superposition and entanglement and all the other quantum mysteries. Using simple math and diagrams, I have explained the old problems, often using spin to do it. The fact that I use spin to solve these problems is important here, because it is spins that also explain pilot waves, duality, and all the rest. Spins not only dissolve Bell's inequality, they dissolve the entire field problem of quantum mechanics. They also explain the empty wavefunction, as I show below.

[You may now also consult my newest paper on quantum nonlocality, where I actually correct and extend the wavefunction, disproving nonlocality in the most direct way possible.]

So, although I am quite happy that Valentini is publicly espousing realism, determinism, and causality, and am thrilled that he is attempting to falsify string theory, I cannot allow him the fudges he is keeping, the most horrible of which is signal nonlocality. If he can use quantum entanglement as a stand-alone communication channel, he can basically bypass all rules of logic, rigor, and physicality. That one fudge is as bad as any virtual fudge by Feynman or borrowing from the vacuum of Weinberg or other-dimension fudge of Hawking.

My question to the new heretics like Valentini is why they don't just embrace logic and rigor at all

points. Why would a theoretical physicist make a stand for reality, causality, and determinism, and yet let locality go? It doesn't make sense to me. It would be like a father remembering his love for his family—after decades of drunkenness and whoring—and returning to the old manse for a reunion. Once there, we see him wax eloquent about his newfound principles, rail against a society that would allow or encourage such dissolution, and attack the reprobates who are still flopping around in the houses of sin. We then see him kiss his wife, his daughter, his old hound-dog, and the family cat. But when his son enters the room, the father throws a chair at him and orders him from the house. This is what Valentini has done to locality, ones of the sons of the house of physics.

But let us return to pilot waves. The theory of pilot waves looks at first like a younger, uglier sister of my charge field theory, and that is simply because the pilot waves are an early attempt to give form to data was known to be there. De Broglie's pilot waves aren't even the first such attempt, since Slater had already proposed a similar theory in 1924, as part of the so-called BKS (Bohr-Kramers-Slater) model. Slater's theory is also a pilot wave theory, since the particles are guided by E/M field waves. The experiments of the time were already showing that this was roughly how it worked, and the theorists could see that some such mechanism was beneath the data. But they couldn't make it match the math of the time. They also couldn't get their models past Bohr and his students like Pauli, who, because of their strong personalities, had taken control of theoretical physics. Bohr was the gatekeeper of all theory at the time, and he had a genetic predisposition against mechanical or visual theories (as did Heisenberg). So all attempts to model quantum interactions were kept in committee by Bohr and his allies.

That said, there *were* problems with these early models, and these problems may have kept the theories from wider acclaim even without Bohr's influence. These models didn't catch on later, and it is because they were never properly fleshed out until I came along to draw them. The problem with any pilot wave is the problem Valentini still has at his ground level: how does the particle create the wave, or the reverse? According to all pilot wave theory, the wave function *is not influenced* by the particle. This means that the wave and particle are completely separate entities, which means that the wave is an ambient field wave with no known cause. As a question of both metaphysics and physics, this is a theory-ender. In pilot wave theory, we have particles (for which we have lots of evidence) being led by waves (for which we have only indirect evidence). Even worse, it is these uncaused waves that are primary. The wavefunction is assigned to the waves, obviously, so the waves are the cause of all motion and interaction. So we have secondary characteristics (waves) leading primary characteristics (particles).

Let me expand on that idea. We can see how particles might have waves or cause waves. Particles can vibrate or spin, and this will cause waves in a field. But how can waves have particles? That is what the pilot wave theory is basically telling us: that waves have particles. The particle is just a tag-along of the wave, a wave characteristic. That is topsy-turvy. It is both illogical and counter-intuitive. In all our experience, a wave cannot be a primary characteristic. A wave is created by a particle or field of particles, not the reverse. In water, a wave is the motion of a field of particles. Sound likewise. So how can a wave create a particle in the case of light?

This is the question that de Broglie could not answer. This is the problem that was always greater than any problem of collision or mathematical impossibility. If the particle is not creating the wave, what is?

I have been able to answer this question directly. Charge photons are creating this wave. Quanta are not being piloted by waves, they are being piloted by charge photons. And the photons are not pushing

the quanta with their waves, they are pushing by straight collision. Quanta are being driven by photon wind. Yes, the charge field has waves, but even then they are not field waves. They are spin waves. We know that light does not move via an ether, so we can have no field waves here of that sort. All the waves in the data and math are caused by photons with real spin and radius. It is this radius of the photon and the stacking of spins that causes both the waves and the quantization, as I have shown in many previous papers.

[See newer papers where I show precisely how the wavefunction applies to the photon, not to the electron. It applies to the charge field, not the E/M field.]

The only analogue to a field wave we have at the quantum level is the neutrino, which is a field wave in the charge field, moving at c. But that isn't what we are seeing in the wavefunction or in the normal motions of the quantum charge wind. The waves we are detecting in most quantum experiments are stacked photon spins, not neutrino field waves. Slater and de Broglie were not seeing neutrinos or any other *field* waves in the data, they were seeing real photons spins. They were seeing quanta being pushed by a photon wind.

I said above that I would be able to explain the empty wavefunction, and I will do that now. The empty wavefunction is not really empty, it is just a charge field without any quanta (ions) to push around. The charge field is not created by matter. Although it is recycled by what we now call fermions, it exists with or without fermions. Photons do not require the presence of other matter. Charge density is increased by the presence of other matter, since concentrations of matter tend to attract photons. But even nearly empty space will have photon traffic, as we know. What we don't seem to know is the baseline density of that traffic. It is far above what we have thought. Because most photons are dark to us, and because we have no way to measure photon traffic in the absence of ions, we have not understood that this baseline is very high. I have shown how to calculate this baseline straight from the fundamental charge, showing that what we call dark matter is actually photonic matter. I first unveiled this calculation in my paper analyzing MOND:

$e = 1.602 \times 10^{-19}$ C
$1C = 2 \times 10^{-7}$ kg/s (see definition of Ampere to find this number in the mainstream)
$e = 3.204 \times 10^{-26}$ kg/s

If we divide that last number by the proton mass, we get 19, which means that charge outweighs baryonic matter by 19 to 1, or 95%. That is the current number for dark matter.

This means that the empty wavefunction is just another measurement of the charge field. It is telling us we have charge with no particle to lead around. That is now easy to understand, given the charge field, which is real photons. The empty wavefunction is real charge photons with no ions. This is how charge is transmitted across "empty" space at the speed of light. Charge *is* light.

With all that in mind, we can go back even further than de Broglie and Slater, to see why both men had such trouble getting serious attention for their models. I have said that Maxwell gave up on his vortex theory after criticism from Kelvin. But Kelvin later came up with a vortex theory of his own. With Tait, he developed what has variously been called a knot theory or a vortex theory to explain not only

the atom but other quantum particles and events. Because this theory seemed to depend on an ether, it was said to have been killed by Michelson in the 1880's. Via Poincaré, knot theory moved into topology in the early decades of the 20th century, but it was no longer pushed in quantum physics. We now see how this dovetails with BKS and pilot theory, because on closer inspection they both seem to rely on an ether in the same way as knot and vortex theory. If you don't have an ether, you have no way to explain the transmission of the pilot waves. Slater tried to gloss over this problem by staying strictly mathematical, but it didn't work. The question had been too recently begged and it was a scab that had not healed. Bohr spotted it immediately, and if he hadn't many others would have. Vortex theory, like BKS theory, had to be dismissed.

Some have tried to paint over my charge photons with the same brush they painted over Kelvin, Tait, Slater, and de Broglie, but the paint will not adhere. It won't adhere because my theory is well-oiled with mechanics. I have been able to introduce spins in my nuclear models precisely because I have given the quantization and the wavefunction to the photons underneath. Because my larger quanta are driven by photons, I have no ether to explain at the level of the electron, proton, or nucleus. Protons and the nucleus don't spin relative to or via the ether, they spin via charge photons, which are real. So the old arguments don't work against me at that level. Then we come to photons, the level below that. Again, my charge photons don't fall to the old ether or quantum arguments because nothing they do requires any ether. My charge photons don't travel via an ether. All the waves in my quantum theory come from the real spins of real particles, not from traveling as waves in a field. In other words, the wave in my quantum theory belongs to each individual photon, and is a real motion of that particle. And photons spin from their own collisions, not from the influence of an underlying ether. This bypasses all the philosophical quibbling of the 20th century.   Because I give the spin to a real particle in a mechanical field—rather than to an undefined math or poorly defined ether—my theory succeeds where the others failed.

Beyond that, I have destroyed most of the math and theory that was used to dismiss vortices and knots and so on, including the Michelson experiments. I don't require an ether, but Michelson would not stop me if I did. I have shown that Michelson's experiment was poorly prepared and misread. It could not have detected an ether if there were one. Michelson's set-up guaranteed a null outcome, as did the experiments of Eotvos and Dicke.   I have also re-read many other experiments in a direct, simple, real, and visual way, including Stern-Gerlach, Pound-Rebka, the Compton scattering experiments, the Rutherford experiments, and many others. I have done a total rewrite of the Bohr equations and the Schrodinger equation as well, which gives my opponents no place left to sit down.   It no longer matters whether my theory matches old math and assumptions, since that math and those assumptions have been shown to be false.

Now let us take a look at another part of the work of Valentini, continuing the work of Bohm. A central pillar of Bohm's theory is quantum non-equilibrium. "Non-equilibrium" just means there is no equality between the probability density function and the square of the wavefunction.   Born first interpreted the amplitude of the wavefunction to be the probability of finding a particle in a given location. This interpretation is called the Born rule, and it is treated as a sort of mathematical equality. Well, Bohm tells us that the Born rule is just an unproved assumption and that there is no equality between the probability density function and the square of the wavefunction.   More recently, Valentini has backpedalled into "relaxation," where the probability density function "falls" into the wavefunction sort of like the wavefunction collapses into reality. But we will ignore that and look at Bohm's original

idea.

If we go back before Bohm, we find that other top physicists also disagreed with Born and the Born rule. Schrodinger never agreed with Born's explanation of equilibrium, and neither did Einstein or Planck. None of them ever agreed with the Born rule, pointing out that it was never a rule, but only a bad guess. Karl Popper, the top physical philosopher at the time, also came down on the side of Einstein and Schrodinger and Planck.

Given what we now know about the charge field, what can we say about equilibrium and the Born rule? Well, since I have shown that Bohr made a basic error in his math, conflating the momentum of the electron with that of the photon, we know the wavefunction actually applies to the photon. For this reason alone, the Born rule totally evaporates. Since Born applied the probability density function to the probability of finding a particle in a certain place, we cannot give the place to the electron and the wavefunction to the photon. If the wavefunction goes to the photon, the probability has to go with the photon also. Even if Born were correct about the number equality, the density function would have to be telling us the probability of finding the photon in that place, not the electron.

But, as Schrodinger correctly saw, both the wavefunction and the probability density apply to the charge density. What this means is that the probability density isn't the probability of finding *any* particle at any place. It is the actual density of photons necessary to cause the given wavefunction. In other words, the wavefunction applies to the photon, and it it is telling us nothing about the probability of finding an electron. It is telling us a density, not a probability. The probability math was attached to the density after the fact, so of course it matches it; but even with this created number equality, there is no equilibrium. We don't have a field equality, or even a mathematical equality, we just have probabilities pushed to match data, since that is what that sort of math does. That is neither an equality nor a rule. It is fitted math, where one side of the equality is manufactured to fit the other.

And this means that we have been the witness to another tempest in a teapot. Both sides were wrong because both sides didn't have any mechanics. Born was correct about the equilibrium (the number equality), but wrong about the mechanics. Bohm was wrong about the equilibrium, but right that Born was wrong about the mechanics.

Notice that Bohm, like de Broglie, is arguing for a pilot wave theory. Since the wave is now outside the particle and leading it, the wavefunction must apply to the wave, not the particle. That is sometimes admitted but rarely analyzed. To give the wavefunction to a wave that is not part of the particle, or even caused by it, confirms my correction to Bohr's equations, and to Schrodinger's as well. Remember, I showed that Bohr had conflated the photon's momentum with that of the electron, compromising all his math. Well, that has never been corrected until I corrected it. Schrodinger didn't correct it. The Schrodinger equation rests upon Bohr's bad math. *But Bohm didn't correct any of that, either.* He gave the wavefunction to the pilot wave—how could he not?—but he didn't point to the proper line in the Bohr derivation to justify it. He didn't rewrite any of the equations, he simply re-interpreted some of them.

This is curious, because it must influence the equilibrium arguments. I have shown how it destroys the Born rule, but it also destroys the Bohm non-equilibrium. As I just pointed out, the wavefunction cannot apply to the waves while the probability density applies to the particle. Since both are parts of the same set of equations, the variables must apply to the same things. The probability amplitude is a parameter of the wavefunction, and by moving the wavefunction off the particle **you must move the amplitude off as well.** Once you have done that, I think we all agree there are more important things

to study than equilibrium. We have to start over completely, and re-define the entire argument. We have to ask different questions, so of course we will get different answers.

But why did Bohm ever want non-equilibrium (beyond showing Born was wrong about something)? Unfortunately, the answer is to create a fudge. The non-equilibrium, if real, would have allowed a mathematical formalism tied to non-locality, and that formalism would have explained the collapse of the wave function, entanglement, and other mysteries. In other words, if you deny the number equality of the Born rule, you create a gap in data that you can then exploit. You can squeeze some new math and theory into that gap. That is precisely why Valentini is still pursuing non-equilibrium or relaxation. Either one can give him a slippery math which, with non-locality, can explain some of the old mysteries of quantum mechanics. By following a trick of Bohm, Valentini has pried open a gap and inserted non-locality into it. He can then squirt his oily entanglement math in the gap to fill it.

However, since I have explained these mysteries in a more direct fashion, we don't need these mathematical tricks. I consider it a major black mark against Bohm, Bell, and all their followers, that they would expose old fudges only to replace them with their own. Nor is this just a mathematical error. We all make mistakes of math. This is the overt use of non-locality to cheat. For decades that cheat was too gruesome even for Born and Pauli and those guys. The fact that a "straight shooter" like Bohm would stoop to use it may have signaled all the others that it was a fair push from then on. The timeline certainly supports that, since after Bohm the gates were let down in theory. Soon after that, Feynman and Schwinger went wild, as did Gell-Mann and all the other top dogs of the 1960's. Einstein's death in 1955 also contributed to this anything-goes attitude, no doubt, but Bohm's embrace of non-locality must also be seen as decisive.

To see another way I have explained all this directly, we may look at the *hidden variables* of Bohm and Valentini. Although my theory agrees with theirs in that these variables behind quantum events must be there and be real, in my equations the variables are no longer hidden. I have pulled them out of the dark and assigned them to real charge photons. By giving my real photons real size, mass, spin, and chirality, I have directly assigned a whole new set of quantum numbers. By working backward from the known equations of the quantum field and the classical E/M field—and by making simple corrections to them—I have been able to calculate directly the electron radius, the photon radius, and the radius of the stacked spins. Using old constants like G and k, I have found the mass of the photon as well as the quantum spin equation that unifies all the quantum particles. This has allowed me to correct the Bohr radius, to find gravity at the quantum level, to explain the fine structure constant, to unify the field, and to solve the vacuum catastrophe.

Given that, the work of these new "heretics" like Valentini doesn't look so heretical. From my vantage, it all looks pretty tame and status-quo. Beyond questioning the reality of the quantum level, Valentini questions very little of current theory. And with some more research, bigger questions arise, such as Valentini's real connection to the power structure. Not only is Valentini privileged to appear in slick and expensive TV productions like this one on the Science Channel, he is also a scholar at the Perimeter Institute in Canada, which I have learned to read as a red flag. The government of Canada is now funding Perimeter to the tune of 127 million a year or more, and hiding that funding in accounting to Parliament**, so we may assume that more than just philanthropy and "charitable" research is going on there. This while general funding for science has been slashed in Canada due to the worldwide budgetary crisis. Gary Goodyear, the minister for Science and Technology, has overseen budget cuts

in his department of around 150 million per annum, and yet the funding for Perimeter has grown year by year in that same time. Also curious to find Goodyear, a creationist Christian, loudly defending Perimeter in Parliament. Also curious that Perimeter seems to be such a funding concern of conservatives in Canada. If Canada works anything like the US, we must read such evidence as indication the military is involved, or the intelligence community. This would mean that "Through the Wormhole," like Hawking's Brave New World, is mainly another propaganda series, created to channel more taxdollars into domestic spy programs and homeland gestapos.   This would make Valentini just another darling of the New World Order Nazis, not a physics heretic. Of course it is possible he is just being used as cover, and doesn't know what is going on. It is also possible that all these people are using fake physics as a cover on purpose, and that while down the hole they aren't studying quantum mechanics at all. If they were actually studying quantum mechanics, as they tell us, it seems they would have discovered something in 80 years besides new ways to fudge equations.

*See the page for Bell's theorem.
**http://www.cbc.ca/news/politics/story/2011/10/31/pol-funding-perimeter-institute.html